

APPENDIX N

Updated Traffic Impact Study Attachments

VI. APPENDICES

The following sections provide information on the traffic data collection, study methodology and assumptions, and printouts of the following worksheets:

- Raw traffic count data
- Alternative C trip generation information
- Levels of service
- Signal warrants

A. TRAFFIC DATA

According to the Caltrans Guide for the Preparation of Traffic Impact Studies, one of the common rules for counting vehicular traffic is:

“Vehicle counts should be conducted on Tuesdays, Wednesdays, or Thursdays during weeks not containing a holiday and conducted in favorable weather conditions.”¹²

Table 101 shows the dates and days the Existing 24-hour segment and peak hour intersection counts were collected for this Project. Prior to conducting these counts it was verified that these were non-holiday weeks. The Appendices section Attachment VI – C - 53 contains copies of all the raw count data collected for this analysis.

TABLE 101: EXISTING SEGMENT AND INTERSECTION COUNTS DAYS AND DATES COUNTED				
Segments	Day		Date	
Madera Site (Alternative A, B, C)				
Avenue 18 ½ - Road 24 to Road 23	Tuesday		6/24/08	
Road 23 – Avenue 18 ½ to Avenue 17	Tuesday		6/24/08	
Avenue 17 – Road 23 to SR 99	Tuesday		6/24/08	
Avenue 17 – SR 99 to Road 27	Tuesday		6/24/08	
Golden State Boulevard – Avenue 17 to Avenue 18	Tuesday		6/24/08	
Intersections	AM Peak Hour		PM Peak Hour	
	Day	Date	Day	Date
Madera Site (Alternative A, B, C)				
Avenue 18 ½ at SR 99 SB off-ramp / Road 23	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 18 ½ at SR 99 NB Ramps	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 18 ½ at Pistachio Drive	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 18 ½ at Golden State Boulevard	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 18 at Road 23	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 17 at SR 99 SB Off-ramp	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 17 at SR 99 NB Ramps	Tuesday	6/24/08	Tuesday	6/24/08

¹² *Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, June 2001, page 4.

TABLE 101: EXISTING SEGMENT AND INTERSECTION COUNTS DAYS AND DATES COUNTED				
Intersections	AM Peak Hour		PM Peak Hour	
	Day	Date	Day	Date
Madera Site (Alternative A, B, C)				
Avenue 17 at Golden State Boulevard / Airport Road	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 17 at Road 23	Tuesday	6/24/08	Tuesday	6/24/08
Ellis Street at Road 26	Thursday	6/26/08	Thursday	6/26/08
Avenue 16 at Schnoor Avenue / Golden State Boulevard	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 16/Avenue 16 connector at SR 99 NB ramps	Wednesday	6/25/08	Wednesday	6/25/08
Avenue 16 at SR 99 NB ramp connector	Wednesday	6/25/08	Wednesday	6/25/08
Gateway/Avenue 16 at SR 99 NB ramps	Wednesday	6/25/08	Wednesday	6/25/08
Avenue 16 at SR 99 SB Ramps	Wednesday	6/25/08	Wednesday	6/25/08
SR 99 NB Ramps at Cleveland Avenue / Avenue 15 ½	Wednesday	6/25/08	Wednesday	6/25/08
SR 99 SB Ramps at Cleveland Avenue / Avenue 15 ½	Tuesday	6/24/08	Tuesday	6/24/08
Avenue 15 ½ at Road 23	Tuesday	6/24/08	Tuesday	6/24/08
SR 99 NB Ramps at SR145 / Madera Avenue	Wednesday	6/25/08	Wednesday	6/25/08
SR 99 SB Off -Ramp at Olive Avenue / Avenue 14	Wednesday	6/25/08	Wednesday	6/25/08
SR 99 SB On-Ramp / Olive Avenue / Avenue 14 at SR 145	Wednesday	7/9/08	Wednesday	7/9/08
Avenue 14 at Road 23	Wednesday	6/25/08	Wednesday	6/25/08
Avenue 12 / Golden State Boulevard at SR 99 SB Ramps	Wednesday	6/25/08	Wednesday	6/25/08
Avenue 12 at Golden State Boulevard / Road 29	Wednesday	6/25/08	Wednesday	6/25/08
Avenue 12 at SR 99 NB Ramps	Wednesday	6/25/08	Wednesday	6/25/08
North Fork Site (Alternative D)				
SR 41 at SR 145	Wednesday	7/9/08	Wednesday	7/9/08
SR 41 at Road 200	Wednesday	7/9/08	Wednesday	7/9/08
SR 41 at Thornberry Road	Tuesday	7/8/08	Tuesday	7/8/08
SR 41 at SR 49	Tuesday	7/8/08	Tuesday	7/8/08
Road 274 (Malum Ridge Road) at Road 225 (Mammoth Pool Rd)	Tuesday	7/8/08	Tuesday	7/8/08
Road 225 (Mammoth Pool Road) at Cascadel Road	Tuesday	7/8/08	Tuesday	7/8/08
North Fork Road at Auberry Road	Tuesday	7/8/08	Tuesday	7/8/08
North Fork Road at Crane Valley Road	Tuesday	7/8/08	Tuesday	7/8/08
Cascadel Road at Mission Drive (Federal Road 209)	Tuesday	7/8/08	Tuesday	7/8/08

SR = State Route

B. METHODOLOGY AND ASSUMPTIONS

This TIS was prepared to assess the existing and projected traffic conditions resulting from the development of the North Fork Casino Project in Madera County. In order to prepare the traffic evaluation for the Project, a variety of data and technical assumptions had to be developed. This section describes the various data and technical assumptions that were used in this study. The sources used in this study can be found in the Introduction section III – H.

Scenarios

The scenarios that were analyzed for this study include:

- Existing (2008) Traffic Conditions (Without Project)
- Opening Day (2010) No Project Traffic Conditions (Without Project)
- Opening Day (2010) Project Traffic Conditions (With Project)
- Mitigated Opening Day (2010) Project Traffic Conditions (With Project)
- 2030 No Project Traffic Conditions (Without Project)
- 2030 Project Traffic Conditions (With Project)
- Mitigated 2030 Project Traffic Conditions (With Project)

The Opening Day (2010) No Project/Project and 2030 No Project/Project scenarios reflect cumulative conditions analysis.

Study Locations

Madera Site (Alternative A, B, C)

The Madera County Resource Management Agency, Road Department, and the City of Madera initially identified the following study segments and intersections to be analyzed for the Madera Site location:

Segments

County of Madera

- Avenue 18 ½ - Road 24 to Road 23
- Road 23 – Avenue 18 ½ to Avenue 17
- Avenue 17 – Road 23 to SR 99
- Avenue 17 – SR 99 to Road 27
- Golden State Boulevard – Avenue 17 to Road 23
- Road 26 – Ellis Street to Avenue 18 ½
- Road 26 – Avenue 18 ½ to Avenue 21
- Avenue 19 – Avenue 18 ½ to Road 24
- Avenue 20 ½ – SR 99 to Road 26
- Road 24 – Avenue 18 ½ to Avenue 19
- Road 24 – Avenue 19 to Avenue 20 ½

City of Madera

- Road 23 – Avenue 12 to Avenue 17
- Avenue 14 – SR 145 to Road 23
- Avenue 13 – SR 145 to Road 23

- Avenue 12 – SR 145 to Road 23

Intersections

County of Madera

- Avenue 20-20 ½ at SR 99 SB ramps
- Avenue 20-20 ½ at SR 99 NB ramps
- Avenue 18 ½ at SR 99 SB ramps/Road 23
- Avenue 18 ½ at SR 99 NB ramps
- Avenue 17 at SR 99 SB ramps
- Avenue 17 at SR 99 NB ramps
- Avenue 12/Golden State Boulevard at SR 99 SB ramps
- Golden State Boulevard at Avenue 12
- Avenue 12 at SR 99 NB ramps
- Avenue 18 ½ at Road 24
- Avenue 18 ½ at Road 26
- Avenue 18 at Road 23
- Avenue 17 at Road 23
- Avenue 17 at Golden State Boulevard
- Avenue 17 at Road 27
- Ellis Street at Road 26
- Avenue 19 at Road 24
- Avenue 20 ½ at Road 22
- Avenue 20 ½ at Road 24
- Avenue 21 at Road 26
- Avenue 12 at SR 145
- Avenue 7 at SR 145

City of Madera

- Avenue 12 at Road 23
- Avenue 14 at Road 23
- Avenue 15 ½ at Road 23
- SR 145 at Tozer Street/Road 28
- SR 99 NB ramps at Cleveland Avenue/Avenue 15 ½
- SR 99 SB ramps at Cleveland Avenue/Avenue 15 ½
- SR 145 at Olive Avenue/Avenue 14
- SR 99 NB ramps at Olive Avenue/Avenue 14
- SR 99 SB off-ramp at Olive Avenue/Avenue 14
- SR 99 SB on-ramp at SR 145
- SR 145 at Avenue 13
- SR 145 at Avenue 12
- Avenue 16 at Condor Road

Per County direction, “the Traffic Study should be based on the Madera County Regional Transportation Model”, and segments and “intersections may be removed from the analysis if trip assignment would reasonably expected to result in a capacity reduction of less than 1 percent”. To determine which segments and intersections should be analyzed, TPG ran the MCTC Model and overlaid the Model select zone results with the estimated Project trip generation. Based on the Model

select zone/trip generation results and discussions with County and City of Madera staff, the following City and County segments and intersections were ultimately analyzed for the Madera Site:

Segments

County of Madera

- Avenue 18 ½ - Road 24 to Road 23
- Road 23 – Avenue 18 ½ to Avenue 17
- Avenue 17 – Road 23 to SR 99
- Avenue 17 – SR 99 to Road 27
- Golden State Boulevard – Avenue 17 to Road 23

Intersections

County of Madera

- Avenue 18 ½ at SR 99 SB ramps/Road 23
- Avenue 18 ½ at SR 99 NB ramps
- Avenue 17 at SR 99 SB ramps
- Avenue 17 at SR 99 NB ramps
- Avenue 12/Golden State Boulevard at SR 99 SB ramps
- Avenue 12 at Golden State Boulevard/Road 29
- Avenue 12 at SR 99 NB ramps
- Avenue 18 at Road 23
- Avenue 17 at Road 23
- Avenue 17 at Golden State Boulevard
- Ellis Street at Road 26
- Avenue 18 ½ at Pistachio Drive
- Avenue 18 ½ at Golden State Boulevard/Road 23

City of Madera

- Avenue 15 ½ at Road 23
- Avenue 14 at Road 23
- Avenue 16 at Schnoor Avenue/Golden State Boulevard
- Avenue 16 at SR 99 NB ramps
- Avenue 16 at SR 99 SB ramps
- SR 99 NB ramps at Cleveland Avenue/Avenue 15 ½
- SR 99 SB ramps at Cleveland Avenue/Avenue 15 ½
- SR 99 NB ramps at SR 145/Madera Avenue
- SR 99 SB off-ramp at Olive Avenue/Avenue 14
- SR 99 SB on-ramp/Olive Avenue/Avenue 14 at SR 145
- Avenue 16/Ellis Street at Golden State Boulevard
- Avenue 16/Ellis Street at SR 99 SB ramps
- Avenue 16/Ellis Street at SR 99 NB ramps

Please note that the initial minimum peak hour trip threshold for including an intersection location was 50 peak hour 2-directional trips. However, several intersections that were showing less than 50 peak hour 2-directional trips were included in the analysis due to agency concerns.

In addition to the County and City study locations, Caltrans requested that the following freeway locations be analyzed for the Madera Site:

- SR 99 north of Avenue 18 ½
- SR 99 between Avenue 18 ½ and Avenue 17
- SR 99 south of Avenue 17

Queuing analyses were also prepared for the following Madera Site locations based on the level of service calculations:

- SR 99 NB off-ramp at Avenue 18 ½
- SR 99 SB off-ramp at Avenue 18 ½
- SR 99 SB off-ramp at Avenue 17
- SR 99 NB off-ramp at Avenue 17
- SR 99 NB off-ramp at Avenue 16
- SR 99 SB off-ramp at Avenue 16
- SR 99 NB off-ramp at Avenue 15 ½ / Cleveland Avenue
- SR 99 SB off-ramp at Avenue 15 ½ / Cleveland Avenue
- SR 99 NB off-ramp at SR 145/Madera Avenue
- SR 99 SB off-ramp at Avenue 14/Olive Avenue
- SR 99 SB off-ramp at Avenue 12/Golden State Boulevard
- SR 99 NB off-ramp at Avenue 12
- Avenue 17 between the SR 99 SB off-ramp and Golden State Boulevard

North Fork Site (Alternative D)

TPG and AES staff identified the following study intersections to be analyzed for the North Fork Site location with review and approval of the two appropriate commenting agencies (County of Madera, Caltrans):

- SR 145 at SR 41
- SR 41 at Road 200
- SR 41 at Thornberry Road
- SR 41 at SR 49
- Malum Ridge Road at Road 225/Mammoth Pool Road
- Road 225/Mammoth Pool Road at Cascadel Road
- Cascadel Road at Mission Drive/Federal Road 209
- North Fork Road at Auberry Road
- North Fork Road at Crane Valley Road

Analysis Time Periods

According to *Transportation Impact Analyses for Site Development*, the overall purpose of a traffic impact study is to determine the project impacts that are likely to occur to the surrounding street system. In order to accomplish this purpose you need to determine what occurs when the peak of the project generated traffic overlays the peak of the street traffic. *Transportation Impact Analyses for Site Development* states that “the peak periods [of the adjacent street and highway system] are generally the weekday morning (7-9 a.m.) and evening (4-6 p.m.) peak hours, although local area characteristics occasionally result in other peaks (e.g., at major shopping or recreational centers)”, and

that the peaking characteristics of the adjacent street and highway system should be determined from available traffic count data. Per discussions with County of Madera, City of Madera, and Caltrans staff, the following peak of the street traffic times were chosen for analysis:

- 7:00 to 9:00 AM
- 4:00 to 6:00 PM

These are also the standard peak of the street hours typically used for study in the County and City of Madera.

Madera County Traffic Model

Background

According to the Madera County Transportation Commission (MCTC) website, "MCTC is the Regional Comprehensive Planning Agency, Regional Transportation Planning Agency (RTPA), the Metropolitan Planning Organization (MPO), and the Local Transportation Commission for Madera County. MCTC's role is to foster intergovernmental coordination; undertake comprehensive regional planning with an emphasis on transportation issues; provide a forum for citizen input into the planning process; and to provide technical services to its member agencies.

As a RTPA, MCTC is responsible for developing and maintaining a microcomputer-based traffic simulation model that represents Madera County. The current Model was developed to analyze proposed land uses, circulation systems, and air quality and covers the entire Madera County area, as well as portions of Fresno, Merced, and Stanislaus counties.

The Model is actually comprised of three (3) separate models:

- Madera County 2030
- Madera County City of Madera Cumulative 2030
- Madera County Rio Mesa 2030

The Madera County City of Madera Cumulative 2030 Model is a land use enhanced version of the Madera County 2030 Model that includes the following cumulative land use projects:

- Foxglove & Schnoor (Felcnd/Zinkin Commercial- APN 13-160-06&16)
- Area 2 (CAT 17, APN 38-040-02)
- Area 3 (Madera Town Center, APN 33-040-01)
- Area 4 (Bratton, APN 13-010-13)
- Area 5 (Gottschalks, APN 13-010-34)
- Ranchwood

Likewise, the Madera County Rio Mesa 2030 Model is a land use enhanced version of the Madera County 2030 Model that includes 2030 population and employment forecasts for the following southeast Madera County land use projects:

- Kesterson
- Urretia
- Freels
- McCaffrey
- Sumner Ranch
- Combs
- Gunner East

- Riverbend Ranch
- Jim Cobb
- Gateway Village
- Rolling Hills, et. al.
- Dunmore Homes
- Gunner West

Project Model Use

The Madera County City of Madera Cumulative 2030 Model was used in this study to develop several pieces of information for use in the Alternative A, B and C analyses. This information included:

- Project primary (new) trip distribution
- Pending/Proposed Project trip generation/distribution for those projects not yet fully defined
- Approved/Pending/Proposed Project primary (new) trip distribution for those projects with more thorough definitions
- Opening Day (2010) No Project/"0" Project growth increments
- 2030 No Project/"0" Project growth increments

The Project primary (new) trip distributions, the pending/proposed project trip generation/distribution data, and the approved/pending/proposed project primary (new) trip distribution data were created using the 2030 model year, while the Opening Day (2010) and 2030 growth increments were created using the 2000 and 2030 model years.

The Madera County Rio Mesa 2030 Model was used in this study to develop several pieces of information for use in the Alternative D analyses. This information included:

- Project primary (new) trip distribution
- Pending/Proposed Project trip generation/distribution for those projects not yet fully defined
- Opening Day (2010) No Project/"0" Project growth increments
- 2030 No Project/"0" Project growth increments

The Project primary (new) trip distributions, and the pending/proposed project trip generation/distribution data were created using the 2030 model year, while the Opening Day (2010) and 2030 growth increments were created using the 2000 and 2030 model years.

Project Model Adjustments (Approved, Pending, Proposed Land Use Projects)

Residential dwelling unit and employment adjustments were made to the City of Madera Cumulative 2030 No / "0" Project Model land use data to incorporate 33 approved or proposed General Plan Amendments (GPAs) and other projects that were located in the County and City of Madera. The status and size of the 33 approved or proposed General Plan Amendments and other projects are:

County of Madera

- GPA 04-06 (Approved) – approximately 13 acre site converted from low density residential (LDR) to light industrial/business park (LI) – located in Madera County
- GPA 04-03 (Approved) – approximately 25 acre site converted from agriculture exclusive (AE) to agricultural residential (AR) and rural residential (RR) – located in Coarsegold
- GPA 04-02 (Approved) – approximately 0.33 acre site converted from community commercial (CC) to LDR – located in Madera County

- GPA 03-08 (Approved) – approximately 0.6 acre site converted from very low density residential (VLDR)/rural commercial area (RCA) to rural development area (RDA) – located in Madera County
- GPA 03-06 (Approved) – approximately 23 acre site converted from AR to rural estate residential (RER) – located in Madera County
- GPA 02-12 (Approved) – approximately 71 acre site converted from AR and public institutional (PI) to RER – located in Madera County
- GPA 02-09 (Approved) – approximately 76 acre site converted from VLDR to agriculture (A), AR, agriculture exclusive (AE) – located in Madera County
- GPA 02-08 (Approved) – approximately 8 acre site converted from high density residential (HDR) to CC – located near Bass Lake in Madera County
- GPA 02-07 (Approved) – approximately 1 acre site converted from VLDR to PI – located near Childrens Hospital in Madera County
- GPA 02-06 (Approved) – approximately 50 acre site converted from AE to AR – located in Madera County
- GPA 02-04 (Approved) – approximately 321 acre site converted from medium density residential (MDR), LDR, HDR, highway commercial (HC), PI to A – located in Madera County
- GPA 01-03 (Approved) – approximately 19 acre site converted from AE to highway service commercial (HSC) and A – located in Madera County
- GPA 00-09 (Approved) – approximately 220 acre site converted from open space (OS) to A – located near North Fork in Madera County
- GPA 00-07 (Approved) – acreage unknown – conversion of an existing commercial building to an office – located near Bass Lake in Madera County
- GPA 00-06 (Approved) – approximately 3 acre site converted from HDR to LI – located in Oakhurst
- GPA 00-04 (Approved) – approximately 94 acre site converted from A to RER – located in Madera County
- GPA 99-09 (Approved) – approximately 84 acre site converted from heavy industrial (HI) to MDR and OS – located near North Fork in Madera County
- GPA 99-04 (Approved) – approximately 4 acre site converted from A to VLDR – located in Madera County
- GPA 99-03 (Approved) – approximately 9 acre site converted from AR to RER – located in Madera County near the intersection of Avenue 16 and Road 29 ½

City of Madera

- Madera Town Center (Approved) – located on the north side of Avenue 17 east of SR 99 (APN 33-040-01) – General Plan amendment, Specific Plan amendment and rezoning for approximately 100 acres – included in this analysis as 791,630 sf of retail
- East Olive Avenue Specific Plan (Approved) – located east and north of SR 99, south of Olive Avenue and west of Road 28 – approximately 143 acre residential and commercial development
- Madera Promenade (Proposed) – located on the north side of Avenue 17 just west of Airport Drive and North Golden State Boulevard (APN 33-040-07 & 33-050-17) – General Plan and Specific Plan amendment, rezone and annexation for approximately 100 acre site from industrial to commercial – included in this analysis as a 834,000 sf shopping center
- Bratton Highway Commercial Project (Approved) – located south of Avenue 17 on the west side of Airport Drive (APN 13-010-13) – master plan for construction of a highway commercial project on approximately 8.6 acres – included in this analysis as the following uses:
 - 8,000 sf high-turnover sit-down restaurant
 - 3,000 sf fast-food restaurant with drive-through

- 24,755 sf of specialty retail
 - 86 room hotel
 - 69 room hotel
 - 12 fueling position service station with convenience market and car was
- Cat 17 Project (Approved) – located south of Avenue 17 east of SR 99 and the railroad tracks (APN 38-040-02) – Specific Plan amendment and rezoning for approximately 48 acres – included in this analysis as approximately 452,499 sf of retail
 - Madera District Fair Board Commercial Project (Approved) – located on the south side of West Cleveland Avenue west of SR 99 (APN 33-240-04) – Rezoning application for annexation of approximately 35 acres – included in this analysis as approximately 306,500 sf of retail
 - Feland/Zinkin Commercial Project (Proposed) – located south of Avenue 16 between North Schnoor Avenue and SR 99 (APN 13-160-06 & 16) – Site plan review application for approximately 20 acres – included in this analysis as approximately 221,000 sf of retail
 - Gottschalks Expansion (Proposed) – located south of Avenue 17 and west of Airport Drive (APN 13-010-34) – Application submitted for approximately 42 acres including a preliminary description of 159,000 sf of office, 115,000 sf of service commercial, and 208,000 sf of regional commercial
 - Heritage Homes (Proposed) – located south of Avenue 17 at the east end of Yeager Road (APN 13-010-24, 25, & 26, & 13-170-01) – conceptual project only for approximately 42 acres
 - Horizon Enterprises (Proposed) – located north of Avenue 17 on both sides of Golden State Boulevard (APN 13-210-05 & 06) – conceptual commercial project for approximately 15.7 acres along with a 1.0 acre gas station/mini-mart
 - Horizon Enterprises/Weil (Proposed) – located on the southwest corner of North Schnoor Avenue and Avenue 16, west of the Home Depot Center (APN 13-070-19) – conceptual project only for approximately 2.58 acres
 - Finalized Subdivision Maps, as of July 2008 – 1,679 single family dwelling units
 - Tentative Maps Approved, as of July 2008 – 1,673 single family dwelling units
 - Active Applications, as of July 2008 – 3,367 single family dwelling units

Opening Day (2010) No Project/"0" Project and 2030 No Project/"0" Project Volumes

The Opening Day (2010) No Project/"0" Project and 2030 No Project/"0" Project forecasted volumes were calculated using growth increment/growth rate data developed from the 2000 and the 2030 No Project/"0" Project Model runs. For segments and intersections that are showing negative or no growth by Opening Day (2010) or 2030, a 3% growth factor applied to the Existing count data was used to calculate the Opening Day (2010) No Project/"0" Project and 2030 No Project/"0" Project volumes and should be considered a worst-case.

Intersection Analysis and Volume Adjustments

Intersection heavy vehicle percentages were developed from the Existing conditions count data. A minimum default of 2% heavy vehicles was used on all intersections and in all scenarios. A peak hour factor of either 0.88 or 0.92 as provided in the *HCM 2000* was used in all intersection analyses as appropriate.¹³

All signalized intersections within a one-half mile distance were analyzed as actuated coordinated. Actuated signals use vehicle detectors and an actuated controller unit to assign the right of way based

¹³ *HCM 2000*, Exhibit 9-2, page 9-9.

on changing traffic demand. Coordination between the signals can either be based on pre-timed coordination or hardwire coordination. The signalized intersections were optimized to achieve the greatest reduction in overall intersection delay.

Left-turns at signalized intersections were analyzed as “permitted” or “protected” in the study area depending on if a separate left-turn lane was warranted. Permitted lefts are left-turns that are allowed to go at the same time as the opposing direction through and right-turn movements. Protected lefts are left-turns that are only allowed to go during their “protected” phase of the signal, and the left-turns are not allowed to go at the same time as the opposing direction through and right-turn movements.

For this study, if an unsignalized intersection was projected to operate below the adopted level of service standard or have movements or approaches that were projected to operate below the adopted level of service standard and did not warrant a signal based on the appropriate peak hour volume warrant, then modifications to the Existing lane configurations were tested to determine if the intersection could be mitigated.

Signal Warrant Analysis

Rural and urban peak hour volume warrants (Warrant 3) were prepared for all unsignalized intersections, as appropriate, based on the methodology presented in the California Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, pages 4C-4, 4C-5 and 4C-10. The peak hour volume warrant is the easiest to project based on available traffic data and is also the warrant that will indicate need for a signal before most other warrants will be met. According to the MUTCD, “the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.” Therefore prior to making a final determination on installation of a proposed signal, a thorough engineering investigation, including collision history, should be conducted.

Queue Analysis

95th Percentile queues were taken from level of service analysis. Queue lengths for unsignalized and signalized intersections were determined using Synchro 6.0, which incorporates the HCM 2000 methodologies.

Ramp Widening Analysis

Caltrans Highway Design Manual recommends that when ramp volumes are between 900 to 1,499 passenger car equivalents (PCE), provisions should be made for the future widening of a one-lane ramp to two-lanes and for the future construction of an associated 1,333 foot (ft) (minimum) auxiliary lane prior to the widened ramp. When ramp volumes are equal to or exceed 1,500 PCE, a two-lane ramp and associated 1,333 ft (minimum) auxiliary lane should be constructed.

Left-Turn Warrant Analysis

Left-turn warrant analysis was prepared using the left-turn warrant methodology found in *A Policy on Geometric Design of Highways and Streets* by AASHTO. The volumes used in the left-turn warrant analysis were adjusted based on the Existing conditions heavy vehicle percentages. The warrant analysis was limited to peak hour volume only and other conditions may exist that meet other left-turn warrants.

Dual Left-Turn / Separate Right-Turn Lanes

Per *Caltrans Highway Design Manual*, Section 405.2 (3), “double left-turn lanes should be considered if the left-turn demand is 300 vehicles per hour or more.” Standard state of the practice dictates that dual left-turn lanes are required for left-turning volumes greater than 300 vehicles per hour and that separate right-turn lanes are required for right-turning volumes greater than 300 vehicles per hour.

Left-Turn Storage Length Analysis

Left-turn Storage lengths were determined for unsignalized and signalized intersections based on the *Caltrans Highway Design Manual*, section 405.2 (2) (e). According to the *Caltrans Highway Design Manual*, “at unsignalized intersections, storage length may be based on the number of turning vehicles likely to arrive in an average 2-minute period during the peak hour” and “at signalized intersections, the storage length may be based on one and one-half to two times the average number of vehicles that would store per signal cycle depending on cycle length, signal phasing, and arrival and departure rates.” An average length of 25 feet per vehicle was used to determine the subsequent storage length.

Opening Day (2010) and 2030 Network Configurations

Background roadway and intersection improvements utilized in this study for the various No Project and Project scenarios were based on information derived from the Madera County 2007 RTP and information provided by Caltrans and City staff. These roadway and intersection improvements, by scenario, include:

Opening Day (2010) No Project/Project, 2030 No Project/Project

- Avenue 12 at SR 99 NB ramps
 - Signalize the intersection
 - Restripe/widen the EB approach, west leg, from a shared left-through, to a separate left-turn lane and one (1) through lane
- SR 145 at SR 99 Interchange
 - Reconstruct the interchange
- Avenue 16/Ellis Avenue Overcrossing
 - Ellis Street will be extended west over SR 99 and will merge with Avenue 16 near the intersection of Avenue 16 and Golden State Boulevard.

2030 No Project/Project

- SR 99 from Fresno County Line to Avenue 21 1/2
 - Restripe/widen from four (4) lanes to six (lanes)
- Avenue 17 at SR 99 Interchange
 - Reconstruct the interchange
- Avenue 12 at SR 99 Interchange
 - Reconstruct the interchange
- Avenue 16/Ellis Avenue at SR 99 Interchange
 - The Avenue 16 at SR 99 interchange will be replaced by the Ellis Street overcrossing interchange. The SR 99 SB and NB ramps at Avenue 16 will be removed and Avenue 16 will be converted to an overpass connecting to Gateway Boulevard. NB and SB ramps will be added to the Ellis Street overcrossing, including a WB to SB loop on-ramp and an EB to SB slip on-ramp.
- Avenue 18 ½ at SR 99 SB off-ramp
 - Remove NB approach, south leg (Road 23)
 - Restripe the SB approach, north leg, from a shared left-through-right lane, to a shared left-right lane
 - Restripe the EB approach, west leg, from a shared through-right lane, to one (1) through lane
 - Restripe the WB approach, east leg, from a shared left-through lane, to one (1) through lane
- Avenue 18 ½ at Pistachio Drive
 - Restripe the SB approach, north leg, from a shared left-right lane, to a separate right-turn lane
- Avenue 18 ½ at Golden State Boulevard
 - Realign Road 23 from current northern terminus at the intersection of Avenue 18 ½ at SR 99 SB ramps to the NB approach, south leg, of Avenue 18 ½ at Golden State Boulevard

Level of Service Analysis Methods

Freeway segments analyses were completed using *HCS+*, which is an industry standard for calculating freeway segments. County road segments were calculated using the Segment analysis was completed using the *Madera County Capacity Table*. Signalized and unsignalized intersection analyses were completed using *Synchro 6.0*, which incorporates the *HCM 2000* methodologies. *Synchro 6.0* allows for optimization of signals to provide for the greatest reduction in overall intersection delay. This optimization process can result in different signal cycle lengths for both the AM and PM peak hours of a given scenario and across all scenarios. The changing of the signal cycle length somewhat reflects the agency process whereby the agency will adjust intersection signal cycle lengths for differing traffic conditions based on current count data.

Level of Service

For analysis purposes, the *HCM 2000* defines six levels of service for various facility types. The six levels are given letter designations ranging from "A" to "F", with "A" representing the best operating conditions and "F" the worst. Quantifiable measures of effectiveness that best describe the quality of operation on the subject facility type are used to determine the facilities level of service. For signalized and unsignalized intersections, the quantifiable measure of effectiveness is average control

delay.¹⁴ For segments, the quantifiable measure of effectiveness is volume-to-capacity ratios. For freeway segments, the quantifiable measure of effectiveness is density (passenger cars/mile/lane).

Segments

Street segment assessments for Madera County roadways were completed using the Capacity Table developed by Korve Engineering for use with the Madera County Transportation Commission (MCTC) Model. A copy of this table can be found in the Appendices section Attachment VI – C – 54. Levels of service for the segment volume-to-capacity ratios developed in this study were derived from the level of service ranges used in the Model.

Freeway Segments

The freeway segment analysis was completed using HCS +. Per Caltrans direction, the rural peak hour factor of 0.88 was used in all scenarios. The driver population factor was left at the HCS + default value. The measured free-flow speed used in this study was 70 mph.

Freeway truck percentages were taken from the Caltrans 2007 Annual Average Daily Truck Traffic on the California State Highway System. The truck percentage used was 24%. A recreational vehicle (RV) percentage of 2% was used for the freeway calculations.

Table 102 shows the six levels of service and their corresponding ranges of density for basic freeway segments. Table 102 also contains a brief traffic flow description for basic freeway segments for each level of service category. Density values at level of service thresholds will have a plus (+) or minus (-) appended to the density value if the calculated density value at full precision is greater (+) or less (-) than the rounded displayed density value.

Intersections

For signalized intersections, “the average control delay per vehicle is estimated for each lane group and aggregated for each approach and for the intersections as a whole”.¹⁵ Level of service for the signalized intersection is then based on the aggregated intersection delay. AWSC intersections, which have stop signs on all corners of the intersection and are considered unsignalized, function similarly to a signalized intersection in that control delay per vehicle is estimated for each lane group and aggregated for each approach and for the intersection as a whole. Level of service for the AWSC intersection is likewise based on the aggregated intersection delay. Control delay for TWSC intersections, which have stop signs on only the minor street approaches, is also per vehicle but is computed for the stop-controlled or minor street movements only since theoretically the through movements on the major street are not experiencing any delay. Since there is no aggregation of delay for a TWSC intersection, there is no intersection level of service as a whole, only levels of service for the individual minor movements. The minor movements generally consist of separate lefts on the major street approaches and all movements on both minor street approaches. Delay values at level of service thresholds for TWSC intersections will have a plus (+) or minus (-) appended to the delay value if the calculated delay value at full precision is greater (+) or less (-) than the rounded displayed delay value.

¹⁴ Control delay, according to the 2000 Highway Capacity Manual, page 16-1, includes initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay.

¹⁵ 2000 HCM, page 16-2.

TABLE 102:

BASIC FREEWAY

LEVEL OF SERVICE DESCRIPTION

(FREE-FLOW SPEED = 65 OR 70 MPH)

Level of Service	Conditions	Description	Density (pc/mi/ln)
"A"	Free Flow	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. Effects of incidents or point breakdowns are easily absorbed at this level.	≤ 11
"B"	Stable Operation	Free-flow speeds are maintained. The ability to maneuver within the traffic stream is slightly restricted. Effects of minor incidents or point breakdowns are still easily absorbed at this level.	> 11 – 18
"C"	Stable Operation	Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.	> 18 – 26
"D"	Approaching Unstable	Speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.	> 26 – 35
"E"	Unstable Operations	Traffic volumes are at capacity. Any disruption to the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce extensive queuing.	> 35 – 45
"F"	Forced Flow	Traffic volumes exceed the capacity of the freeway and traffic queues develop easily. Stop and go traffic conditions exist.	> 45

Source: 2000 Highway Capacity Manual, Transportation Research Board.

Table 103 shows the six levels of service and their corresponding ranges of average control delay for both signalized and unsignalized intersections. Table 103 also contains a brief traffic flow description for signalized intersections for each level of service category. The level of service diagrams provided throughout the report show the levels of service for the study intersections. The levels of service shown for signalized intersections are representative of the overall level of service for that intersection. For TWSC intersections, the level of service shown on the maps is the level of service for the worst operating movement at that intersection as opposed to the overall intersection level of service.

TABLE 103: INTERSECTION LEVEL OF SERVICE DESCRIPTION			Intersections	
			Signalized	Unsignalized ¹
Level of Service	Conditions	Signalized Intersection Description	Delay (secs/veh)	Delay (secs/veh)
"A"	Free Flow	Users experience very low delay. Progression is favorable and most vehicles do not stop at all.	≤ 10.0	≤ 10.0
"B"	Stable Operations	Vehicles travel with good progression. Some vehicles stop, causing slight delay.	> 10.0 to 20.0	> 10.0 to 15.0
"C"	Stable Operations	Higher delays result from fair progression. A significant number of vehicles stop, although many continue to pass through the intersection without stopping.	> 20.0 to 35.0	> 15.0 to 25.0
"D"	Approaching Unstable	Congestion is noticeable. Progression is unfavorable, with more vehicles stopping rather than passing through the intersection.	> 35.0 to 55.0	> 25.0 to 35.0
"E"	Unstable Operations	Traffic volumes are at capacity. Users experience poor progression and long delays.	> 55.0 to 80.0	> 35.0 to 50.0
"F"	Forced Flow	Intersection's capacity is oversaturated, causing poor progression and unusually long delays.	> 80.0	> 50.0

Source: 2000 Highway Capacity Manual, Transportation Research Board.

¹ Unsignalized intersections include TWSC and AWSC

Level of Service Standards

The County and City of Madera has adopted a LOS "D" as their standard for traffic impact study purposes.

"Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing measures of effectiveness should be maintained."

C. WORKSHEETS

ATTACHMENT VI – C - 1

NORTH FORK CASINO PROJECT

ALTERNATIVE C

TRIP GENERATION DATA

Summary of Multi-Use Trip Generation
 Average Weekday Driveway Volumes
 October 21, 2008

Land Use	Size	24 Hour Two-Way Volume	AM Pk Hour Enter	Hour Exit	PM Pk Hour Enter	Hour Exit
Free-Standing Discount Superstore	125 Th.Gr.Sq.Ft.	6151	118	113	238	246
Discount Club	100 Th.Gr.Sq.Ft.	4180	40	16	212	212
Fast-Food Restaurant with Drive-Thru	3 Th.Gr.Sq.Ft.	1488	81	78	54	50
High Turnover (Sit-Down) Restaurant	4 Th.Gr.Sq.Ft.	509	24	22	27	17
High Turnover (Sit-Down) Restaurant	5 Th.Gr.Sq.Ft.	636	30	28	33	21
Total		12964	293	257	564	546

Note: A zero indicates no data available.

TRIP GENERATION BY MICROTRANS

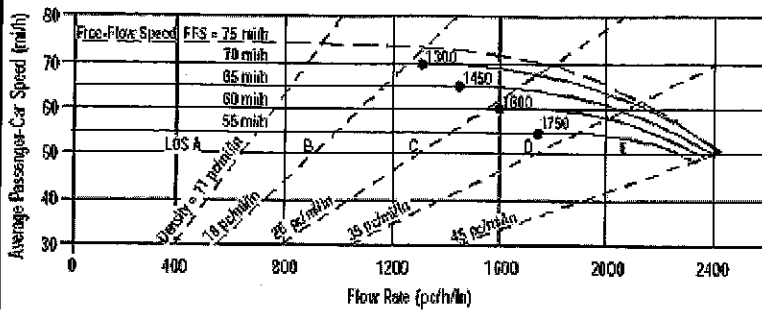
ATTACHMENT VI – C - 2

EXISTING (2008) CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R. Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing AM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
--	----------------------------------	--

Flow Inputs			
Volume, V	2464	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

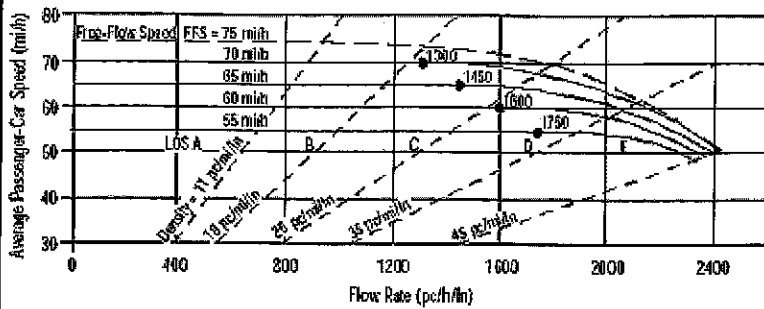
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 /mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1574 pc/h/ln	Design LOS	
S	69.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	22.6 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Existing PM	Analysis Year	2008																					
Project Description 04-837.2 Northfork Casino Alts A, B & C																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	2406	veh/h	Peak-Hour Factor, PHF 0.88																					
AAADT		veh/day	%Trucks and Buses, P _T 24																					
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV = AAADT x K x D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW} mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC} mi/h																					
Interchange Density	0.50	l/mi	f _{ID} mi/h																					
Number of Lanes, N	2		f _N mi/h																					
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
Design LOS		Design LOS																						
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1537	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																					
S	69.7	mi/h	S																					
D = v _p / S	22.1	pc/mi/ln	D = v _p / S																					
LOS	C		Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing AM	Analysis Year	2008
Project Description 04-837.1 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2014	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

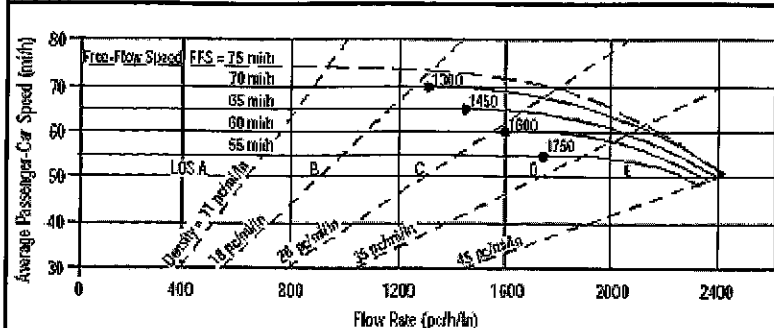
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 1/mi	f_{ID}	mi/h
Number of Lanes, N	2	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	1286 pc/h/ln	Design LOS	
S	70.0 mi/h	$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	18.4 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing PM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2944	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

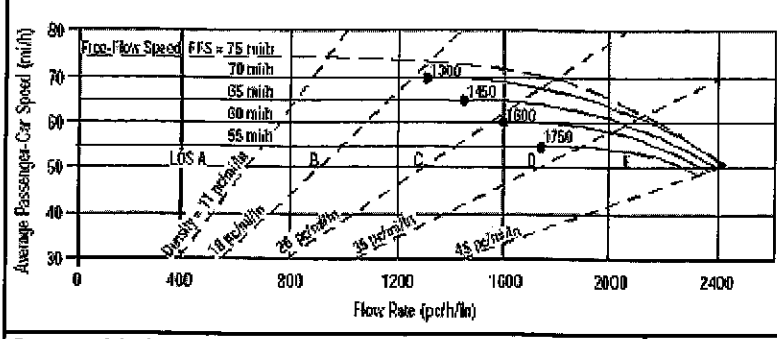
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1880 pc/h/ln	Design LOS	
S	66.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.1 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing AM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2559	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade %
Driver type adjustment	1.00		Length
			Up/Down %

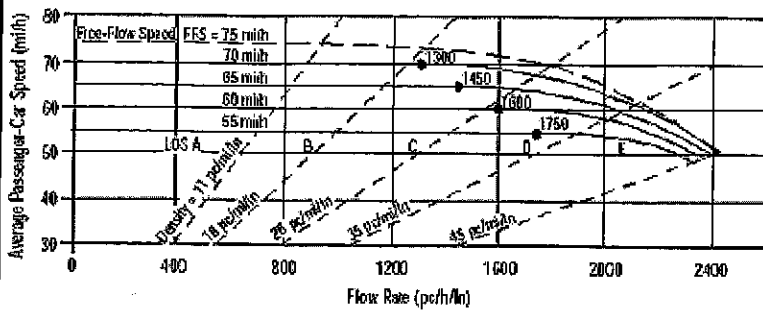
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1634 pc/h/ln	Design LOS	
S	69.2 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	23.6 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst: R Davis
 Agency or Company: TPG Consulting, Inc.
 Date Performed: 9/22/08
 Analysis Time Period: Existing PM
 Project Description: 04-837.2 Northfork Casino Alts A, B & C

Site Information

Highway/Direction of Travel: SR 99 Northbound
 From/To: between Ave 18 1/2 & Ave 17
 Jurisdiction: Caltrans
 Analysis Year: 2008

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2499	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/P _T (E _T -1) + P _R (E _R -1)	0.890

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	l/mi
Number of Lanes, N	2	
FFS (measured)	70.0	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	70.0	mi/h

LOS and Performance Measures

Operational (LOS)		
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1596	pc/h/ln
S	69.5	mi/h
D = v _p / S	23.0	pc/mi/ln
LOS	C	

Design (N)

Design (N)	
Design LOS	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
S	mi/h
D = v _p / S	pc/mi/ln
Required Number of Lanes, N	

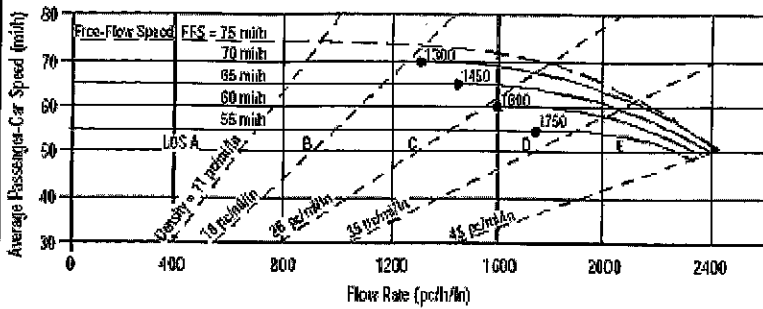
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing AM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2092	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	2		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

Operational (LOS)			Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1336	pc/h/ln	Design LOS	
S	70.0	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.1	pc/mi/ln	S	mi/h
LOS	C		D = v _p / S	pc/mi/ln
			Required Number of Lanes, N	

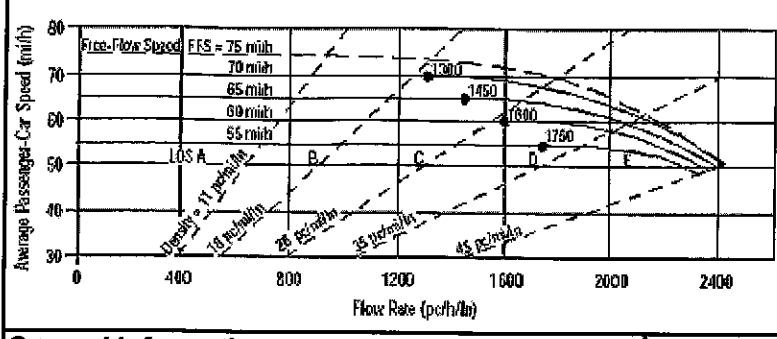
Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																																																								
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows density curves for various speeds: 75, 70, 65, 60, and 55 mi/h. Regions A, B, C, D, and E are marked along the curves. A table of application inputs and outputs is provided to the right of the graph.</p> <table border="1" style="float: right; margin-left: 20px;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">General Information</th> <th colspan="2" style="text-align: left;">Site Information</th> </tr> </thead> <tbody> <tr> <td>Analyst</td> <td>R Davis</td> <td>Highway/Direction of Travel</td> <td>SR 99 Southbound</td> </tr> <tr> <td>Agency or Company</td> <td>TPG Consulting, Inc.</td> <td>From/To</td> <td>between Ave 18 1/2 & Ave 17</td> </tr> <tr> <td>Date Performed</td> <td>9/22/08</td> <td>Jurisdiction</td> <td>Caltrans</td> </tr> <tr> <td>Analysis Time Period</td> <td>Existing PM</td> <td>Analysis Year</td> <td>2008</td> </tr> <tr> <td colspan="4">Project Description 04-837.2 Northfork Casino Alts A, B & C</td> </tr> <tr> <td colspan="2"><input checked="" type="checkbox"/> Oper.(LOS)</td> <td colspan="2"><input type="checkbox"/> Des.(N)</td> </tr> <tr> <td colspan="4" style="text-align: right;"><input type="checkbox"/> Planning Data</td> </tr> </tbody> </table>			General Information		Site Information		Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound	Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17	Date Performed	9/22/08	Jurisdiction	Caltrans	Analysis Time Period	Existing PM	Analysis Year	2008	Project Description 04-837.2 Northfork Casino Alts A, B & C				<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data			
Application	Input	Output																																																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																																																						
Design (N)	FFS, LOS, v _p	N, S, D																																																						
Design (v _p)	FFS, LOS, N	v _p , S, D																																																						
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<input type="checkbox"/> Planning Data																																																								
Flow Inputs																																																								
Volume, V	3057	veh/h	Peak-Hour Factor, PHF	0.88																																																				
AADT		veh/day	% Trucks and Buses, P _T	24																																																				
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																																																				
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E _T	1.5		f _{HV} = [1/P _T (E _T -1) + P _R (E _R -1)]	0.890																																																				
Speed Inputs		Calc Speed Adj and FFS																																																						
Lane Width	12.0	ft	f _{LW}	mi/h																																																				
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																																																				
Interchange Density	0.50	l/mi	f _{ID}	mi/h																																																				
Number of Lanes, N	2		f _N	mi/h																																																				
FFS (measured)	70.0	mi/h	FFS	70.0																																																				
Base free-flow Speed, BFFS		mi/h																																																						
LOS and Performance Measures		Design (N)																																																						
Operational (LOS)		Design (N)																																																						
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1952	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h																																																				
S	65.7	mi/h	S	mi/h																																																				
D = v _p / S	29.7	pc/mi/ln	D = v _p / S	pc/mi/ln																																																				
LOS	D		Required Number of Lanes, N																																																					
Glossary		Factor Location																																																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																																																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																																																					
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LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																																																					
DDHV - Directional design hour volume																																																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing AM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2701	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

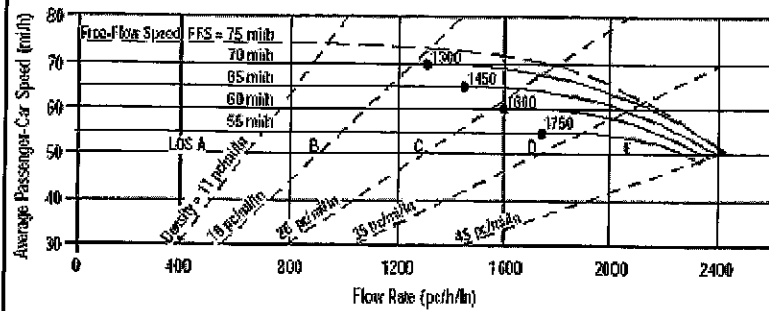
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1725 pc/h/ln	Design LOS	
S	68.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.1 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing PM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

<input checked="" type="checkbox"/> Oper.(LOS)	<input checked="" type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	2638	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level mi
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %
Driver type adjustment	1.00		

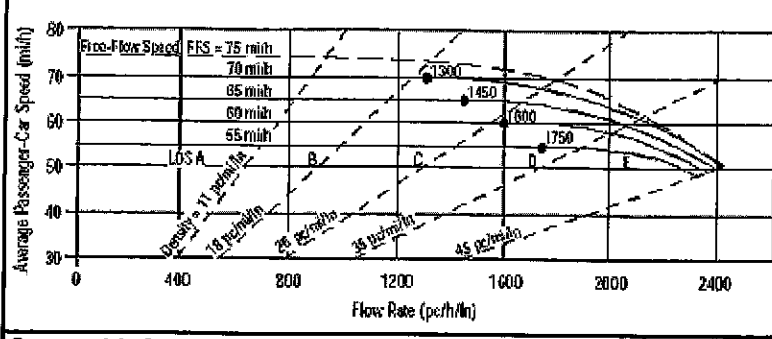
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1685 pc/h/ln	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
S	68.9 mi/h	S	mi/h
D = v _p / S	24.5 pc/mi/ln	D = v _p / S	pc/mi/ln
LOS	C	Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing AM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2208	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level mi
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %
Driver type adjustment	1.00		

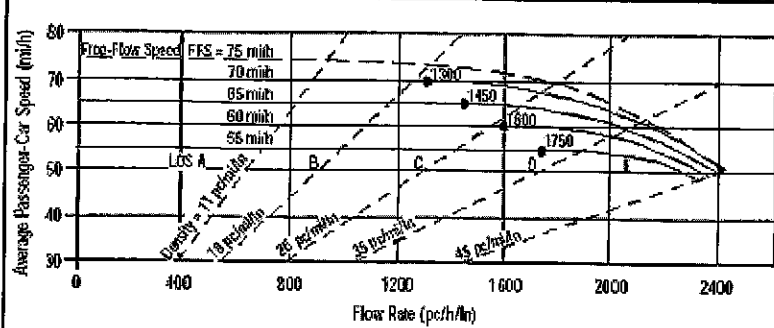
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1410 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	20.2 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Existing PM	Analysis Year	2008
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3227	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level mi
DDHV = AAADT x K x D		veh/h	Grade % Length Up/Down %
Driver type adjustment	1.00		

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = [1/P _T (E _T -1) + P _R (E _R -1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2061 pc/h/ln	Design LOS	
S	63.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	32.4 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 3

EXISTING (2008) CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
Existing AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	139	43	0	0	79	12	152	2	37	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	47	0	0	86	13	165	2	40	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	99			47			441	448	47	483	441	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	99			47			441	448	47	483	441	92
tC, single (s)	4.5			4.3			7.4	6.8	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.6			2.4			3.8	4.3	3.6	3.5	4.0	3.3
p0 queue free %	88			100			62	99	96	100	100	100
cM capacity (veh/h)	1278			1458			438	411	948	432	453	970
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	151	47	99	165	42							
Volume Left	151	0	0	165	0							
Volume Right	0	0	13	0	40							
cSH	1278	1700	1700	438	889							
Volume to Capacity	0.12	0.03	0.06	0.38	0.05							
Queue Length 95th (ft)	10	0	0	43	4							
Control Delay (s)	8.2	0.0	0.0	18.1	9.3							
Lane LOS	A			C	A							
Approach Delay (s)	6.3		0.0	16.3								
Approach LOS				C								
Intersection Summary												
Average Delay			9.2									
Intersection Capacity Utilization			29.5%		ICU Level of Service				A			
Analysis Period (min)			15									











3: Ave 18.5 & Road 23
Existing AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↗		↖		↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	259	34	11	179	0	40	0	60	12	34	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	282	37	12	195	0	43	0	65	13	37	74
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	195			318			611	518	300	584	537	195
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195			318			611	518	300	584	537	195
tC, single (s)	4.4			4.3			7.4	6.8	6.5	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.5			2.4			3.7	4.2	3.5	3.8	4.3	3.6
p0 queue free %	100			99			86	100	90	96	91	90
cM capacity (veh/h)	1208			1132			310	423	684	338	402	767
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	318	207	43	65	124							
Volume Left	0	12	43	0	13							
Volume Right	37	0	0	65	74							
cSH	1700	1132	310	684	546							
Volume to Capacity	0.19	0.01	0.14	0.10	0.23							
Queue Length 95th (ft)	0	1	12	8	22							
Control Delay (s)	0.0	0.6	18.5	10.8	13.5							
Lane LOS		A	C	B	B							
Approach Delay (s)	0.0	0.6	13.9		13.5							
Approach LOS			B		B							
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			38.4%			ICU Level of Service			A			
Analysis Period (min)			15									












4: Ave 18.5 & Pistacchio
Existing AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	229	181	114	53	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	249	197	124	58	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	321				448	197
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321				448	197
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				89	99
cM capacity (veh/h)	1084				516	774
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	250	197	124	62		
Volume Left	1	0	0	58		
Volume Right	0	0	124	4		
cSH	1084	1700	1700	528		
Volume to Capacity	0.00	0.12	0.07	0.12		
Queue Length 95th (ft)	0	0	0	10		
Control Delay (s)	0.0	0.0	0.0	12.7		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		12.7		
Approach LOS				B		
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		25.8%		ICU Level of Service	A	
Analysis Period (min)		15				













5: Ave 18.5 & Golden State
Existing AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	56	64	95	104	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	61	70	103	113	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	173				137	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173				137	70
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				84	99
cM capacity (veh/h)	1398				719	835
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	64	70	103	117		
Volume Left	3	0	0	113		
Volume Right	0	0	103	4		
cSH	1398	1700	1700	723		
Volume to Capacity	0.00	0.04	0.06	0.16		
Queue Length 95th (ft)	0	0	0	14		
Control Delay (s)	0.4	0.0	0.0	10.9		
Lane LOS	A			B		
Approach Delay (s)	0.4	0.0		10.9		
Approach LOS				B		
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization		18.1%		ICU Level of Service	A	
Analysis Period (min)		15				

6: Ave 18 & Road 23
Existing AM

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	8	3	1	2	5	1	91	0	4	70	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	3	1	2	5	1	99	0	4	76	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	192	186	76	193	186	99	76			99		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	192	186	76	193	186	99	76			99		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	99	100	100	100	99	100			100		
cM capacity (veh/h)	744	693	966	731	686	928	1368			1331		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	9	100	80								
Volume Left	0	1	1	4								
Volume Right	3	5	0	0								
cSH	751	827	1368	1331								
Volume to Capacity	0.02	0.01	0.00	0.00								
Queue Length 95th (ft)	1	1	0	0								
Control Delay (s)	9.9	9.4	0.1	0.4								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.9	9.4	0.1	0.4								
Approach LOS	A	A										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			16.2%		ICU Level of Service				A			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
Existing AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↑	↗		↑	↗			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	76	0	0	476	60	66	1	126	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	83	0	0	517	65	72	1	137	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	583			83			630	696	83	768	630	517
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	583			83			630	696	83	768	630	517
tC, single (s)	4.3			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			100			81	100	86	100	100	100
cM capacity (veh/h)	917			1496			383	355	966	271	394	562
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	15	83	517	65	73	137						
Volume Left	15	0	0	0	72	0						
Volume Right	0	0	0	65	0	137						
cSH	917	1700	1700	1700	383	966						
Volume to Capacity	0.02	0.05	0.30	0.04	0.19	0.14						
Queue Length 95th (ft)	1	0	0	0	17	12						
Control Delay (s)	9.0	0.0	0.0	0.0	16.6	9.3						
Lane LOS	A				C	A						
Approach Delay (s)	1.4		0.0		11.9							
Approach LOS					B							
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			35.4%		ICU Level of Service				A			
Analysis Period (min)			15									

8: Ave 17 & SR 99 SB on-ramp
Existing AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	90	36	0	145	397	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	98	39	0	158	432	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	589			137			255	687	98	255	295	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589			137			255	687	98	255	295	158
tC, single (s)	4.3			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	921			1447			702	372	964	702	620	893
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	98	39	158	432								
Volume Left	0	0	0	0								
Volume Right	0	39	0	432								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.06	0.02	0.09	0.25								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			27.9%		ICU Level of Service				A			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
Existing AM

10/22/2008

	↖	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	95	145	0	31	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	103	158	0	34	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	158				261	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158				261	158
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.5
p0 queue free %	100				95	98
cM capacity (veh/h)	1341				687	838
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	103	158	34	15		
Volume Left	0	0	34	0		
Volume Right	0	0	0	15		
cSH	1700	1700	687	838		
Volume to Capacity	0.06	0.09	0.05	0.02		
Queue Length 95th (ft)	0	0	4	1		
Control Delay (s)	0.0	0.0	10.5	9.4		
Lane LOS			B	A		
Approach Delay (s)	0.0	0.0	10.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			17.6%		ICU Level of Service	A
Analysis Period (min)			15			













10: Ave 17 & GS Blvd
Existing AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	52	10	100	50	9	7	4	35	8	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	57	11	109	54	10	8	4	38	9	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	64			67			329	338	57	373	344	59
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			67			329	338	57	373	344	59
tC, single (s)	4.2			4.2			7.4	6.8	6.5	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.5	3.6	4.1	3.4
p0 queue free %	100			93			99	99	96	98	100	100
cM capacity (veh/h)	1489			1479			547	506	946	511	523	982
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	0	57	11	109	64	8	4	38	10			
Volume Left	0	0	0	109	0	8	0	0	9			
Volume Right	0	0	11	0	10	0	0	38	0			
cSH	1700	1700	1700	1479	1700	547	506	946	512			
Volume to Capacity	0.00	0.03	0.01	0.07	0.04	0.01	0.01	0.04	0.02			
Queue Length 95th (ft)	0	0	0	6	0	1	1	3	1			
Control Delay (s)	0.0	0.0	0.0	7.6	0.0	11.7	12.2	9.0	12.2			
Lane LOS				A		B	B	A	B			
Approach Delay (s)	0.0			4.8		9.7			12.2			
Approach LOS						A			B			
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization		25.7%				ICU Level of Service			A			
Analysis Period (min)			15									

11: Ave 17 & Road 23
Existing AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	25	4	24	16	3	2	93	18	9	60	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	27	4	26	17	3	2	101	20	10	65	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	212	210	65	218	200	111	65			121		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	212	210	65	218	200	111	65			121		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.3			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.4			2.4		
p0 queue free %	100	96	100	96	97	100	100			99		
cM capacity (veh/h)	721	679	996	694	678	924	1430			1336		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	32	47	123	75								
Volume Left	0	26	2	10								
Volume Right	4	3	20	0								
cSH	711	700	1430	1336								
Volume to Capacity	0.04	0.07	0.00	0.01								
Queue Length 95th (ft)	3	5	0	1								
Control Delay (s)	10.3	10.5	0.1	1.1								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.5	0.1	1.1								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			24.0%		ICU Level of Service				A			
Analysis Period (min)			15									

12: Ellis & Road 26
Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr't			0.850			0.850		0.988			0.998	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3397	0	1752	3498	0
Flt Permitted		0.738			0.754		0.950			0.950		
Satd. Flow (perm)	0	1375	1583	0	1405	1583	1719	3397	0	1752	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			4			18		13			2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	5	0	4	27	0	17	4	260	22	3	389	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	5	0	4	29	0	18	4	283	24	3	423	5
Lane Group Flow (vph)	0	5	4	0	29	18	4	307	0	3	428	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.3	10.3		10.5	10.5	8.5	56.0		8.5	56.0	
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.11	0.77		0.11	0.77	
v/c Ratio		0.03	0.02		0.16	0.08	0.02	0.12		0.02	0.16	
Control Delay		10.8	8.5		11.9	6.9	13.5	4.3		13.7	4.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		10.8	8.5		11.9	6.9	13.5	4.3		13.7	4.4	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		9.8			10.0			4.4			4.5	

12: Ellis & Road 26
Existing AM

10/22/2008

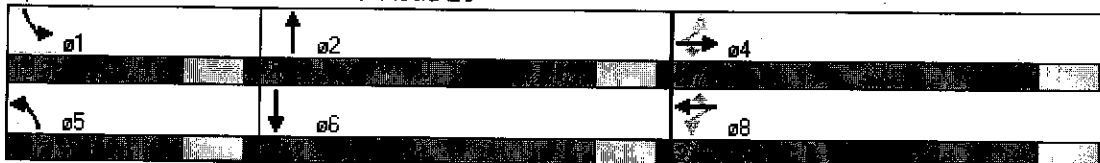
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		1	0		7	0	1	0		1	0	
Queue Length 95th (ft)		7	5		21	11	7	47		6	65	
Internal Link Dist (ft)	1328			1040			976			2128		
Turn Bay Length (ft)												
Base Capacity (vph)		426	493		435	502	296	2742		302	2821	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.01	0.01		0.07	0.04	0.01	0.11		0.01	0.15	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 72.3
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.16
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 27.6%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26









13: Ave 16 & Gateway
Existing AM

10/22/2008

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations		↗	↘		↙	↖
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	123	3	0	78	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	134	3	0	85	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	125		239	105		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	125		239	105		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		100	100		
cM capacity (veh/h)	1437		687	872		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	134	3	125			
Volume Left	0	3	0			
Volume Right	0	0	40			
cSH	1700	687	1700			
Volume to Capacity	0.08	0.00	0.07			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.3	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.3	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		16.6%		ICU Level of Service		A
Analysis Period (min)		15				










14: Gateway & AVE 16 Connector
Existing AM

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↑		↑	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	37	3	53	157	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	3	58	171	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	61				72	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	61				72	32
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				82	100
cM capacity (veh/h)	1469				932	1042
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	40	61	171			
Volume Left	0	0	171			
Volume Right	0	58	0			
cSH	1700	1700	932			
Volume to Capacity	0.02	0.04	0.18			
Queue Length 95th (ft)	0	0	17			
Control Delay (s)	0.0	0.0	9.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization			18.8%		ICU Level of Service	A
Analysis Period (min)			15			













15: Ave 16 & AVE 16 Connector
Existing AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	157	123	78	0	0	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	171	134	85	0	0	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	85				560	85
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85				560	85
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	89				100	94
cM capacity (veh/h)	1505				428	963
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	304	85	58			
Volume Left	171	0	0			
Volume Right	0	0	58			
cSH	1505	1700	963			
Volume to Capacity	0.11	0.05	0.06			
Queue Length 95th (ft)	10	0	5			
Control Delay (s)	4.7	0.0	9.0			
Lane LOS	A		A			
Approach Delay (s)	4.7	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization		25.2%		ICU Level of Service		A
Analysis Period (min)		15				

16: Ave 16 & SR 99 SB off-ramp
Existing AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	102	240	130	1	40	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	111	261	141	1	43	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	142				624	141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	142				624	141
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	92				89	84
cM capacity (veh/h)	1434				409	896
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	111	261	141	1	43	147
Volume Left	111	0	0	0	43	0
Volume Right	0	0	0	1	0	147
cSH	1434	1700	1700	1700	409	896
Volume to Capacity	0.08	0.15	0.08	0.00	0.11	0.16
Queue Length 95th (ft)	6	0	0	0	9	15
Control Delay (s)	7.7	0.0	0.0	0.0	14.9	9.8
Lane LOS	A				B	A
Approach Delay (s)	2.3		0.0		11.0	
Approach LOS					B	
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			25.8%		ICU Level of Service	A
Analysis Period (min)			15			

17: Ave 16 & GS Blvd
Existing AM

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↘			↑	↗		↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	38	14	125	25	13	26	9	186	12	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	41	15	136	27	14	28	10	202	13	1	1
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	58	136	41	38	202	15						
Volume Left (vph)	1	136	0	28	0	13						
Volume Right (vph)	15	0	14	0	202	1						
Hadj (s)	0.10	0.64	-0.10	0.46	-0.61	0.62						
Departure Headway (s)	5.5	5.8	5.1	5.6	4.6	6.1						
Degree Utilization, x	0.09	0.22	0.06	0.06	0.26	0.03						
Capacity (veh/h)	618	591	673	613	756	558						
Control Delay (s)	9.0	9.3	7.2	7.8	7.9	9.2						
Approach Delay (s)	9.0	8.8		7.9		9.2						
Approach LOS	A	A		A		A						

Intersection Summary

Delay		8.4				
HCM Level of Service		A				
Intersection Capacity Utilization		28.2%		ICU Level of Service		A
Analysis Period (min)		15				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						75			136			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	41	418	0	0	565	69	185	0	125	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	45	454	0	0	614	75	201	0	136	0	0	0
Lane Group Flow (vph)	45	454	0	0	614	75	101	100	136	0	0	0
Turn Type	Prot					Perm	Prot		Perm			
Protected Phases	7	4			8		5	2				
Permitted Phases						8			2			
Detector Phases	7	4			8	8	5	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	8.5	20.5	20.5			
Total Split (s)	19.5	55.5	0.0	0.0	36.0	36.0	29.5	29.5	29.5	0.0	0.0	0.0
Total Split (%)	22.9%	65.3%	0.0%	0.0%	42.4%	42.4%	34.7%	34.7%	34.7%	0.0%	0.0%	0.0%
Maximum Green (s)	14.9	50.9			31.4	31.4	25.0	25.0	25.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	Max	Max			
Walk Time (s)		5.0			5.0	5.0		5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0		0	0			
Act Effct Green (s)	7.9	51.5			43.8	43.8	21.7	20.4	25.5			
Actuated g/C Ratio	0.09	0.61			0.52	0.52	0.26	0.24	0.30			
v/c Ratio	0.28	0.22			0.34	0.09	0.24	0.26	0.25			
Control Delay	29.8	5.7			13.9	3.8	24.6	24.3	5.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	29.8	5.7			13.9	3.8	24.6	24.3	5.5			
LOS	C	A			B	A	C	C	A			
Approach Delay		7.9			12.8			16.8				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	23	73			107	0	42	42	0			
Queue Length 95th (ft)	27	0			152	23	83	82	39			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	317	2103			1790	837	485	388	552			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.14	0.22			0.34	0.09	0.21	0.26	0.25			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 53.5 (63%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.34
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 43.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps

Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			278									49
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	390	256	251	499	0	0	0	0	69	0	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	424	278	273	542	0	0	0	0	75	0	49
Lane Group Flow (vph)	0	424	278	273	542	0	0	0	0	0	75	49
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	27.9	27.9	31.6	59.5	0.0	0.0	0.0	0.0	25.5	25.5	25.5
Total Split (%)	0.0%	32.8%	32.8%	37.2%	70.0%	0.0%	0.0%	0.0%	0.0%	30.0%	30.0%	30.0%
Maximum Green (s)		23.3	23.3	27.0	54.9					21.0	21.0	21.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		47.5	47.5	17.9	70.3					9.5	9.5	
Actuated g/C Ratio		0.56	0.56	0.21	0.83					0.11	0.11	
v/c Ratio		0.22	0.29	0.75	0.19					0.42	0.24	
Control Delay		11.9	2.8	40.0	5.3					41.4	13.1	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		11.9	2.8	40.0	5.3					41.4	13.1	
LOS		B	A	D	A					D	B	
Approach Delay		8.3			16.9					30.2		

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Existing AM

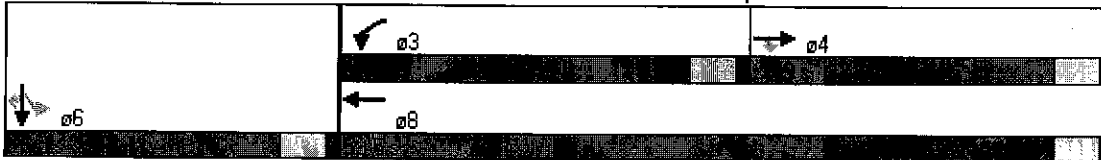
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B						C	
Queue Length 50th (ft)		62	0	147	50						38	0
Queue Length 95th (ft)		106	42	199	108						76	30
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1887	967	558	2842						404	398
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.22	0.29	0.49	0.19						0.19	0.12

Intersection Summary













Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 35.5 (42%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 43.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
Existing AM

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	31	1	16	0	118	25	10	75	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	34	1	17	0	128	27	11	82	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	263	259	82	245	245	142	82			155		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263	259	82	245	245	142	82			155		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	95	100	98	100			99		
cM capacity (veh/h)	671	640	978	704	652	906	1415			1327		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	52	155	92								
Volume Left	0	34	0	11								
Volume Right	0	17	27	0								
cSH	1700	759	1415	1327								
Volume to Capacity	0.00	0.07	0.00	0.01								
Queue Length 95th (ft)	0	6	0	1								
Control Delay (s)	0.0	10.1	0.0	1.0								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	10.1	0.0	1.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			22.4%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Existing AM

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850						0.850
Flt Protected		0.978								0.950		
Satd. Flow (prot)	0	1705	0	0	1776	1509	0	0	0	1752	1568	0
Flt Permitted		0.682								0.950		
Satd. Flow (perm)	0	1189	0	0	1776	1509	0	0	0	1752	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						72					566	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		491			1298			1379		1837		
Travel Time (s)		9.6			25.3			31.3		41.8		
Volume (vph)	261	306	0	0	294	66	0	0	0	142	0	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	284	333	0	0	320	72	0	0	0	154	0	75
Lane Group Flow (vph)	0	617	0	0	320	72	0	0	0	154	75	0
Turn Type	Perm					Perm				Perm		
Protected Phases		2			6						8	
Permitted Phases	2					6				8		
Detector Phases	2	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	49.5	49.5	0.0	0.0	49.5	49.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	70.7%	70.7%	0.0%	0.0%	70.7%	70.7%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	44.9	44.9			44.9	44.9				16.0	16.0	
Yellow Time (s)	3.6	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max	C-Max				None	None	
Walk Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0	0				0	0	
Act Effct Green (s)		53.4			53.4	53.4				11.5	11.5	
Actuated g/C Ratio		0.76			0.76	0.76				0.16	0.16	
v/c Ratio		0.68			0.24	0.06				0.53	0.10	
Control Delay		7.6			4.2	1.3				32.8	0.3	
Queue Delay		0.1			0.0	0.0				0.0	0.0	
Total Delay		7.7			4.2	1.3				32.8	0.3	
LOS		A			A	A				C	A	
Approach Delay		7.7			3.7						22.2	

21: SR 145/Madera & SR 99 NB ramps
Existing AM

10/22/2008

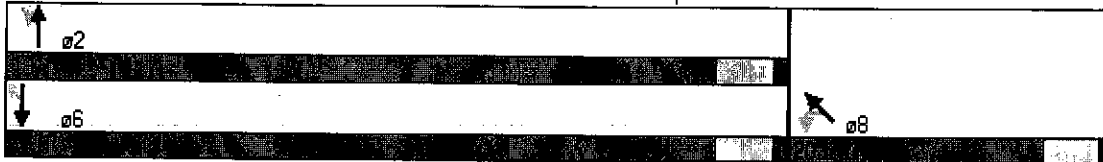
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)		58			37	0				61	0	
Queue Length 95th (ft)		#419			83	11				106	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)		907			1355	1168				413	802	
Starvation Cap Reductn		22			0	0				0	0	
Spillback Cap Reductn		0			0	0				0	0	
Storage Cap Reductn		0			0	0				0	0	
Reduced v/c Ratio		0.70			0.24	0.06				0.37	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 55 (79%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 9.1
 Intersection Capacity Utilization 63.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗				↘	↙	↖		↗	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50	50	50	50	50
Trailing Detector (ft)	0	0	0				0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850						0.850			0.850
Flt Protected		0.966					0.950				0.990	
Satd. Flow (prot)	0	1748	1538	0	0	0	1656	1743	1482	0	3436	1553
Flt Permitted		0.966					0.950				0.990	
Satd. Flow (perm)	0	1748	1538	0	0	0	1656	1743	1482	0	3436	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			252						22			205
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	177	76	232	0	0	0	81	370	20	50	197	189
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	192	83	252	0	0	0	88	402	22	54	214	205
Lane Group Flow (vph)	0	275	252	0	0	0	88	402	22	0	268	205
Turn Type	Perm		Perm				Split		Perm	Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4						2			6
Detector Phases	4	4	4				2	2	2	6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6	20.6	20.6	20.6	20.6
Total Split (s)	21.0	21.0	21.0	0.0	0.0	0.0	28.4	28.4	28.4	20.6	20.6	20.6
Total Split (%)	30.0%	30.0%	30.0%	0.0%	0.0%	0.0%	40.6%	40.6%	40.6%	29.4%	29.4%	29.4%
Maximum Green (s)	16.5	16.5	16.5				23.8	23.8	23.8	16.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max	C-Max	Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0	0	0	0	0
Act Effct Green (s)		15.4	15.4				26.0	26.0	26.0		16.6	16.6
Actuated g/C Ratio		0.22	0.22				0.37	0.37	0.37		0.24	0.24
v/c Ratio		0.71	0.47				0.14	0.62	0.04		0.33	0.39
Control Delay		32.9	8.3				16.6	23.9	7.2		27.6	11.5
Queue Delay		4.3	0.4				0.0	0.0	0.0		0.0	0.0
Total Delay		37.2	8.6				16.6	23.9	7.2		27.6	11.5
LOS		D	A				B	C	A		C	B
Approach Delay		23.6						21.9			20.6	

22: AVE 14/Olive & SR 145/Madera
Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			C	
Queue Length 50th (ft)		83	0				26	144	0		56	0
Queue Length 95th (ft)		141	1				55	236	13		90	67
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		425	564				615	648	564		815	525
Starvation Cap Reductn		88	73				0	0	0		0	0
Spillback Cap Reductn		0	0				0	0	0		0	0
Storage Cap Reductn		0	0				0	0	0		0	0
Reduced v/c Ratio		0.82	0.51				0.14	0.62	0.04		0.33	0.39

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 60 (86%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 22.1
 Intersection Capacity Utilization 50.2%
 Analysis Period (min) 15







Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
Existing AM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00
Frnt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	1845	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	1845	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						159
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	297	249	0	188	146
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	323	271	0	204	159
Lane Group Flow (vph)	0	323	271	0	204	159
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		27.0	20.5		20.5	20.5
Total Split (s)	0.0	37.5	37.5	0.0	32.5	32.5
Total Split (%)	0.0%	53.6%	53.6%	0.0%	46.4%	46.4%
Maximum Green (s)		33.0	33.0		28.0	28.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		48.4	48.4		13.6	13.6
Actuated g/C Ratio		0.69	0.69		0.19	0.19
v/c Ratio		0.13	0.21		0.63	0.38
Control Delay		4.4	2.1		34.1	6.8
Queue Delay		0.0	0.4		0.0	0.0
Total Delay		4.4	2.5		34.1	6.8
LOS		A	A		C	A
Approach Delay		4.4	2.5		22.2	

23: Ave 14/Olive & SR 99 SB off-ramp
Existing AM

10/22/2008

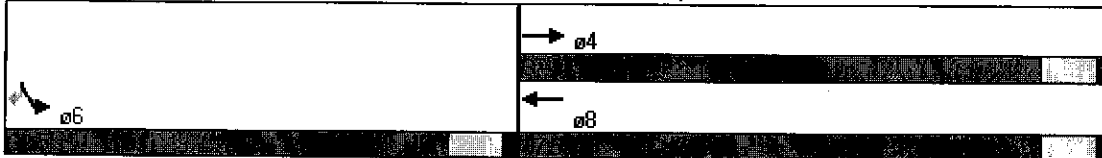
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		20	12		82	0
Queue Length 95th (ft)		43	26		130	40
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2425	1277		680	703
Starvation Cap Reductn		0	607		0	0
Spillback Cap Reductn		9	0		22	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.13	0.40		0.31	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 10.6
 Intersection Capacity Utilization 30.2%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: Ave 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
Existing AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	13	60	6	9	64	42	8	43	5	37	50	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	65	7	10	70	46	9	47	5	40	54	23
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	86	125	61	117								
Volume Left (vph)	14	10	9	40								
Volume Right (vph)	7	46	5	23								
Hadj (s)	0.12	0.03	0.32	0.24								
Departure Headway (s)	4.6	4.5	4.9	4.7								
Degree Utilization, x	0.11	0.16	0.08	0.15								
Capacity (veh/h)	743	760	698	720								
Control Delay (s)	8.2	8.3	8.3	8.6								
Approach Delay (s)	8.2	8.3	8.3	8.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.4									
HCM Level of Service			A									
Intersection Capacity Utilization		26.0%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
Existing AM

10/22/2008

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↓
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	273	75	75	0	92	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	297	82	82	0	100	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	355	82			82	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	355	82			82	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	50	92			93	
cM capacity (veh/h)	593	967			1510	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	297	82	82	0	174	
Volume Left	297	0	0	0	100	
Volume Right	0	82	0	0	0	
cSH	593	967	1700	1700	1510	
Volume to Capacity	0.50	0.08	0.05	0.00	0.07	
Queue Length 95th (ft)	70	7	0	0	5	
Control Delay (s)	17.0	9.1	0.0	0.0	4.6	
Lane LOS	C	A			A	
Approach Delay (s)	15.3		0.0		4.6	
Approach LOS	C					
Intersection Summary						
Average Delay			10.4			
Intersection Capacity Utilization			37.1%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
Existing AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗		↖	↗		↖	↗	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt			0.850		0.952			0.873				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1522	0	1687	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1522	0	1687	1776	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			17		27			17				54
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	162	215	16	13	275	130	16	3	16	289	9	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	176	234	17	14	299	141	17	3	17	314	10	54
Lane Group Flow (vph)	176	234	17	14	440	0	17	20	0	314	10	54
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	15.0	36.4	36.4	8.6	30.0	0.0	8.5	22.0	0.0	23.0	36.5	36.5
Total Split (%)	16.7%	40.4%	40.4%	9.6%	33.3%	0.0%	9.4%	24.4%	0.0%	25.6%	40.6%	40.6%
Maximum Green (s)	10.4	31.8	31.8	4.0	25.4		4.0	17.5		18.5	32.0	32.0
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	11.0	38.2	38.2	4.6	24.8		4.5	18.0		18.3	37.0	37.0
Actuated g/C Ratio	0.12	0.43	0.43	0.05	0.28		0.05	0.20		0.21	0.42	0.42
v/c Ratio	0.88	0.32	0.03	0.18	0.93		0.21	0.06		0.90	0.01	0.08
Control Delay	78.4	18.9	8.1	48.5	57.3		48.3	15.6		64.1	17.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	78.4	18.9	8.1	48.5	57.3		48.3	15.6		64.1	17.9	6.0
LOS	E	B	A	D	E		D	B		E	B	A
Approach Delay		43.0			57.1			30.6			54.6	

26: Ave 12 & GS Blvd
Existing AM

10/22/2008

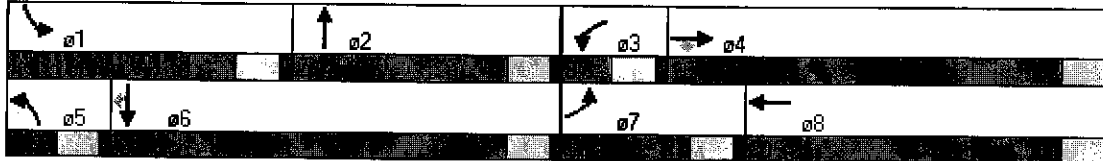
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			C			D	
Queue Length 50th (ft)	100	81	0	8	227		9	1		174	3	0
Queue Length 95th (ft)	#221	160	14	27	#408		31	20		#323	14	24
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	201	734	634	78	490		80	325		361	745	664
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.88	0.32	0.03	0.18	0.90		0.21	0.06		0.87	0.01	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 88.2
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 51.0
 Intersection Capacity Utilization 64.0%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Existing AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↗			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	77	443	0	0	253	286	175	0	101	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	482	0	0	275	311	190	0	110	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		818										
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	586			482			1079	1235	482	1189	1079	430
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	586			449			1084	1250	449	1201	1084	430
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	91			100			0	100	80	100	100	100
cM capacity (veh/h)	955			1026			162	141	553	114	186	625
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	565	586	190	110								
Volume Left	84	0	190	0								
Volume Right	0	311	0	110								
cSH	955	1700	162	553								
Volume to Capacity	0.09	0.34	1.17	0.20								
Queue Length 95th (ft)	7	0	259	18								
Control Delay (s)	2.3	0.0	180.5	13.1								
Lane LOS	A		F	B								
Approach Delay (s)	2.3	0.0	119.2									
Approach LOS			F									
Intersection Summary												
Average Delay			25.5									
Intersection Capacity Utilization			78.1%		ICU Level of Service				D			
Analysis Period (min)			15									

1: Ave 18.5 & SR 99 NB ramps
Existing PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	121	56	0	0	84	7	150	0	43	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	61	0	0	91	8	163	0	47	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	99			61			419	423	61	466	419	95
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	99			61			419	423	61	466	419	95
tC, single (s)	4.3			4.2			7.3	6.7	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.7	4.2	3.5	3.5	4.0	3.3
p0 queue free %	90			100			66	100	95	100	100	100
cM capacity (veh/h)	1372			1469			476	449	956	450	478	967
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	132	61	99	163	47							
Volume Left	132	0	0	163	0							
Volume Right	0	0	8	0	47							
cSH	1372	1700	1700	476	956							
Volume to Capacity	0.10	0.04	0.06	0.34	0.05							
Queue Length 95th (ft)	8	0	0	38	4							
Control Delay (s)	7.9	0.0	0.0	16.4	9.0							
Lane LOS	A			C	A							
Approach Delay (s)	5.4		0.0	14.8								
Approach LOS				B								
Intersection Summary												
Average Delay			8.3									
Intersection Capacity Utilization			28.3%		ICU Level of Service				A			
Analysis Period (min)			15									












3: Ave 18.5 & Road 23
Existing PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↗		↖		↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	333	61	23	165	0	25	0	28	23	53	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	362	66	25	179	0	27	0	30	25	58	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	179			428			763	624	395	655	658	179
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	179			428			763	624	395	655	658	179
tC, single (s)	4.3			4.3			7.3	6.7	6.4	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.9	4.4	3.7
p0 queue free %	100			98			87	100	95	92	83	86
cM capacity (veh/h)	1295			1046			217	366	611	309	331	774
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	428	204	27	30	192							
Volume Left	0	25	27	0	25							
Volume Right	66	0	0	30	110							
cSH	1700	1046	217	611	485							
Volume to Capacity	0.25	0.02	0.13	0.05	0.40							
Queue Length 95th (ft)	0	2	11	4	47							
Control Delay (s)	0.0	1.2	24.0	11.2	17.2							
Lane LOS		A	C	B	C							
Approach Delay (s)	0.0	1.2	17.2		17.2							
Approach LOS			C		C							
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			51.6%			ICU Level of Service			A			
Analysis Period (min)			15									

4: Ave 18.5 & Pistacchio
Existing PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	295	141	166	92	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	321	153	180	100	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	334				498	153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334				498	153
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				80	99
cM capacity (veh/h)	1131				504	860
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	333	153	180	107		
Volume Left	12	0	0	100		
Volume Right	0	0	180	7		
cSH	1131	1700	1700	517		
Volume to Capacity	0.01	0.09	0.11	0.21		
Queue Length 95th (ft)	1	0	0	19		
Control Delay (s)	0.4	0.0	0.0	13.8		
Lane LOS	A			B		
Approach Delay (s)	0.4	0.0		13.8		
Approach LOS				B		
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization		36.6%		ICU Level of Service	A	
Analysis Period (min)		15				













5: Ave 18.5 & Golden State
Existing PM

10/22/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	81	60	81	114	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	88	65	88	124	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	153				155	65
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153				155	65
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				83	100
cM capacity (veh/h)	1427				734	877
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	89	65	88	127		
Volume Left	1	0	0	124		
Volume Right	0	0	88	3		
cSH	1427	1700	1700	737		
Volume to Capacity	0.00	0.04	0.05	0.17		
Queue Length 95th (ft)	0	0	0	16		
Control Delay (s)	0.1	0.0	0.0	10.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		10.9		
Approach LOS				B		
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			18.2%		ICU Level of Service	A
Analysis Period (min)			15			

6: Ave 18 & Road 23
Existing PM



















10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	12	6	0	12	9	4	67	0	8	107	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	13	7	0	13	10	4	73	0	9	116	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	233	216	117	229	217	73	118			73		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	233	216	117	229	217	73	118			73		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	98	99	100	98	99	100			99		
cM capacity (veh/h)	681	660	911	699	669	981	1376			1443		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	23	77	127								
Volume Left	1	0	4	9								
Volume Right	7	10	0	2								
cSH	724	775	1376	1443								
Volume to Capacity	0.03	0.03	0.00	0.01								
Queue Length 95th (ft)	2	2	0	0								
Control Delay (s)	10.1	9.8	0.5	0.6								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.1	9.8	0.5	0.6								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			18.3%		ICU Level of Service					A		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps







Existing PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	187	0	0	243	51	42	2	369	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	203	0	0	264	55	46	2	401	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	320			203			500	555	203	902	500	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			203			500	555	203	902	500	264
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			90	99	52	100	100	100
cM capacity (veh/h)	1224			1368			473	431	832	133	469	779
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	16	203	264	55	48	401						
Volume Left	16	0	0	0	46	0						
Volume Right	0	0	0	55	0	401						
cSH	1224	1700	1700	1700	471	832						
Volume to Capacity	0.01	0.12	0.16	0.03	0.10	0.48						
Queue Length 95th (ft)	1	0	0	0	8	66						
Control Delay (s)	8.0	0.0	0.0	0.0	13.5	13.3						
Lane LOS	A				B	B						
Approach Delay (s)	0.6		0.0		13.3							
Approach LOS					B							
Intersection Summary												
Average Delay			6.2									
Intersection Capacity Utilization		39.4%			ICU Level of Service				A			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
Existing PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	192	98	0	93	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	209	107	0	101	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	107				315	107
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	107				315	107
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	100				85	99
cM capacity (veh/h)	1472				667	934
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	209	107	101	12		
Volume Left	0	0	101	0		
Volume Right	0	0	0	12		
cSH	1700	1700	667	934		
Volume to Capacity	0.12	0.06	0.15	0.01		
Queue Length 95th (ft)	0	0	13	1		
Control Delay (s)	0.0	0.0	11.4	8.9		
Lane LOS			B	A		
Approach Delay (s)	0.0	0.0	11.1			
Approach LOS			B			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			21.9%		ICU Level of Service	A
Analysis Period (min)			15			

10: Ave 17 & GS Blvd
Existing PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	75	9	45	50	14	6	8	79	18	6	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	82	10	49	54	15	7	9	86	20	7	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	70			91			237	249	82	332	251	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	70			91			237	249	82	332	251	62
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	100			97			99	99	91	96	99	100
cM capacity (veh/h)	1519			1485			692	631	976	529	613	973
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	0	82	10	49	70	7	9	86	26			
Volume Left	0	0	0	49	0	7	0	0	20			
Volume Right	0	0	10	0	15	0	0	86	0			
cSH	1700	1700	1700	1485	1700	692	631	976	548			
Volume to Capacity	0.00	0.05	0.01	0.03	0.04	0.01	0.01	0.09	0.05			
Queue Length 95th (ft)	0	0	0	3	0	1	1	7	4			
Control Delay (s)	0.0	0.0	0.0	7.5	0.0	10.3	10.8	9.0	11.9			
Lane LOS				A		B	B	A	B			
Approach Delay (s)	0.0			3.1		9.3			11.9			
Approach LOS						A			B			
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			23.8%			ICU Level of Service			A			
Analysis Period (min)			15									

11: Ave 17 & Road 23
Existing PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	17	5	22	14	5	5	62	44	9	101	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	5	24	15	5	5	67	48	10	110	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	245	256	110	247	233	91	111			115		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245	256	110	247	233	91	111			115		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	97	99	96	98	99	100			99		
cM capacity (veh/h)	686	641	943	672	652	953	1413			1402		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	45	121	121								
Volume Left	0	24	5	10								
Volume Right	5	5	48	1								
cSH	691	689	1413	1402								
Volume to Capacity	0.03	0.06	0.00	0.01								
Queue Length 95th (ft)	3	5	0	1								
Control Delay (s)	10.4	10.6	0.4	0.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.4	10.6	0.4	0.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			24.3%		ICU Level of Service				A			
Analysis Period (min)			15									

12: Ellis & Road 26
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↘	↕		↘	↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.987			0.995	
Flt Protected		0.956			0.955		0.950			0.950		
Satd. Flow (prot)	0	1781	1583	0	1779	1583	1770	3493	0	1770	3522	0
Flt Permitted		0.862			0.816		0.950			0.950		
Satd. Flow (perm)	0	1606	1583	0	1520	1583	1770	3493	0	1770	3522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			11			29		15			5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	11	1	10	32	2	27	8	458	45	31	387	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1	11	35	2	29	9	498	49	34	421	14
Lane Group Flow (vph)	0	13	11	0	37	29	9	547	0	34	435	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.2	10.2		10.4	10.4	8.7	46.6		9.5	47.0	
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.13	0.76		0.14	0.77	
v/c Ratio		0.05	0.04		0.16	0.11	0.04	0.20		0.14	0.16	
Control Delay		12.2	8.4		12.9	7.0	14.9	4.8		14.5	4.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.2	8.4		12.9	7.0	14.9	4.8		14.5	4.4	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		10.4			10.3			5.0			5.1	
Approach LOS		B			B			A			A	

12: Ellis & Road 26
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		1	0		3	0	1	0		3	0	
Queue Length 95th (ft)		14	9		27	15	12	89		25	67	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		560	559		530	571	351	2806		353	2836	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.02		0.07	0.05	0.03	0.19		0.10	0.15	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 61.1
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.20
 Intersection Signal Delay: 5.5
 Intersection Capacity Utilization 36.0%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26









13: Ave 16 & Gateway
Existing PM

10/22/2008

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations		↗	↘		↖	↗
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	190	3	0	147	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	207	3	0	160	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	236		404	198		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236		404	198		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1325		602	843		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	207	3	236			
Volume Left	0	3	0			
Volume Right	0	0	76			
cSH	1700	602	1700			
Volume to Capacity	0.12	0.01	0.14			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.0	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.0	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			22.4%		ICU Level of Service	A
Analysis Period (min)			15			










14: Gateway & Ave 16 Connector
Existing PM

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↓		↑	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	70	3	97	201	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	76	3	105	218	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	109				132	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109				132	56
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1476				862	1011
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	76	109	218			
Volume Left	0	0	218			
Volume Right	0	105	0			
cSH	1700	1700	862			
Volume to Capacity	0.04	0.06	0.25			
Queue Length 95th (ft)	0	0	25			
Control Delay (s)	0.0	0.0	10.6			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization		24.0%		ICU Level of Service		A
Analysis Period (min)			15			







15: Ave 16 & AVE 16 Connector
Existing PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	201	190	147	0	0	97
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	218	207	160	0	0	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	160				803	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160				803	160
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				100	88
cM capacity (veh/h)	1419				296	880
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	425	160	105			
Volume Left	218	0	0			
Volume Right	0	0	105			
cSH	1419	1700	880			
Volume to Capacity	0.15	0.09	0.12			
Queue Length 95th (ft)	14	0	10			
Control Delay (s)	4.8	0.0	9.6			
Lane LOS	A		A			
Approach Delay (s)	4.8	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization		35.5%		ICU Level of Service		A
Analysis Period (min)			15			



















16: Ave 16 & SR 99 SB off-ramp
Existing PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑	↖	↖	↖
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	67	327	241	3	64	200
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	73	355	262	3	70	217
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	265				763	262
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	265				763	262
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				80	72
cM capacity (veh/h)	1299				351	777
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	73	355	262	3	70	217
Volume Left	73	0	0	0	70	0
Volume Right	0	0	0	3	0	217
cSH	1299	1700	1700	1700	351	777
Volume to Capacity	0.06	0.21	0.15	0.00	0.20	0.28
Queue Length 95th (ft)	4	0	0	0	18	29
Control Delay (s)	7.9	0.0	0.0	0.0	17.8	11.4
Lane LOS	A				C	B
Approach Delay (s)	1.3		0.0		13.0	
Approach LOS					B	
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			31.7%		ICU Level of Service	A
Analysis Period (min)			15			

17: Ave 16 & GS Blvd
Existing PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	23	19	253	45	19	31	15	257	31	19	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	25	21	275	49	21	34	16	279	34	21	0
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	46	275	70	50	279	54						
Volume Left (vph)	0	275	0	34	0	34						
Volume Right (vph)	21	0	21	0	279	0						
Hadj (s)	-0.24	0.53	-0.17	0.39	-0.65	0.46						
Departure Headway (s)	5.8	6.1	5.4	6.1	5.1	6.6						
Degree Utilization, x	0.07	0.47	0.10	0.08	0.39	0.10						
Capacity (veh/h)	565	565	632	560	677	509						
Control Delay (s)	9.3	13.2	7.8	8.5	10.1	10.3						
Approach Delay (s)	9.3	12.1		9.9		10.3						
Approach LOS	A	B		A		B						
Intersection Summary												
Delay			10.9									
HCM Level of Service			B									
Intersection Capacity Utilization			36.7%		ICU Level of Service				A			
Analysis Period (min)			15									

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps

Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						104			164			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	54	758	0	0	839	96	255	2	283	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	59	824	0	0	912	104	277	2	308	0	0	0
Lane Group Flow (vph)	59	824	0	0	912	104	139	140	308	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.6	20.6	20.6			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	8.8	48.5			39.9	39.9	28.5	28.5	28.5			
Actuated g/C Ratio	0.10	0.57			0.47	0.47	0.34	0.34	0.34			
v/c Ratio	0.32	0.41			0.55	0.13	0.25	0.25	0.48			
Control Delay	54.0	7.4			19.2	4.2	22.0	22.0	13.0			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	54.0	7.5			19.2	4.2	22.0	22.0	13.0			
LOS	D	A			B	A	C	C	B			
Approach Delay		10.6			17.7			17.2				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps

Existing PM

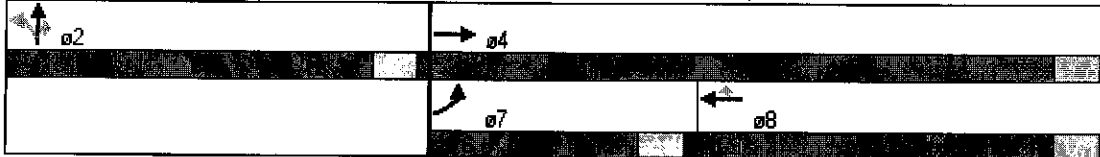
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B				
Queue Length 50th (ft)	35	67			193	0	55	56	56			
Queue Length 95th (ft)	m73	83			275	30	103	103	129			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	342	2000			1662	799	564	565	640			
Starvation Cap Reductn	0	201			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.17	0.46			0.55	0.13	0.25	0.25	0.48			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 15.1
 Intersection LOS: B
 Intersection Capacity Utilization 45.2%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps

Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑						↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			268									38
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391				1434		886	
Travel Time (s)		23.6			7.6				32.6		20.1	
Volume (vph)	0	680	247	163	931	0	0	0	0	132	2	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	739	268	177	1012	0	0	0	0	143	2	38
Lane Group Flow (vph)	0	739	268	177	1012	0	0	0	0	0	145	38
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	34.5	34.5	25.0	59.5	0.0	0.0	0.0	0.0	25.5	25.5	25.5
Total Split (%)	0.0%	40.6%	40.6%	29.4%	70.0%	0.0%	0.0%	0.0%	0.0%	30.0%	30.0%	30.0%
Maximum Green (s)		29.9	29.9	20.4	54.9					21.0	21.0	21.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		45.9	45.9	14.4	64.3						12.7	12.7
Actuated g/C Ratio		0.54	0.54	0.17	0.76						0.15	0.15
v/c Ratio		0.39	0.27	0.59	0.38						0.57	0.15
Control Delay		13.6	2.8	45.4	3.6						42.0	11.2
Queue Delay		0.0	0.0	0.0	0.1						0.0	0.0
Total Delay		13.6	2.8	45.4	3.7						42.0	11.2
LOS		B	A	D	A						D	B
Approach Delay		10.7			9.9						35.6	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A						D	
Queue Length 50th (ft)		112	0	101	72						73	0
Queue Length 95th (ft)		200	43	167	94						123	25
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1910	978	437	2677						428	410
Starvation Cap Reductn		0	0	0	547						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.39	0.27	0.41	0.48						0.34	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 12.2
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
Existing PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	34	1	22	0	99	67	27	109	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	37	1	24	0	108	73	29	118	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	346	358	118	323	321	144	118			180		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	346	358	118	323	321	144	118			180		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	582	556	933	612	578	895	1421			1315		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	62	180	148								
Volume Left	0	37	0	29								
Volume Right	1	24	73	0								
cSH	697	696	1421	1315								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	7	0	2								
Control Delay (s)	10.2	10.7	0.0	1.7								
Lane LOS	B	B		A								
Approach Delay (s)	10.2	10.7	0.0	1.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			36.5%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Existing PM

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850						0.852
Flt Protected		0.980								0.950		
Satd. Flow (prot)	0	1808	0	0	1863	1583	0	0	0	1770	1587	0
Flt Permitted		0.634								0.950		
Satd. Flow (perm)	0	1170	0	0	1863	1583	0	0	0	1770	1587	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95					63	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	272	387	0	0	389	87	0	0	0	123	1	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	296	421	0	0	423	95	0	0	0	134	1	63
Lane Group Flow (vph)	0	717	0	0	423	95	0	0	0	134	64	0
Turn Type	Perm					Perm				Perm		
Protected Phases		2			6						8	
Permitted Phases	2					6				8		
Detector Phases	2	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	54.5	54.5	0.0	0.0	54.5	54.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	72.7%	72.7%	0.0%	0.0%	72.7%	72.7%	0.0%	0.0%	0.0%	27.3%	27.3%	0.0%
Maximum Green (s)	49.9	49.9			49.9	49.9				16.0	16.0	
Yellow Time (s)	3.6	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max	C-Max				None	None	
Walk Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0	0				0	0	
Act Effct Green (s)		58.8			58.8	58.8				11.1	11.1	
Actuated g/C Ratio		0.78			0.78	0.78				0.15	0.15	
v/c Ratio		0.78			0.29	0.08				0.51	0.22	
Control Delay		14.6			4.0	1.0				35.6	9.7	
Queue Delay		1.6			0.0	0.0				0.0	0.0	
Total Delay		16.1			4.0	1.0				35.6	9.7	
LOS		B			A	A				D	A	
Approach Delay		16.1			3.5						27.2	

21: SR 145/Madera & SR 99 NB ramps
Existing PM

10/22/2008

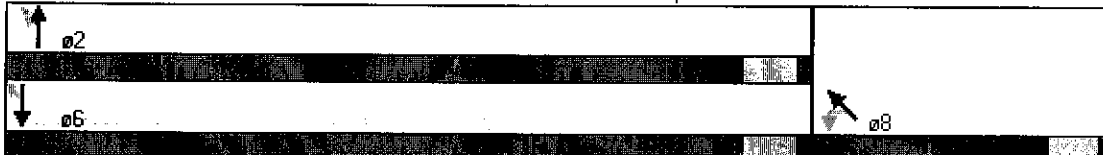
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			A							C
Queue Length 50th (ft)		373			50	0				58	0	
Queue Length 95th (ft)		m#457			105	12				103	30	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)		917			1461	1262				389	398	
Starvation Cap Reductn		80			0	0				0	0	
Spillback Cap Reductn		0			0	0				0	0	
Storage Cap Reductn		0			0	0				0	0	
Reduced v/c Ratio		0.86			0.29	0.08				0.34	0.16	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 13.1
 Intersection Capacity Utilization 72.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: Ave 14/Olive & SR 145/Madera
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50	50	50	50	50
Trailing Detector (ft)	0	0	0				0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frnt			0.850						0.850			0.850
Flt Protected		0.967					0.950				0.986	
Satd. Flow (prot)	0	1767	1553	0	0	0	1770	1863	1583	0	3456	1568
Flt Permitted		0.967					0.950				0.986	
Satd. Flow (perm)	0	1767	1553	0	0	0	1770	1863	1583	0	3456	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			321						8			264
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	217	98	295	0	0	0	108	442	7	83	206	243
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	236	107	321	0	0	0	117	480	8	90	224	264
Lane Group Flow (vph)	0	343	321	0	0	0	117	480	8	0	314	264
Turn Type	Perm		Perm				Split		Perm	Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4						2			6
Detector Phases	4	4	4				2	2	2	6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6	20.6	20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	23.9	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	31.9%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3	19.3	21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max	C-Max	Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0	0	0	0	0
Act Effct Green (s)		19.8	19.8				21.6	21.6	21.6		21.6	21.6
Actuated g/C Ratio		0.26	0.26				0.29	0.29	0.29		0.29	0.29
v/c Ratio		0.73	0.50				0.23	0.90	0.02		0.32	0.41
Control Delay		27.6	4.0				22.9	49.2	12.3		22.5	7.0
Queue Delay		32.8	0.8				0.0	0.0	0.0		0.0	0.0
Total Delay		60.4	4.8				22.9	49.2	12.3		22.5	7.0
LOS		E	A				C	D	B		C	A
Approach Delay		33.5						43.6			15.4	

22: AVe 14/Olive & SR 145/Madera
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						D			B	
Queue Length 50th (ft)		123	10				43	221	0		66	0
Queue Length 95th (ft)		178	8				84	#404	10		102	69
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		507	674				510	536	462		995	640
Starvation Cap Reductn		174	146				0	0	0		0	0
Spillback Cap Reductn		0	0				0	0	0		0	0
Storage Cap Reductn		0	0				0	0	0		0	0
Reduced v/c Ratio		1.03	0.61				0.23	0.90	0.02		0.32	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 31.2
 Intersection Capacity Utilization 58.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
Existing PM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00
Flt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	1863	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	1863	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						114
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	422	351	0	188	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	459	382	0	204	114
Lane Group Flow (vph)	0	459	382	0	204	114
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		53.3	53.3		13.7	13.7
Actuated g/C Ratio		0.71	0.71		0.18	0.18
v/c Ratio		0.18	0.29		0.67	0.31
Control Delay		4.3	4.1		39.0	7.6
Queue Delay		0.0	0.9		0.0	0.0
Total Delay		4.3	5.0		39.0	7.6
LOS		A	A		D	A
Approach Delay		4.3	5.0		27.8	

23: Ave 14/Olive & SR 99 SB off-ramp
Existing PM

10/22/2008

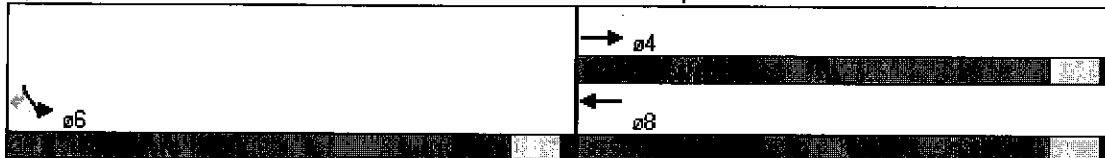
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		30	25		90	0
Queue Length 95th (ft)		58	89		143	37
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2516	1324		769	749
Starvation Cap Reductn		0	654		0	0
Spillback Cap Reductn		6	0		55	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.18	0.57		0.29	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 11.0
 Intersection Capacity Utilization 35.6%
 Analysis Period (min) 15

















Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: Ave 14/Olive & SR 99 SB off-ramp














24: Ave 14/Olive & Road 23
Existing PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	43	77	12	8	24	39	5	64	14	43	51	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	84	13	9	26	42	5	70	15	47	55	18
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	143	77	90	121								
Volume Left (vph)	47	9	5	47								
Volume Right (vph)	13	42	15	18								
Hadj (s)	0.06	-0.14	0.10	0.26								
Departure Headway (s)	4.6	4.5	4.7	4.8								
Degree Utilization, x	0.18	0.10	0.12	0.16								
Capacity (veh/h)	740	753	725	707								
Control Delay (s)	8.6	7.9	8.3	8.7								
Approach Delay (s)	8.6	7.9	8.3	8.7								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.4									
HCM Level of Service			A									
Intersection Capacity Utilization		33.3%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
Existing PM

10/22/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	277	76	114	223	70	122
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	301	83	124	242	76	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	409	124			366	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	409	124			366	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	46	91			94	
cM capacity (veh/h)	555	919			1181	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	301	83	124	242	209	
Volume Left	301	0	0	0	76	
Volume Right	0	83	0	242	0	
cSH	555	919	1700	1700	1181	
Volume to Capacity	0.54	0.09	0.07	0.14	0.06	
Queue Length 95th (ft)	81	7	0	0	5	
Control Delay (s)	18.9	9.3	0.0	0.0	3.4	
Lane LOS	C	A			A	
Approach Delay (s)	16.8		0.0		3.4	
Approach LOS	C					
Intersection Summary						
Average Delay			7.5			
Intersection Capacity Utilization			39.0%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt			0.850		0.947				0.876			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1616	0	1719	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1616	0	1719	1810	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29		30			85				58
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	186	205	27	13	245	134	43	17	78	321	25	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	202	223	29	14	266	146	47	18	85	349	27	58
Lane Group Flow (vph)	202	223	29	14	412	0	47	103	0	349	27	58
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	16.6	28.6	28.6	16.6	28.6	0.0	16.5	28.3	0.0	16.5	28.3	28.3
Total Split (%)	18.4%	31.8%	31.8%	18.4%	31.8%	0.0%	18.3%	31.4%	0.0%	18.3%	31.4%	31.4%
Maximum Green (s)	12.0	24.0	24.0	12.0	24.0		12.0	23.8		12.0	23.8	23.8
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	12.4	37.2	37.2	6.9	23.1		8.4	24.3		12.5	32.9	32.9
Actuated g/C Ratio	0.14	0.42	0.42	0.07	0.26		0.09	0.27		0.14	0.37	0.37
v/c Ratio	0.86	0.30	0.04	0.12	0.89		0.30	0.20		1.44	0.04	0.10
Control Delay	71.2	19.5	7.5	43.1	52.2		42.8	9.3		248.8	22.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	71.2	19.5	7.5	43.1	52.2		42.8	9.3		248.8	22.3	7.2
LOS	E	B	A	D	D		D	A		F	C	A
Approach Delay		41.7			51.9			19.8			202.5	

26: Ave 12 & GS Blvd
Existing PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			F	
Queue Length 50th (ft)	114	76	0	8	207		25	8		274	11	0
Queue Length 95th (ft)	#237	161	19	26	#371		57	46		#442	31	27
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	238	740	645	207	483		227	506		243	673	608
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.85	0.30	0.04	0.07	0.85		0.21	0.20		1.44	0.04	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 88.4
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.44
 Intersection Signal Delay: 90.1
 Intersection LOS: F
 Intersection Capacity Utilization 65.8%
 ICU Level of Service C
 Analysis Period (min) 15

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Existing PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	160	444	0	0	234	277	158	1	116	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	174	483	0	0	254	301	172	1	126	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		818										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	555			483			1235	1386	483	1362	1235	405
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	555			453			1249	1408	453	1383	1249	405
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	83			100			0	99	78	100	100	100
cM capacity (veh/h)	1005			1038			120	106	564	77	135	646
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	657	555	173	126								
Volume Left	174	0	172	0								
Volume Right	0	301	0	126								
cSH	1005	1700	120	564								
Volume to Capacity	0.17	0.33	1.44	0.22								
Queue Length 95th (ft)	16	0	300	21								
Control Delay (s)	4.1	0.0	305.6	13.2								
Lane LOS	A		F	B								
Approach Delay (s)	4.1	0.0	182.3									
Approach LOS			F									
Intersection Summary												
Average Delay			37.9									
Intersection Capacity Utilization			80.3%		ICU Level of Service				D			
Analysis Period (min)			15									

ATTACHMENT VI – C - 4

EXISTING (2008) CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99-NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

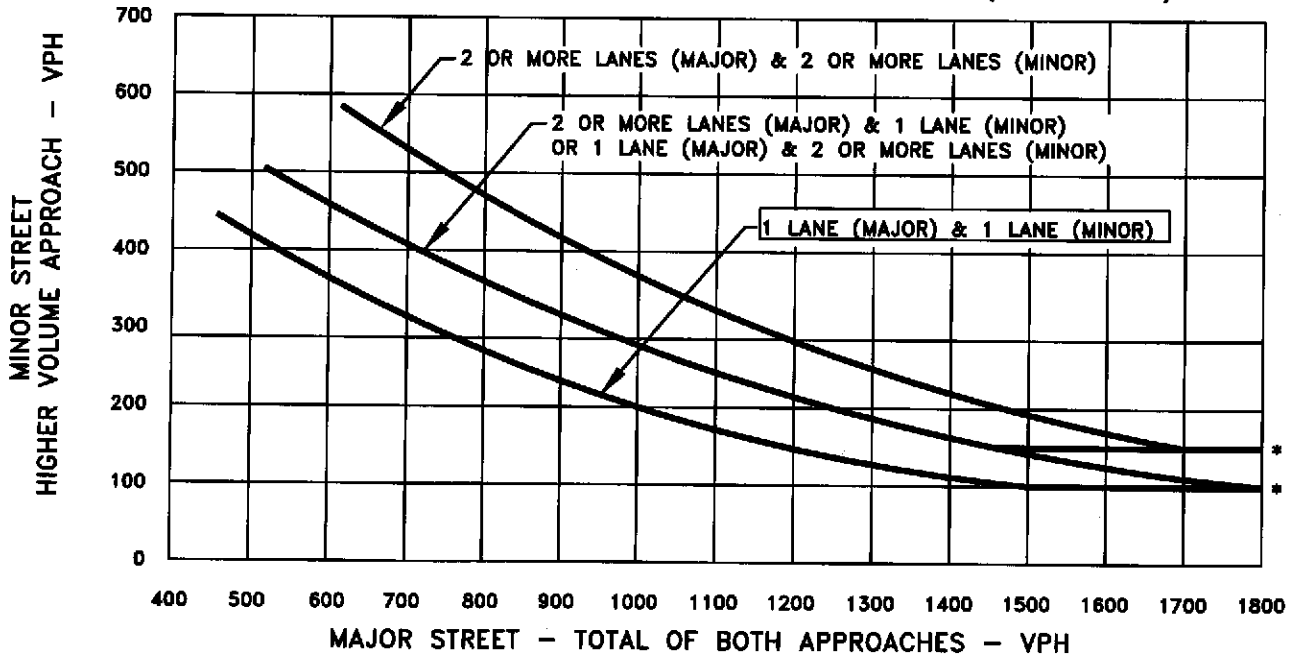
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	/	/	Hour
Both Approaches - Major Street	✓		273	268			
Highest Approaches - Minor Street	✓		191	193			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB ON RAMP/ ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

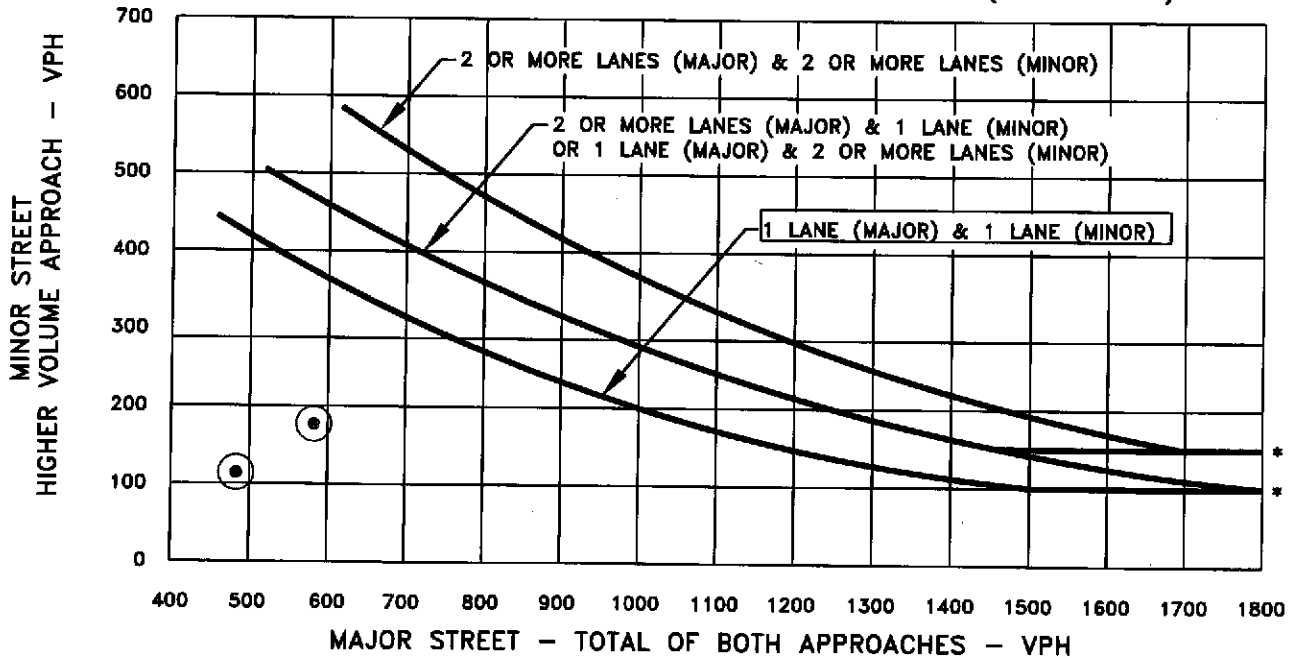
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		483	582	
Highest Approaches - Minor Street	✓		114	177	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

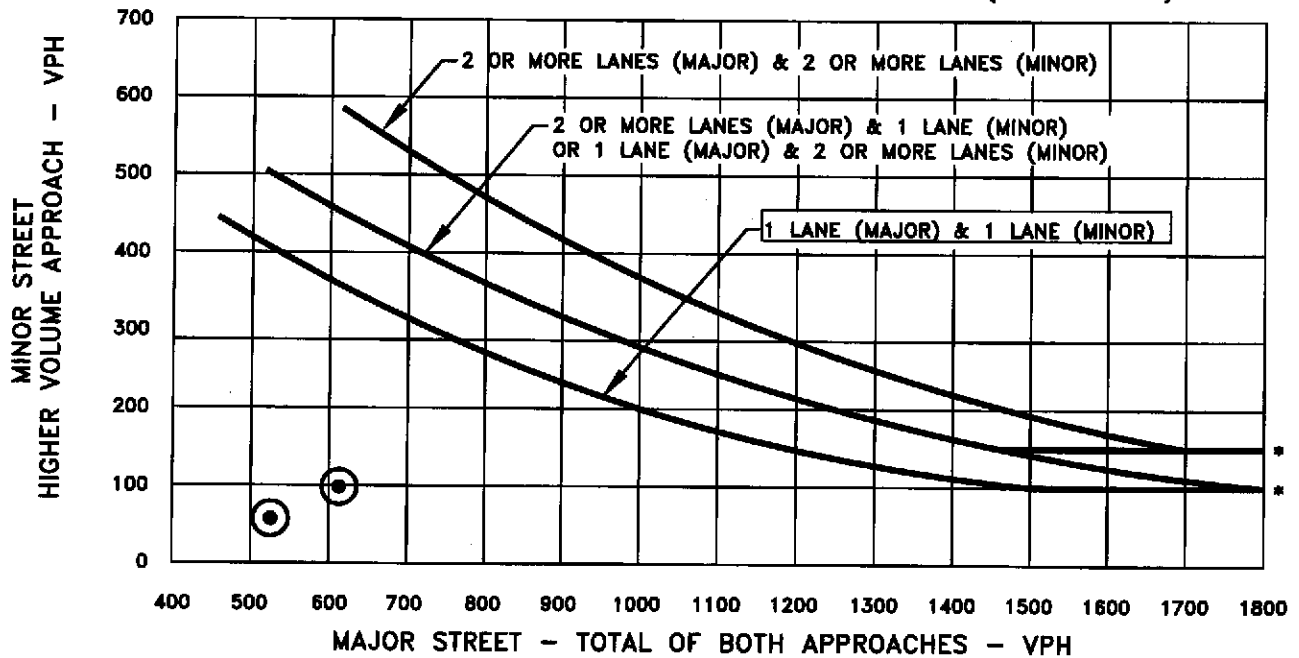
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour	
Both Approaches - Major Street	✓		525	613		
Highest Approaches - Minor Street	✓		57	98		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

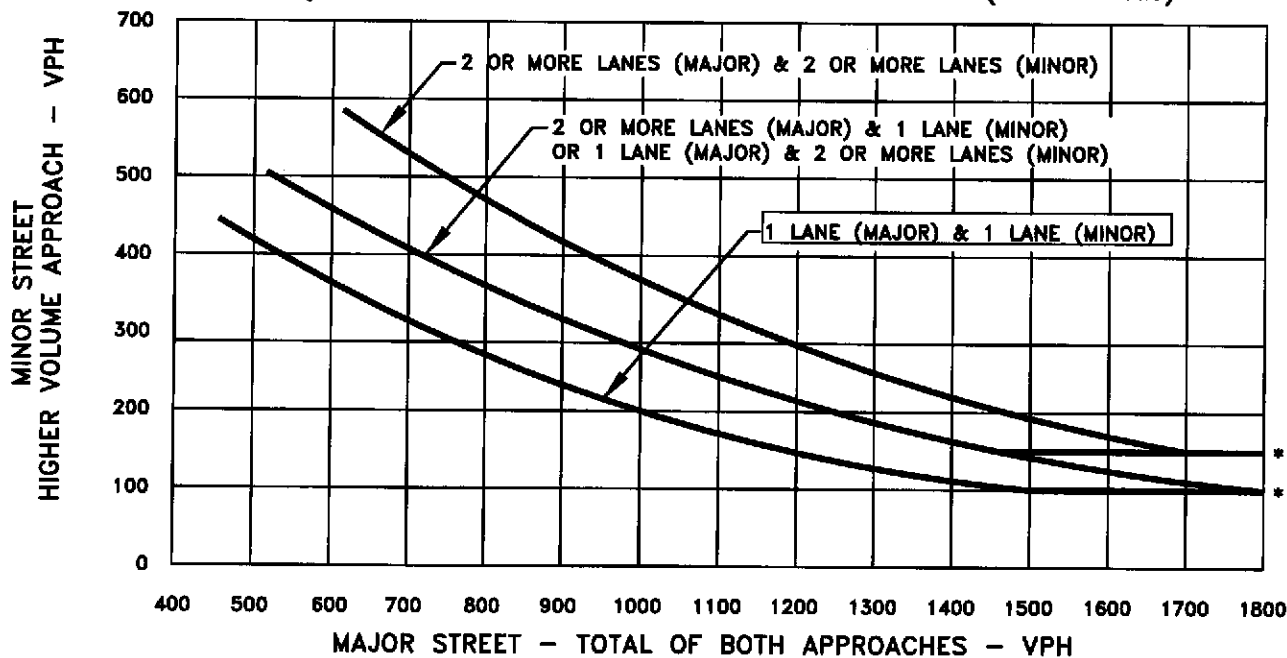
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM	PM PEAK		
Both Approaches - Major Street	✓		218	223		
Highest Approaches - Minor Street	✓		108	117		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

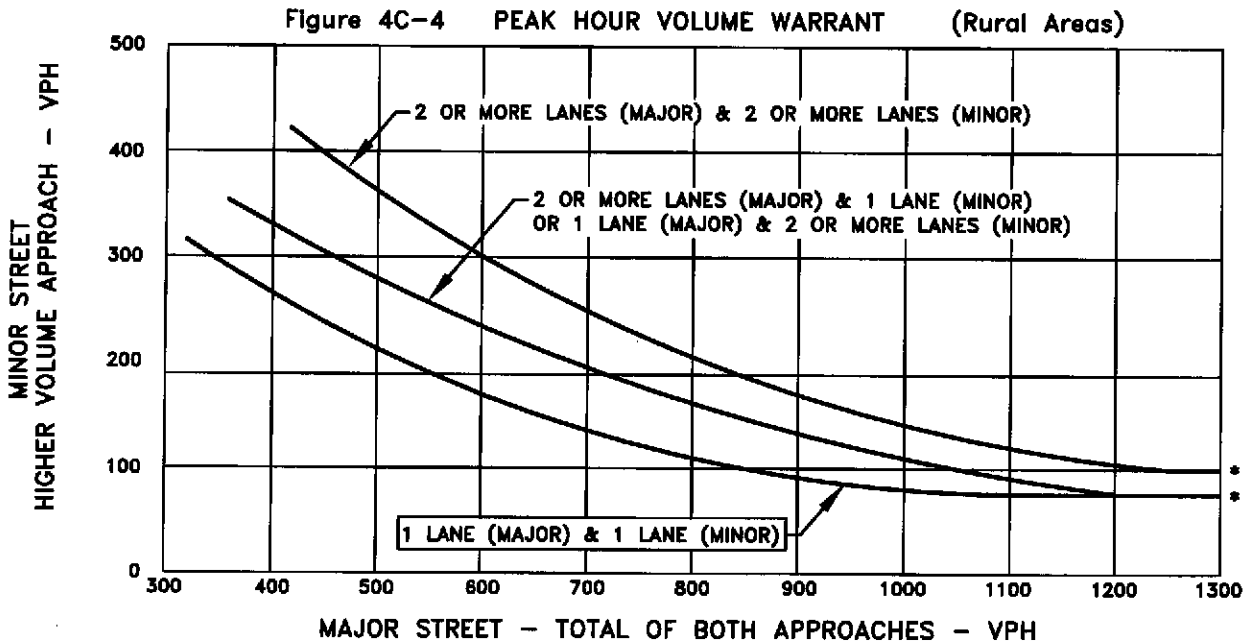
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		166	188			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		11	21			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

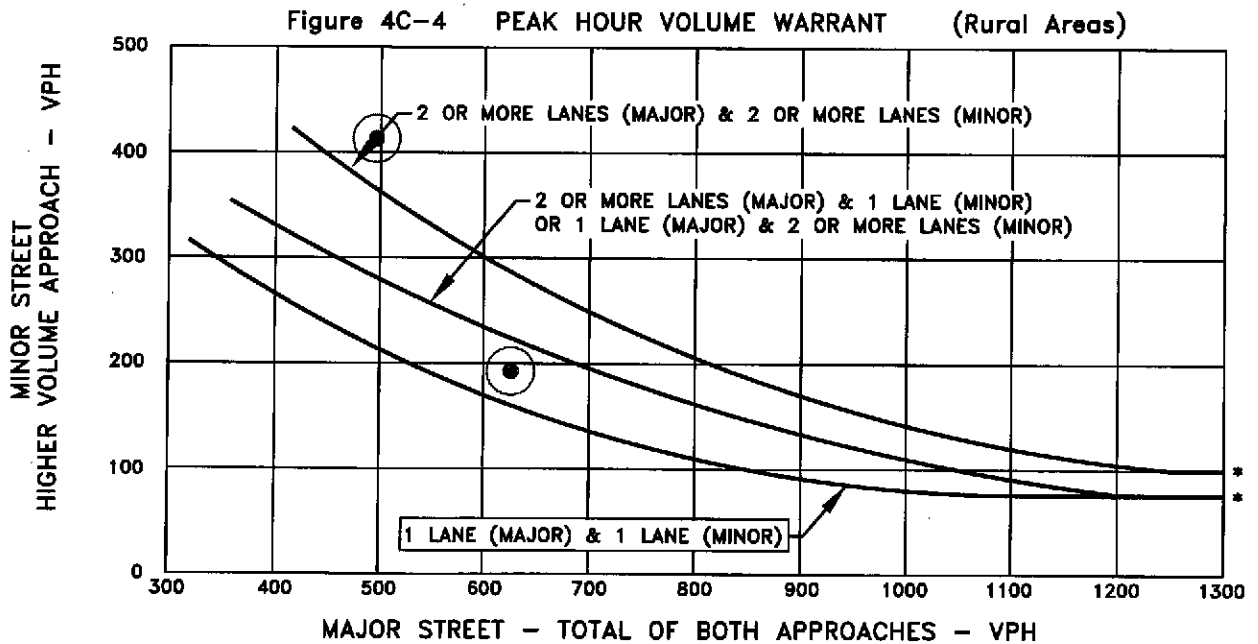
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		626	496		
Highest Approaches - Minor Street	✓		193	413		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 SB OFF RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

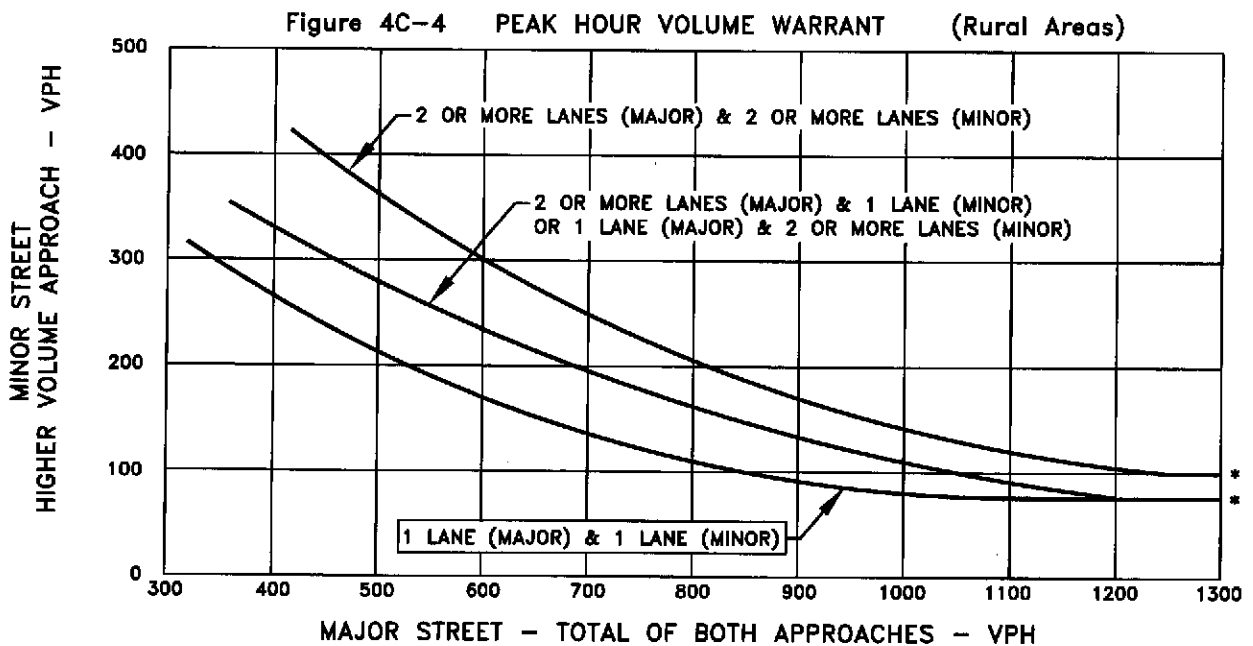
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		240	290		
Highest Approaches - Minor Street	✓		45	104		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: AIRPORT ROAD/ GOLDEN STATE

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ----- or RURAL (R)

In built up area of isolated community of < 10,000 pop. ----- URBAN (U)

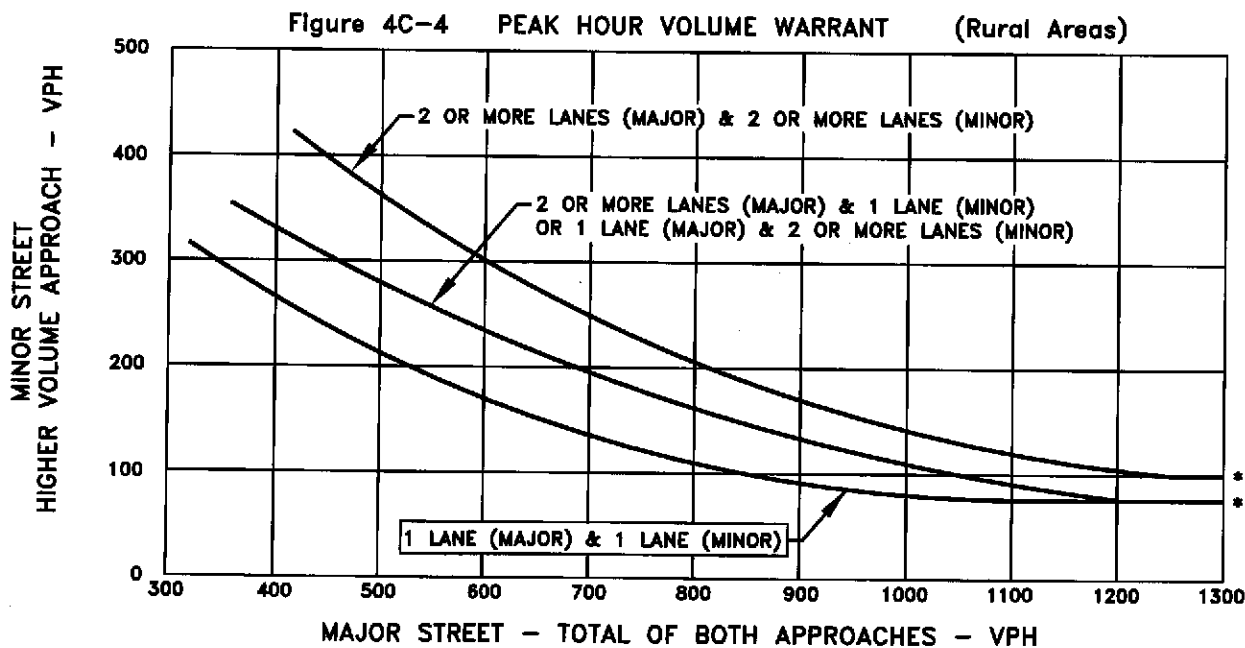
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	221	193			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	46	93			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

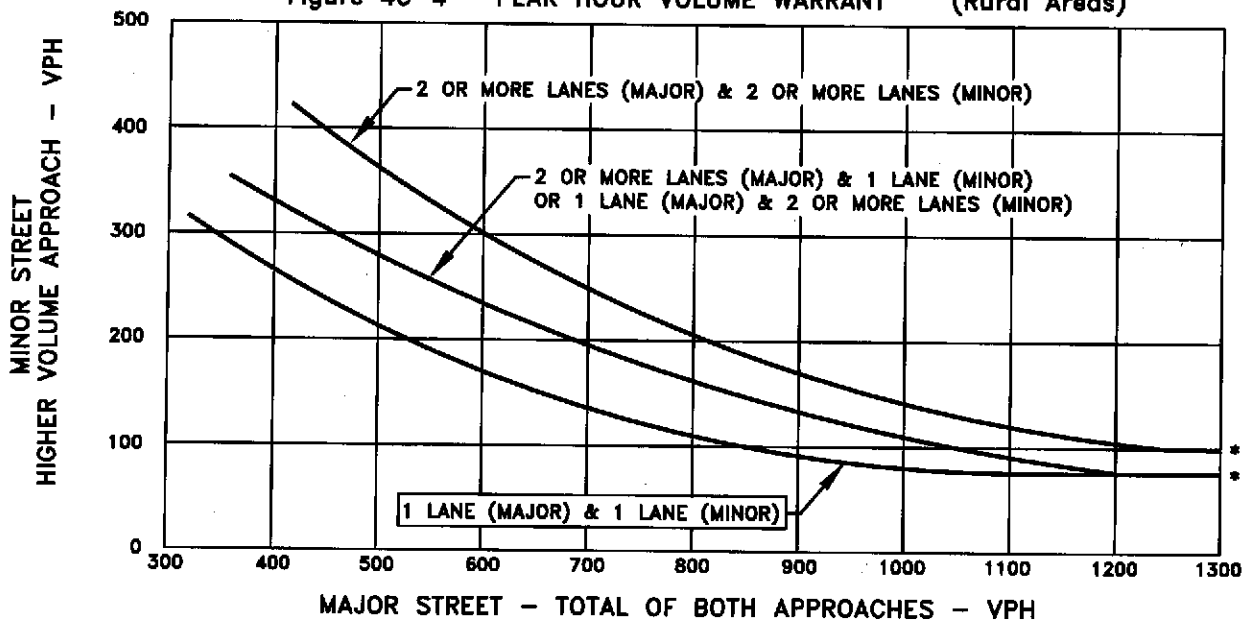
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		182	222		
Highest Approaches - Minor Street	✓		43	41		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB ON RAMP

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16/ GATEWAY

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

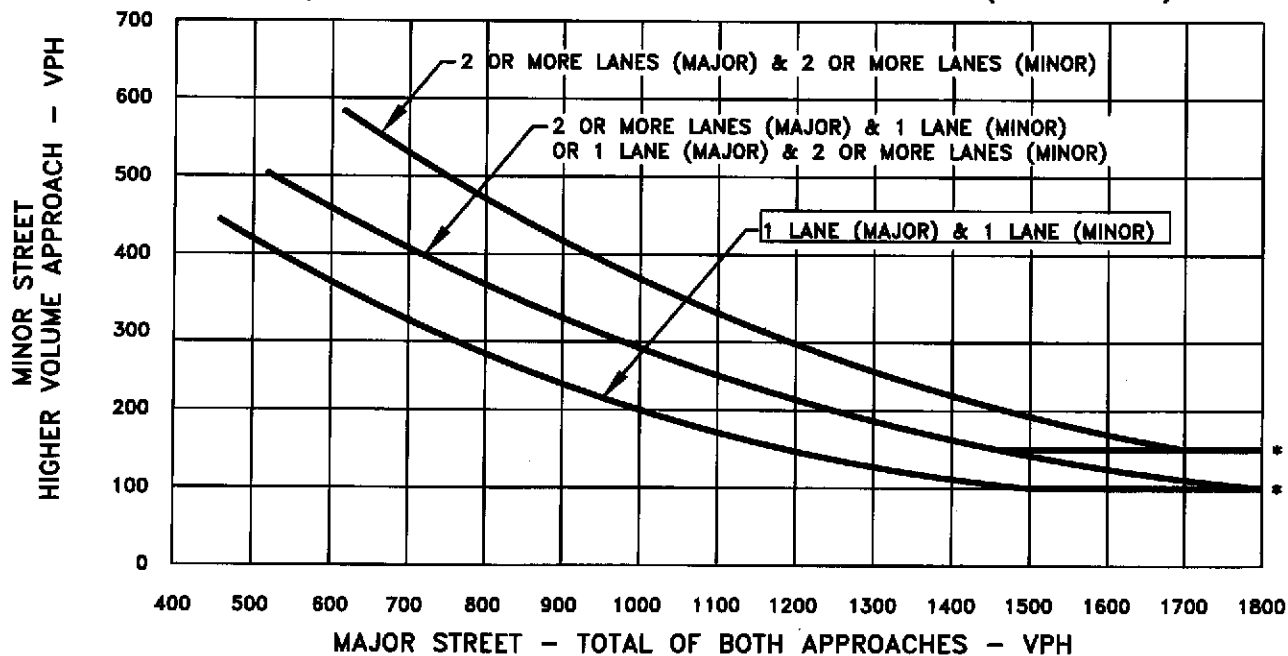
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		123	220	
Highest Approaches - Minor Street	✓		115	190	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 16

Critical Approach Speed 35 mph

MINOR STREET: SR-99 NB ON CONNECTOR

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

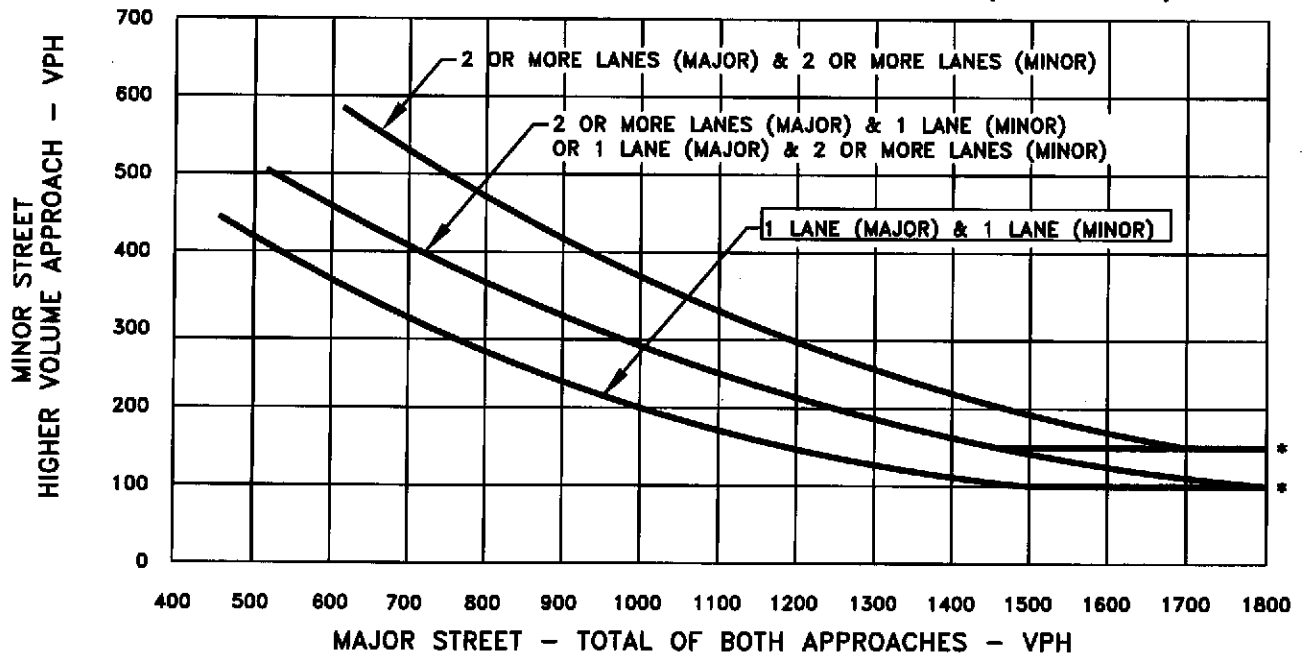
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		157	201	
Highest Approaches - Minor Street	✓		56	100	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16 CONNECTOR

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

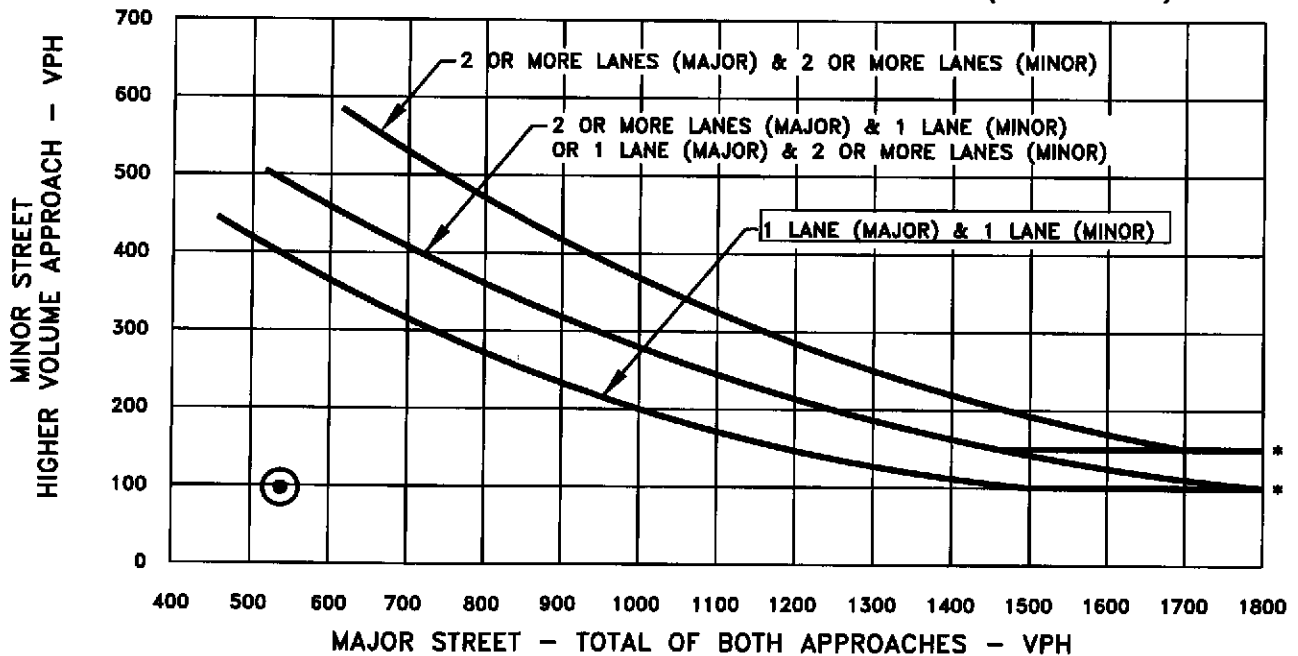
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		358	538	
Highest Approaches - Minor Street	✓		53	97	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 SB

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

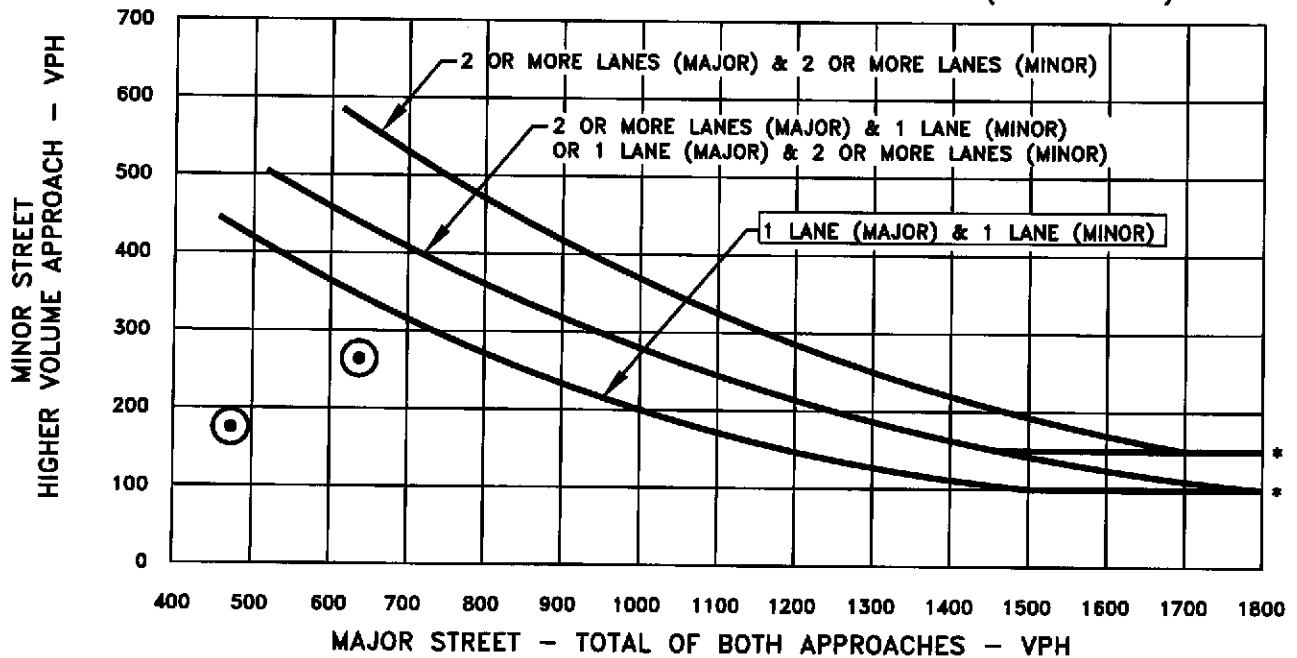
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		473	638	
Highest Approaches - Minor Street	✓		175	264	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



*** NOTE:**
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 16

Critical Approach Speed 45/40 mph

MINOR STREET: SCHNOOR AVENUE

Critical Approach Speed 40/40 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

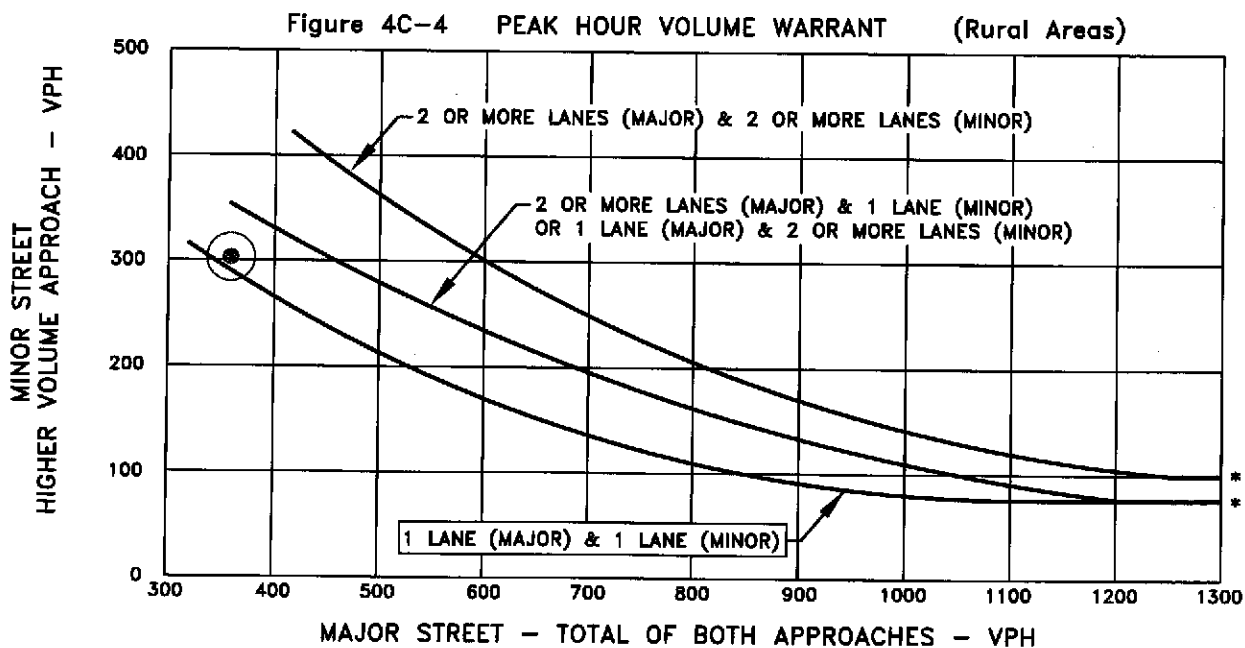
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	235	359		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	163	303		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

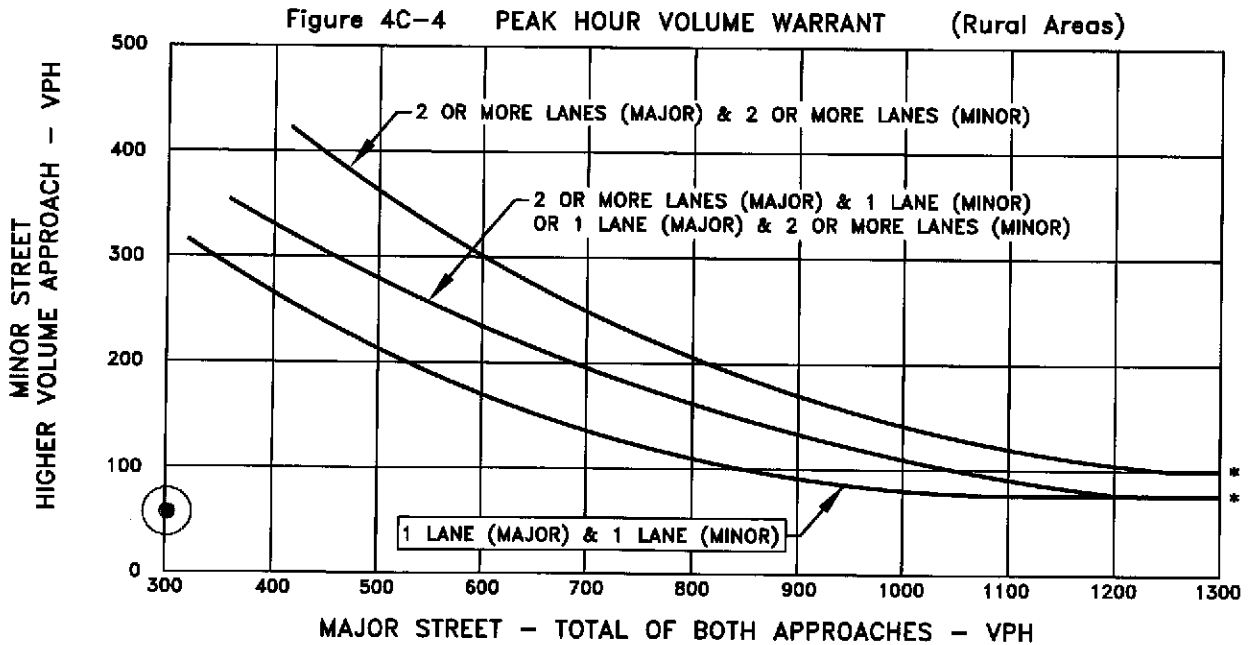
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		228	302		
Highest Approaches - Minor Street	✓		48	57		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

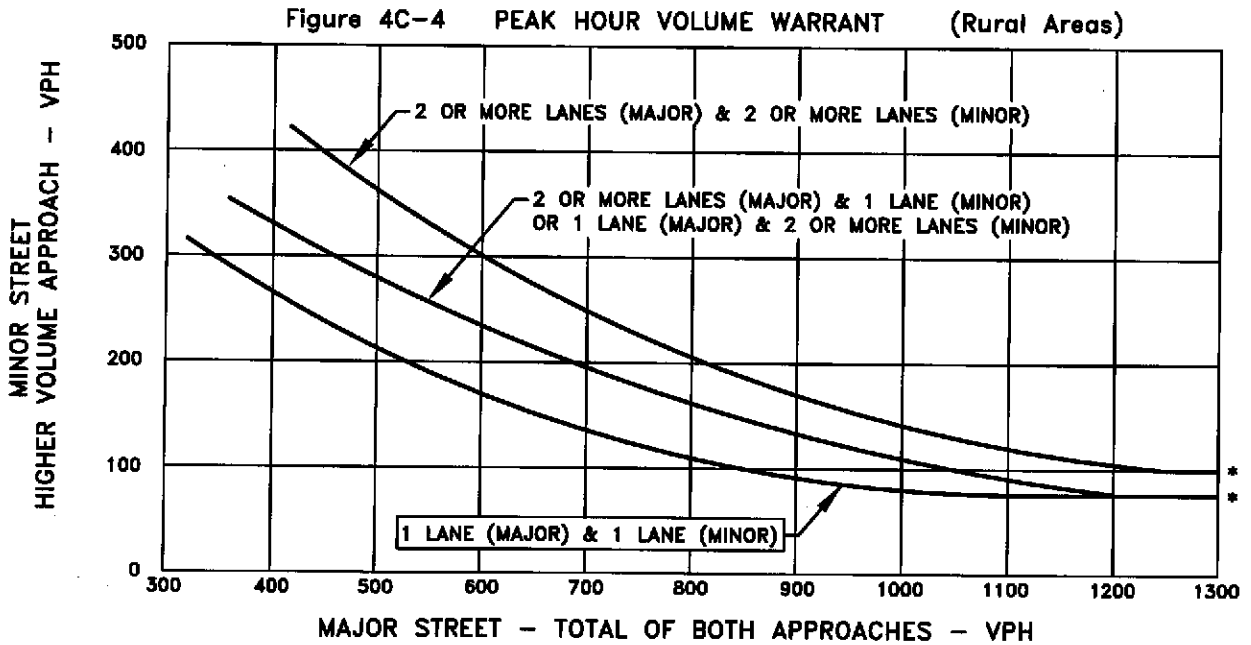
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		194	203		
Highest Approaches - Minor Street	✓		108	111		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB RAMPS/ GOLDEN STATE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

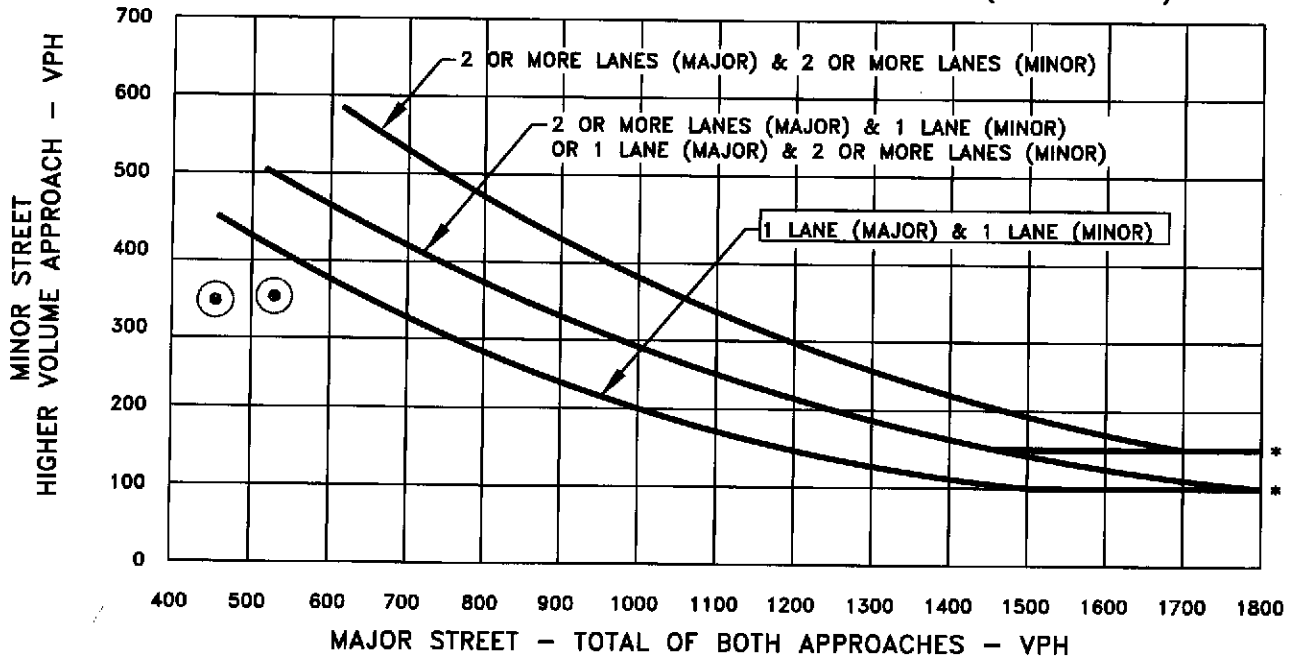
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		455	529	
Highest Approaches - Minor Street	✓		348	353	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: EXISTING

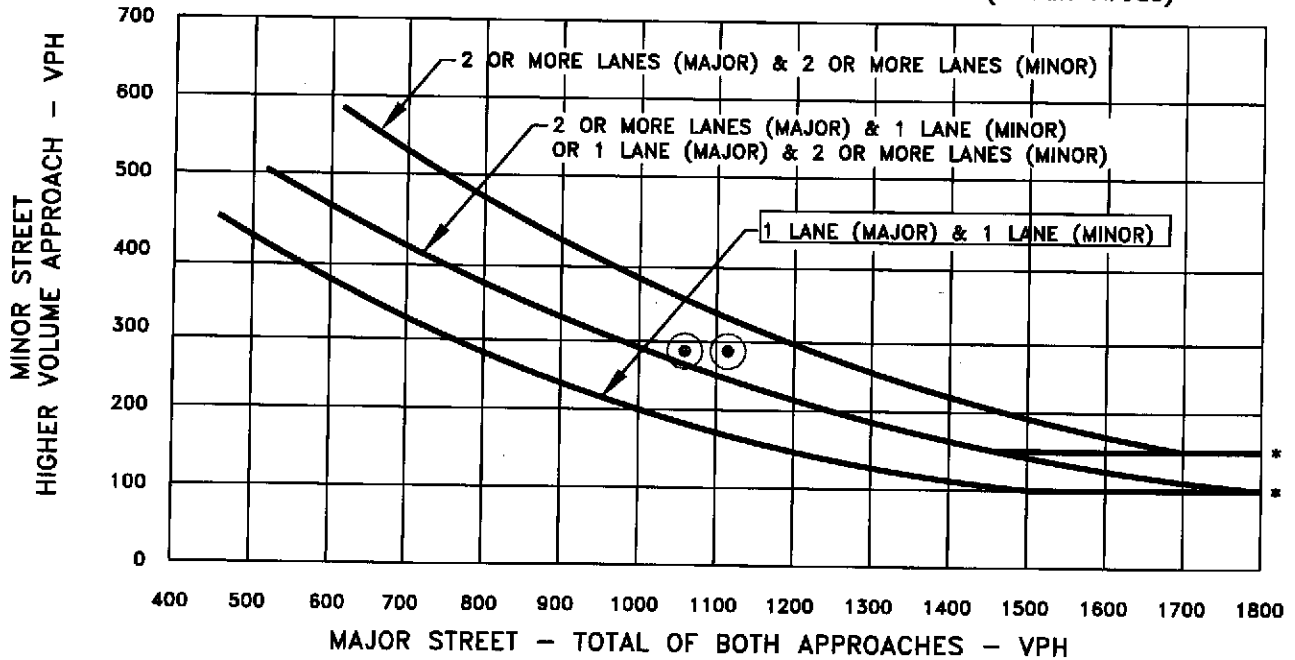
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		Hour	
			AM	PM PEAK		
Both Approaches - Major Street	✓		1059	1115		
Highest Approaches - Minor Street	✓		276	275		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

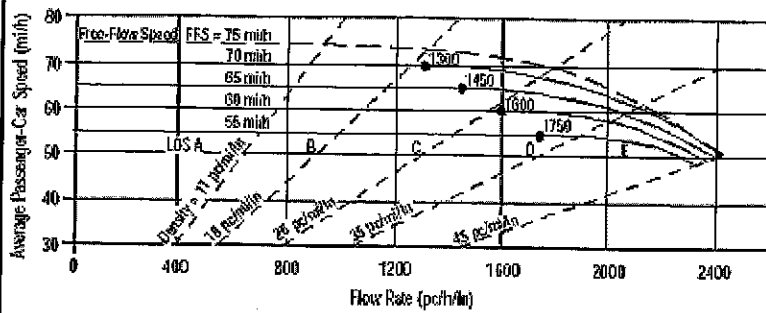
ATTACHMENT VI – C - 5

OPENING DAY (2010) NO PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2590	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

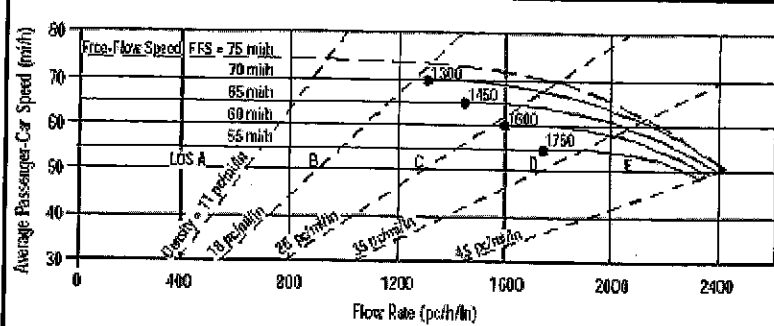
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1654 pc/h/ln	Design LOS	
S	69.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	23.9 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper. (LOS) Des. (N) Planning Data

Flow Inputs			
Volume, V	2614	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

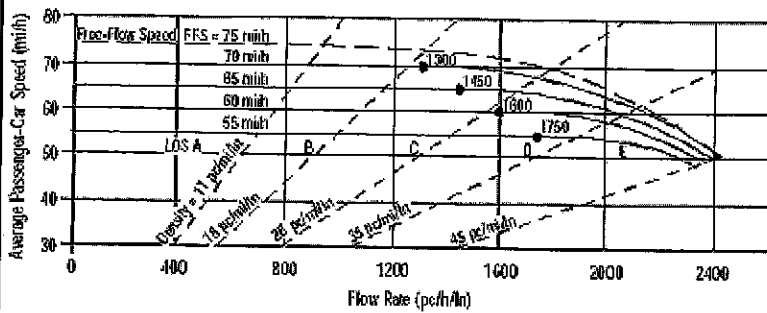
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1669 pc/h/ln	Design LOS	
S	69.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.2 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

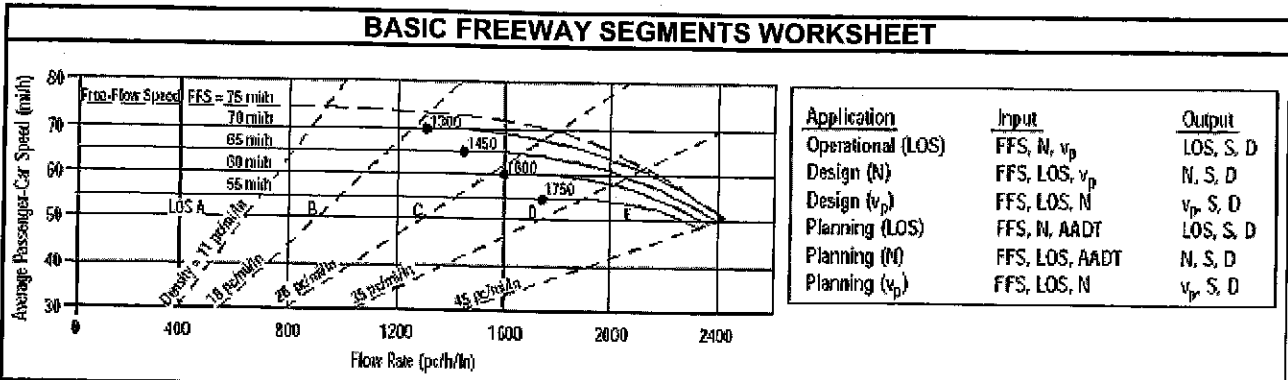
Flow Inputs			
Volume, V	2149	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1372 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.6 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs

Volume, V	3148	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

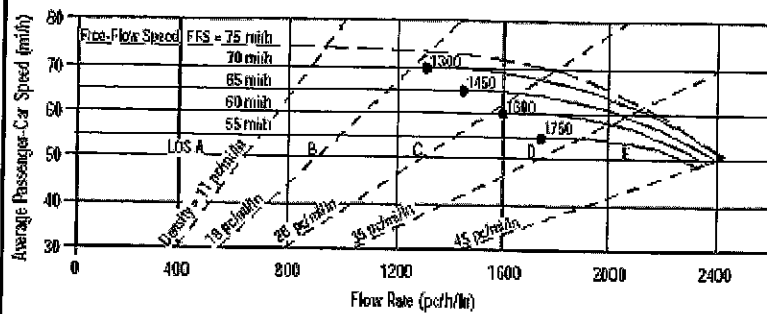
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	Design LOS
f _p	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)
S	f _p
D = v _p / S	S
LOS	D = v _p / S
	Required Number of Lanes, N

Glossary	Factor Location
N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v _p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	
	E _R - Exhibits 23-8, 23-10
	E _T - Exhibits 23-8, 23-10, 23-11
	f _p - Page 23-12
	LOS, S, FFS, v _p - Exhibits 23-2, 23-3
	f _{LW} - Exhibit 23-4
	f _{LC} - Exhibit 23-5
	f _N - Exhibit 23-6
	f _{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2682	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	2		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

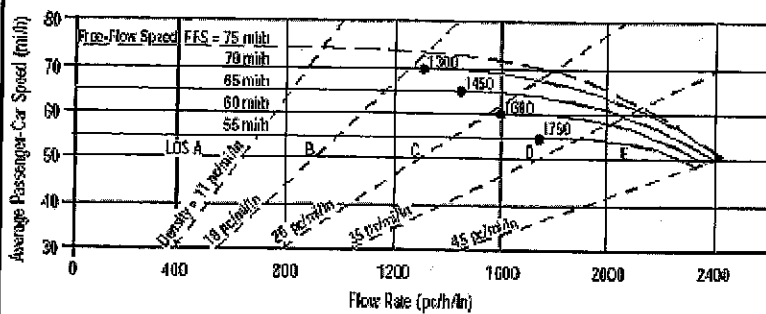
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1713	pc/h/ln	Design LOS
S	68.7	mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)
D = v _p / S	24.9	pc/mi/ln	f _p
LOS	C		S
			D = v _p / S
			Required Number of Lanes, N

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2733	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

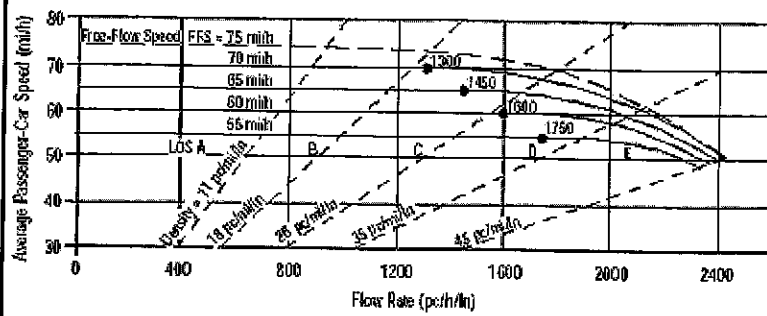
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1745 pc/h/ln	Design LOS	
S	68.4 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.5 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper. (LOS)
 Des. (N)
 Planning Data

Flow Inputs			
Volume, V	2237	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

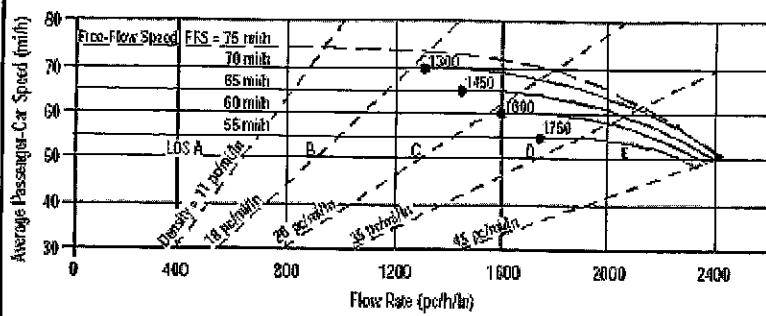
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1429 pc/h/ln	Design LOS	
S	69.9 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	20.4 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	3294	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AAADT, K			%RVs, P _R	2
Peak-Hr Direction Prop., D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}		mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}		mi/h
Interchange Density	0.50	l/mi	f _{ID}		mi/h
Number of Lanes, N	2		f _N		mi/h
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures

Design (N)

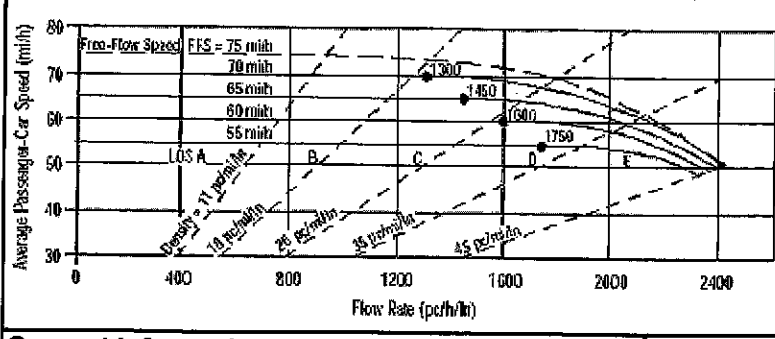
Operational (LOS)			Design (N)		
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	2104	pc/h/ln	Design LOS		
S	62.6	mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)		pc/h
D = v _p / S	33.6	pc/mi/ln	S		mi/h
LOS	D		D = v _p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information **Site Information**

Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Aits A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs

Volume, V	2984	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	2		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

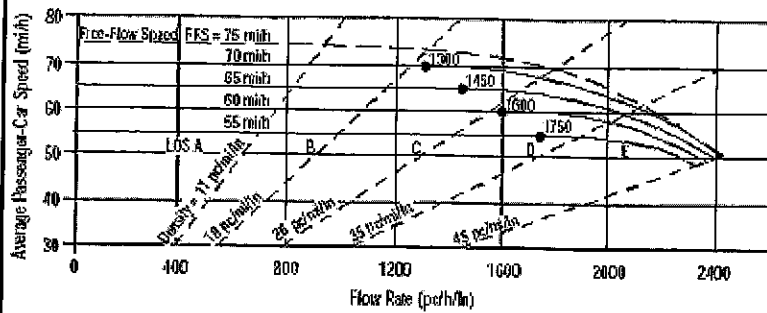
LOS and Performance Measures **Design (N)**

Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1906	pc/h/ln	Design LOS
S	66.5	mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)
D = v _p / S	28.7	pc/mi/ln	S
LOS	D		D = v _p / S
			Required Number of Lanes, N

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3144	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

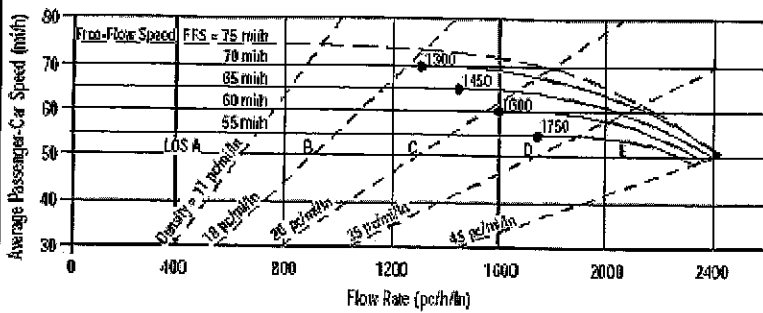
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 /mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2008 pc/h/ln	Design LOS	
S	64.7 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	31.0 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 No Project AM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alts A, B & C																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	2481	veh/h	Peak-Hour Factor, PHF 0.88																			
AADT		veh/day	%Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AADT, K			%RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AADT x K x D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	2		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = V$ or DDHV / (PHF x N x f_{HV} x f_p)	1584	pc/h/ln	Design LOS																			
S	69.5	mi/h	$v_p = V$ or DDHV / (PHF x N x f_{HV} x f_p)																			
$D = v_p / S$	22.8	pc/mi/ln	S																			
LOS	C		$D = v_p / S$																			
			Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 No Project PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3741	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2389 pc/h/ln	Design LOS	
S	53.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	44.4 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 6

OPENING DAY (2010) NO PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
2010 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↗		↖	↗				
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	166	50	0	0	91	12	177	2	38	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	180	54	0	0	99	13	192	2	41	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	112			54			521	527	54	563	521	105
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			54			521	527	54	563	521	105
tC, single (s)	4.5			4.3			7.4	6.8	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.6			2.4			3.8	4.3	3.6	3.5	4.0	3.3
p0 queue free %	86			100			49	99	96	100	100	100
cM capacity (veh/h)	1263			1449			378	359	939	373	397	954
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	180	54	112	192	43							
Volume Left	180	0	0	192	0							
Volume Right	0	0	13	0	41							
cSH	1263	1700	1700	378	869							
Volume to Capacity	0.14	0.03	0.07	0.51	0.05							
Queue Length 95th (ft)	12	0	0	69	4							
Control Delay (s)	8.3	0.0	0.0	24.0	9.4							
Lane LOS	A			C	A							
Approach Delay (s)	6.4		0.0	21.3								
Approach LOS				C								

Intersection Summary

Average Delay		11.2			
Intersection Capacity Utilization		32.3%		ICU Level of Service	A
Analysis Period (min)		15			












3: Ave 18.5 & Road 23
2010 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖		↖	↖		↖	↖	↖		↖	↖
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	296	60	16	204	0	71	0	86	12	53	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	322	65	17	222	0	77	0	93	13	58	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	222			387			720	611	354	704	643	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			387			720	611	354	704	643	222
tC, single (s)	4.4			4.3			7.4	6.8	6.5	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.5			2.4			3.7	4.2	3.5	3.8	4.3	3.6
p0 queue free %	100			98			68	100	85	95	83	89
cM capacity (veh/h)	1179			1066			240	371	637	262	345	740
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	387	239	77	93	151							
Volume Left	0	17	77	0	13							
Volume Right	65	0	0	93	80							
cSH	1700	1066	240	637	464							
Volume to Capacity	0.23	0.02	0.32	0.15	0.33							
Queue Length 95th (ft)	0	1	33	13	35							
Control Delay (s)	0.0	0.8	26.9	11.6	16.5							
Lane LOS		A	D	B	C							
Approach Delay (s)	0.0	0.8	18.5		16.5							
Approach LOS			C		C							
Intersection Summary												
Average Delay			6.2									
Intersection Capacity Utilization			45.9%			ICU Level of Service			A			
Analysis Period (min)			15									







4: Ave 18.5 & Pistacchio
2010 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	262	199	135	86	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	285	216	147	93	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	363				503	216
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363				503	216
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				80	99
cM capacity (veh/h)	1043				478	754
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	286	216	147	98		
Volume Left	1	0	0	93		
Volume Right	0	0	147	4		
cSH	1043	1700	1700	486		
Volume to Capacity	0.00	0.13	0.09	0.20		
Queue Length 95th (ft)	0	0	0	19		
Control Delay (s)	0.0	0.0	0.0	14.3		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		14.3		
Approach LOS				B		
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization		28.9%		ICU Level of Service	A	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
2010 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	74	77	120	144	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	80	84	130	157	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	214				171	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	214				171	84
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				77	99
cM capacity (veh/h)	1350				686	818
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	84	84	130	161		
Volume Left	3	0	0	157		
Volume Right	0	0	130	4		
cSH	1350	1700	1700	689		
Volume to Capacity	0.00	0.05	0.08	0.23		
Queue Length 95th (ft)	0	0	0	23		
Control Delay (s)	0.3	0.0	0.0	11.8		
Lane LOS	A			B		
Approach Delay (s)	0.3	0.0		11.8		
Approach LOS				B		
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization		21.2%		ICU Level of Service	A	
Analysis Period (min)		15				













6: Ave 18 & Road 23
2010 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	25	1	129	0	21	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	27	1	140	0	23	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	330	302	114	311	302	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330	302	114	311	302	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	97	100			98		
cM capacity (veh/h)	581	588	920	601	582	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	34	141	137								
Volume Left	0	4	1	23								
Volume Right	3	27	0	0								
cSH	641	805	1323	1283								
Volume to Capacity	0.02	0.04	0.00	0.02								
Queue Length 95th (ft)	2	3	0	1								
Control Delay (s)	10.7	9.7	0.1	1.4								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.7	9.7	0.1	1.4								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			29.0%		ICU Level of Service				A			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2010 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖	↗		↕	↗			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	43	251	0	0	647	79	215	1	185	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	273	0	0	703	86	234	1	201	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	789			273			1070	1155	273	1271	1070	703
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	789			273			1070	1155	273	1271	1070	703
tC, single (s)	4.3			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	94			100			0	99	73	100	100	100
cM capacity (veh/h)	764			1273			186	182	756	102	209	441
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	47	273	703	86	235	201						
Volume Left	47	0	0	0	234	0						
Volume Right	0	0	0	86	0	201						
cSH	764	1700	1700	1700	186	756						
Volume to Capacity	0.06	0.16	0.41	0.05	1.26	0.27						
Queue Length 95th (ft)	5	0	0	0	322	27						
Control Delay (s)	10.0	0.0	0.0	0.0	202.9	11.5						
Lane LOS	B				F	B						
Approach Delay (s)	1.5		0.0		114.6							
Approach LOS					F							
Intersection Summary												
Average Delay			32.6									
Intersection Capacity Utilization			54.4%		ICU Level of Service				A			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
2010 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	472	437	0	39	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	513	475	0	42	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	475				988	475
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	475				988	475
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.5
p0 queue free %	100				83	90
cM capacity (veh/h)	1018				252	551
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	513	475	42	54		
Volume Left	0	0	42	0		
Volume Right	0	0	0	54		
cSH	1700	1700	252	551		
Volume to Capacity	0.30	0.28	0.17	0.10		
Queue Length 95th (ft)	0	0	15	8		
Control Delay (s)	0.0	0.0	22.2	12.3		
Lane LOS			C	B		
Approach Delay (s)	0.0	0.0	16.6			
Approach LOS			C			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			34.8%		ICU Level of Service	A
Analysis Period (min)			15			

10: Ave 17 & GS Blvd
2010 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	16	291	12	129	274	84	58	23	76	105	13	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	316	13	140	298	91	63	25	83	114	14	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	389			329			948	1021	316	1070	988	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			329			948	1021	316	1070	988	343
tC, single (s)	4.2			4.2			7.4	6.8	6.5	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.5	3.6	4.1	3.4
p0 queue free %	98			88			65	87	88	16	93	98
cM capacity (veh/h)	1127			1181			183	186	672	135	207	679
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	17	316	13	140	389	63	25	83	140			
Volume Left	17	0	0	140	0	63	0	0	114			
Volume Right	0	0	13	0	91	0	0	83	12			
cSH	1127	1700	1700	1181	1700	183	186	672	151			
Volume to Capacity	0.02	0.19	0.01	0.12	0.23	0.35	0.13	0.12	0.93			
Queue Length 95th (ft)	1	0	0	10	0	36	11	10	165			
Control Delay (s)	8.2	0.0	0.0	8.5	0.0	34.8	27.3	11.1	113.9			
Lane LOS	A			A		D	D	B	F			
Approach Delay (s)	0.4			2.2		22.2			113.9			
Approach LOS						C			F			
Intersection Summary												
Average Delay			17.8									
Intersection Capacity Utilization			46.7%			ICU Level of Service			A			
Analysis Period (min)			15									

11: Ave 17 & Road 23
2010 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	99	23	35	90	3	14	133	29	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	108	25	38	98	3	15	145	32	10	104	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	367	330	104	393	315	160	104			176		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	367	330	104	393	315	160	104			176		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.3			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.4			2.4		
p0 queue free %	100	81	97	92	83	100	99			99		
cM capacity (veh/h)	502	576	948	455	579	867	1382			1273		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	133	139	191	114								
Volume Left	0	38	15	10								
Volume Right	25	3	32	0								
cSH	622	543	1382	1273								
Volume to Capacity	0.21	0.26	0.01	0.01								
Queue Length 95th (ft)	20	25	1	1								
Control Delay (s)	12.3	13.9	0.7	0.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.3	13.9	0.7	0.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			6.6									
Intersection Capacity Utilization			35.7%		ICU Level of Service				A			
Analysis Period (min)			15									

12: Ellis & Road 26
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frnt			0.850			0.850		0.983			0.993	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3380	0	1752	3480	0
Flt Permitted		0.730			0.740		0.950			0.950		
Satd. Flow (perm)	0	1360	1583	0	1378	1583	1719	3380	0	1752	3480	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			7			68		20			7	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	24	0	6	39	0	63	6	311	39	31	442	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	26	0	7	42	0	68	7	338	42	34	480	23
Lane Group Flow (vph)	0	26	7	0	42	68	7	380	0	34	503	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.7	10.7		10.7	10.7	8.2	35.0		9.0	35.3	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.64		0.14	0.65	
v/c Ratio		0.11	0.02		0.17	0.20	0.03	0.17		0.14	0.22	
Control Delay		11.6	8.2		12.0	5.6	14.8	5.8		14.7	5.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.6	8.2		12.0	5.6	14.8	5.8		14.7	5.8	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		10.9			8.1			6.0			6.4	

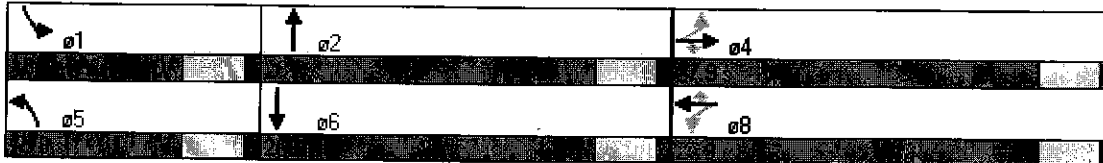
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		3	0		5	0	1	13		4	19	
Queue Length 95th (ft)		20	7		28	23	9	63		24	80	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		529	621		537	658	360	2439		370	2517	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.05	0.01		0.08	0.10	0.02	0.16		0.09	0.20	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 54.5
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.22
 Intersection Signal Delay: 6.6
 Intersection Capacity Utilization 35.0%
 Analysis Period (min) 15










Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
2010 No Project AM

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	138	3	0	97	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	150	3	0	105	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	158		282	132		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158		282	132		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1398		647	841		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	150	3	158			
Volume Left	0	3	0			
Volume Right	0	0	52			
cSH	1700	647	1700			
Volume to Capacity	0.09	0.01	0.09			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.6	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.6	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			18.3%	ICU Level of Service		A
Analysis Period (min)			15			







14: Gateway & AVE 16 Connector
 2010 No Project AM

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↑		↑	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	48	3	61	190	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	52	3	66	207	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				89	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				89	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				77	100
cM capacity (veh/h)	1458				912	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	52	70	207			
Volume Left	0	0	207			
Volume Right	0	66	0			
cSH	1700	1700	912			
Volume to Capacity	0.03	0.04	0.23			
Queue Length 95th (ft)	0	0	22			
Control Delay (s)	0.0	0.0	10.1			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			6.4			
Intersection Capacity Utilization			21.1%	ICU Level of Service		A
Analysis Period (min)			15			

15: Kennedy & Ave 16 Connector
 2010 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑			↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	190	138	96	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	207	150	104	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	104				667	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104				667	104
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	86				100	93
cM capacity (veh/h)	1481				359	939
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	357	104	66			
Volume Left	207	0	0			
Volume Right	0	0	66			
cSH	1481	1700	939			
Volume to Capacity	0.14	0.06	0.07			
Queue Length 95th (ft)	12	0	6			
Control Delay (s)	5.0	0.0	9.1			
Lane LOS	A		A			
Approach Delay (s)	5.0	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		27.8%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frnt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				1		204
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	276	158	1	47	188
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	300	172	1	51	204
Lane Group Flow (vph)	130	300	172	1	51	204
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.4	10.6	10.6	13.6	13.6
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.37	0.37
v/c Ratio	0.34	0.34	0.36	0.00	0.08	0.29
Control Delay	16.8	5.5	14.1	10.0	14.5	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	5.5	14.1	10.0	14.5	4.6
LOS	B	A	B	A	B	A
Approach Delay		8.9	14.1		6.6	

16: Kennedy & SR 99 SB off-ramp
 2010 No Project AM

10/22/2008

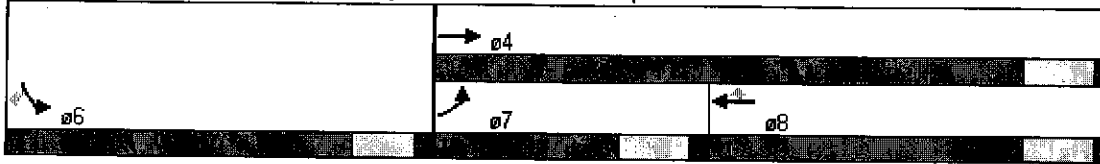
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	29	0	9	0
Queue Length 95th (ft)	69	63	78	3	33	40
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	454	1174	707	601	890	894
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.24	0.00	0.06	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.3
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.3
 Intersection Capacity Utilization 28.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations	↔	↕		↔	↕		↔	↔	↕	↔	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.937			0.945				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3316	0	1770	3345	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3316	0	1770	3345	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			22				3		222	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	44	32	142	35	20	20	29	3	41	52	204
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	48	35	154	38	22	22	32	3	45	57	222
Lane Group Flow (vph)	4	83	0	154	60	0	22	32	3	45	279	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.6	7.0		8.5	15.4		4.6	17.6	17.6	17.1	36.8	
Actuated g/C Ratio	0.07	0.11		0.13	0.24		0.07	0.29	0.29	0.28	0.60	
v/c Ratio	0.03	0.21		0.65	0.07		0.18	0.06	0.01	0.09	0.27	
Control Delay	31.5	18.8		41.6	14.0		33.6	19.2	13.3	19.9	3.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	18.8		41.6	14.0		33.6	19.2	13.3	19.9	3.9	
LOS	C	B		D	B		C	B	B	B	A	
Approach Delay		19.4			33.8			24.5		6.2		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	9		59	5		8	10	0	14	9	
Queue Length 95th (ft)	10	27		#136	21		29	29	6	37	54	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	120	787		252	1047		123	511	459	496	1045	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.11		0.61	0.06		0.18	0.06	0.01	0.09	0.27	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 60.9
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 32.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↗	↖	↗			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						111			165			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	63	483	0	0	628	102	274	0	152	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	68	525	0	0	683	111	298	0	165	0	0	0
Lane Group Flow (vph)	68	525	0	0	683	111	149	149	165	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	8.8	48.5			37.7	37.7	28.5	28.5	28.5			
Actuated g/C Ratio	0.10	0.57			0.44	0.44	0.34	0.34	0.34			
v/c Ratio	0.38	0.27			0.44	0.15	0.27	0.27	0.27			
Control Delay	30.4	7.3			18.6	4.0	22.4	22.4	4.7			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	30.4	7.3			18.6	4.0	22.4	22.4	4.7			
LOS	C	A			B	A	C	C	A			
Approach Delay		10.0			16.5			16.1				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 No Project AM

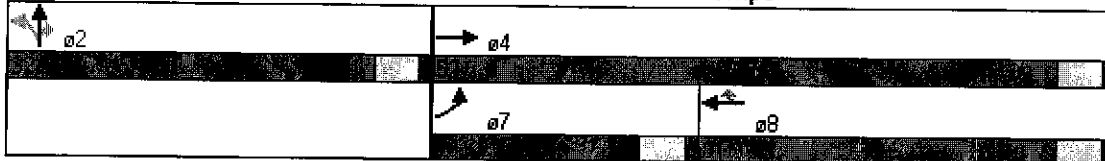
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	35	93			135	0	61	61	0			
Queue Length 95th (ft)	m41	0			192	31	110	110	41			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	339	1981			1540	751	543	543	621			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.20	0.27			0.44	0.15	0.27	0.27	0.27			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 14.3
 Intersection Capacity Utilization 49.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↘	↑↑						↙	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			343									83
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	452	316	271	631	0	0	0	0	94	0	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	491	343	295	686	0	0	0	0	102	0	83
Lane Group Flow (vph)	0	491	343	295	686	0	0	0	0	0	102	83
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	28.2	28.2	32.3	60.5	0.0	0.0	0.0	0.0	24.5	24.5	24.5
Total Split (%)	0.0%	33.2%	33.2%	38.0%	71.2%	0.0%	0.0%	0.0%	0.0%	28.8%	28.8%	28.8%
Maximum Green (s)		23.6	23.6	27.7	55.9					20.0	20.0	20.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		45.0	45.0	19.2	69.0						10.9	10.9
Actuated g/C Ratio		0.53	0.53	0.23	0.81						0.13	0.13
v/c Ratio		0.27	0.36	0.76	0.25						0.50	0.32
Control Delay		14.0	3.2	37.8	8.8						42.1	11.2
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		14.0	3.2	37.8	8.8						42.1	11.2
LOS		B	A	D	A						D	B
Approach Delay		9.5			17.5						28.2	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B						C	
Queue Length 50th (ft)		78	0	161	125						52	0
Queue Length 95th (ft)		134	50	208	177						95	38
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1786	960	572	2791						385	408
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.27	0.36	0.52	0.25						0.26	0.20

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 60.4 (71%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 15.2
 Intersection Capacity Utilization 49.8%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
2010 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	32	1	20	0	157	27	15	114	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	35	1	22	0	171	29	16	124	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	364	357	124	342	342	185	124			200		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	357	124	342	342	185	124			200		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			99		
cM capacity (veh/h)	570	562	927	606	573	857	1364			1277		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	58	200	140								
Volume Left	0	35	0	16								
Volume Right	0	22	29	0								
cSH	1700	681	1364	1277								
Volume to Capacity	0.00	0.08	0.00	0.01								
Queue Length 95th (ft)	0	7	0	1								
Control Delay (s)	0.0	10.8	0.0	1.0								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	10.8	0.0	1.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization		28.6%		ICU Level of Service					A			
Analysis Period (min)		15										

21: SR 145/Madera & SR 99 NB ramps
2010 No Project AM

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.978						0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3300	0	0	0	0	1752	1568	0
Flt Permitted	0.400									0.950		
Satd. Flow (perm)	1353	3312	0	0	3300	0	0	0	0	1752	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					43						474	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	339	338	0	0	465	80	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	368	367	0	0	505	87	0	0	0	158	0	78
Lane Group Flow (vph)	368	367	0	0	592	0	0	0	0	158	78	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	46.5	46.5	0.0	0.0	46.5	0.0	0.0	0.0	0.0	28.5	28.5	0.0
Total Split (%)	62.0%	62.0%	0.0%	0.0%	62.0%	0.0%	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%
Maximum Green (s)	41.9	41.9			41.9					24.0	24.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	58.1	58.1			58.1					11.9	11.9	
Actuated g/C Ratio	0.77	0.77			0.77					0.16	0.16	
v/c Ratio	0.35	0.14			0.23					0.57	0.12	
Control Delay	1.9	0.4			3.4					36.7	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	1.9	0.4			3.4					36.7	0.4	
LOS	A	A			A					D	A	
Approach Delay		1.1			3.4						24.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 No Project AM

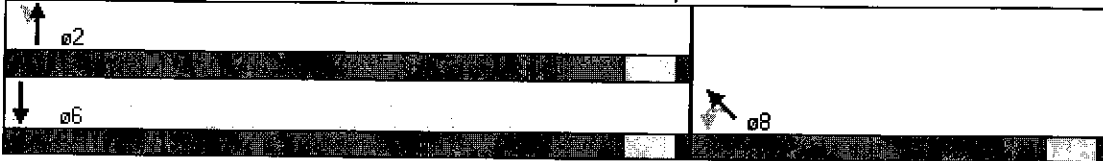
10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A						C	
Queue Length 50th (ft)	3	0			33					69	0	
Queue Length 95th (ft)	m9	m5			64					117	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1049	2567			2568					572	831	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.35	0.14			0.23					0.28	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 5.6
 Intersection Capacity Utilization 43.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↕			↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Fr _t			0.850					0.994				0.850
Fl _t Protected		0.965					0.950				0.991	
Satd. Flow (prot)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Fl _t Permitted		0.965					0.950				0.991	
Satd. Flow (perm)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			322					6				212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	197	78	296	0	0	0	93	482	21	50	220	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	214	85	322	0	0	0	101	524	23	54	239	212
Lane Group Flow (vph)	0	299	322	0	0	0	101	547	0	0	293	212
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		15.9	15.9				25.5	25.5			21.6	21.6
Actuated g/C Ratio		0.21	0.21				0.34	0.34			0.29	0.29
v/c Ratio		0.81	0.56				0.09	0.49			0.30	0.35
Control Delay		36.3	6.9				18.9	22.2			24.2	8.4
Queue Delay		4.3	0.5				0.0	0.0			0.0	0.0
Total Delay		40.6	7.4				18.9	22.2			24.2	8.4
LOS		D	A				B	C			C	A
Approach Delay		23.4						21.7			17.6	

22: AVe 14/Olive & SR 145/Madera
 2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			B	
Queue Length 50th (ft)		119	11				15	102			61	1
Queue Length 95th (ft)		m193	m18				36	167			95	63
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		501	671				1092	1123			991	598
Starvation Cap Reductn		132	103				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		0.81	0.57				0.09	0.49			0.30	0.35

Intersection Summary







Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 21.1
 Intersection LOS: C
 Intersection Capacity Utilization 46.5%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
2010 No Project AM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						175
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	326	287	0	245	161
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	354	312	0	266	175
Lane Group Flow (vph)	0	354	312	0	266	175
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		50.6	50.6		16.4	16.4
Actuated g/C Ratio		0.67	0.67		0.22	0.22
v/c Ratio		0.15	0.13		0.73	0.38
Control Delay		5.3	3.8		38.4	6.2
Queue Delay		0.0	0.3		0.1	0.0
Total Delay		5.3	4.1		38.5	6.2
LOS		A	A		D	A
Approach Delay		5.3	4.1		25.7	

23: AVE 14/Olive & SR 99 SB off-ramp
 2010 No Project AM

10/22/2008

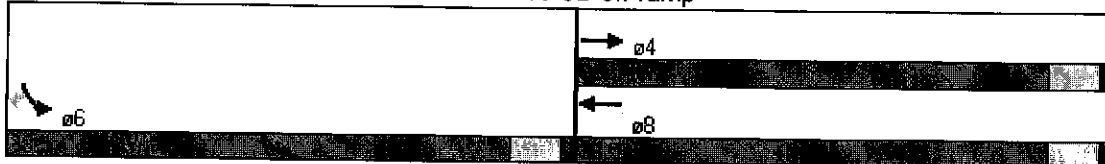
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		26	11		116	0
Queue Length 95th (ft)		55	36		171	41
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2365	2365		769	782
Starvation Cap Reductn		0	1479		0	0
Spillback Cap Reductn		0	0		57	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.15	0.35		0.37	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.1
 Intersection Capacity Utilization 29.3%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2010 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	66	6	12	67	53	8	65	7	48	72	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	72	7	13	73	58	9	71	8	52	78	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	95	143	87	158								
Volume Left (vph)	16	13	9	52								
Volume Right (vph)	7	58	8	27								
Hadj (s)	0.13	0.02	0.31	0.25								
Departure Headway (s)	4.8	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.12	0.21								
Capacity (veh/h)	692	723	676	698								
Control Delay (s)	8.5	8.7	8.7	9.2								
Approach Delay (s)	8.5	8.7	8.7	9.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.8									
HCM Level of Service			A									
Intersection Capacity Utilization		29.9%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
2010 No Project AM

10/22/2008

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↓
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	368	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	400	82	125	239	155	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	510	125			364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	125			364	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	11	91			87	
cM capacity (veh/h)	449	915			1189	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	400	82	125	239	229	
Volume Left	400	0	0	0	155	
Volume Right	0	82	0	239	0	
cSH	449	915	1700	1700	1189	
Volume to Capacity	0.89	0.09	0.07	0.14	0.13	
Queue Length 95th (ft)	239	7	0	0	11	
Control Delay (s)	50.3	9.3	0.0	0.0	6.1	
Lane LOS	F	A			A	
Approach Delay (s)	43.3		0.0		6.1	
Approach LOS	E					
Intersection Summary						
Average Delay			20.7			
Intersection Capacity Utilization			45.2%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.951			0.871				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1613	0	1656	1518	0	1687	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1613	0	1656	1518	0	1687	1776	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			17		23			18				62
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	180	230	16	14	317	152	16	3	17	368	11	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	196	250	17	15	345	165	17	3	18	400	12	62
Lane Group Flow (vph)	196	250	17	15	510	0	17	21	0	400	12	62
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	18.4	49.7	49.7	8.6	39.9	0.0	9.6	20.6	0.0	31.1	42.1	42.1
Total Split (%)	16.7%	45.2%	45.2%	7.8%	36.3%	0.0%	8.7%	18.7%	0.0%	28.3%	38.3%	38.3%
Maximum Green (s)	13.8	45.1	45.1	4.0	35.3		5.1	16.1		26.6	37.6	37.6
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	14.4	50.9	50.9	4.6	35.9		5.6	16.6		27.1	43.9	43.9
Actuated g/C Ratio	0.13	0.46	0.46	0.04	0.33		0.05	0.15		0.25	0.40	0.40
v/c Ratio	0.93	0.32	0.03	0.22	0.94		0.20	0.09		0.96	0.02	0.10
Control Delay	94.3	21.0	8.2	60.7	45.4		55.9	20.2		77.5	22.7	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	94.3	21.0	8.2	60.7	45.4		55.9	20.2		77.5	22.7	6.7
LOS	F	C	A	E	D		E	C		E	C	A
Approach Delay		51.6			45.8			36.2			66.8	

26: Ave 12 & GS Blvd
2010 No Project AM

10/22/2008

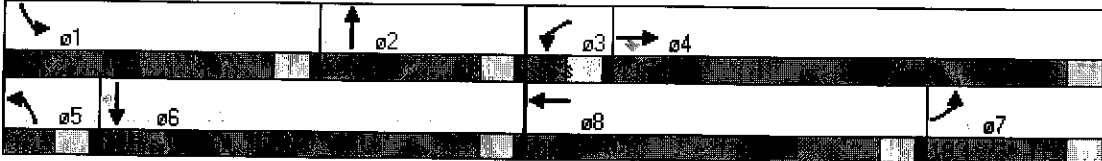
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			D			E	
Queue Length 50th (ft)	139	101	0	11	215		12	2		280	5	0
Queue Length 95th (ft)	#279	184	14	m15	#532		35	25		#473	19	29
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	211	784	676	67	542		84	244		416	708	639
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.93	0.32	0.03	0.22	0.94		0.20	0.09		0.96	0.02	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 72 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 54.0
 Intersection Capacity Utilization 73.0%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit					0.926				0.850			
Fit Protected	0.950							0.950				
Satd. Flow (prot)	1656	1743	0	0	1660	0	0	1597	1429	0	0	0
Fit Permitted	0.950							0.950				
Satd. Flow (perm)	1656	1743	0	0	1660	0	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					90				129			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	81	534	0	0	289	354	194	0	119	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	88	580	0	0	314	385	211	0	129	0	0	0
Lane Group Flow (vph)	88	580	0	0	699	0	0	211	129	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	16.8	81.8	0.0	0.0	65.0	0.0	28.2	28.2	28.2	0.0	0.0	0.0
Total Split (%)	15.3%	74.4%	0.0%	0.0%	59.1%	0.0%	25.6%	25.6%	25.6%	0.0%	0.0%	0.0%
Maximum Green (s)	12.2	77.2			60.4		23.6	23.6	23.6			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	11.0	82.7			69.9		19.3	19.3				
Actuated g/C Ratio	0.10	0.75			0.64		0.18	0.18				
v/c Ratio	0.53	0.44			0.64		0.75	0.36				
Control Delay	51.0	1.9			16.1		59.5	9.3				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	51.0	1.9			16.1		59.5	9.3				
LOS	D	A			B		E	A				
Approach Delay		8.4			16.1		40.4					

27: Ave 12 & SR 99 NB Ramps
2010 No Project AM

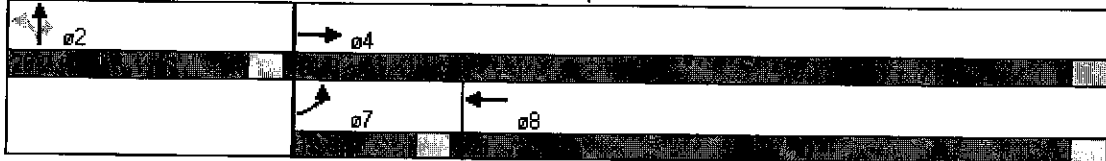
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	61	102			269			142	0			
Queue Length 95th (ft)	m72	m9			461			216	49			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	195	1310			1088			351	415			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.45	0.44			0.64			0.60	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 108 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 17.9
 Intersection Capacity Utilization 62.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2010 No Project PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	150	65	0	0	101	7	205	0	47	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	163	71	0	0	110	8	223	0	51	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	117			71			510	514	71	561	510	114
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			71			510	514	71	561	510	114
tC, single (s)	4.3			4.2			7.3	6.7	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.7	4.2	3.5	3.5	4.0	3.3
p0 queue free %	88			100			45	100	95	100	100	100
cM capacity (veh/h)	1350			1457			405	386	944	379	413	945
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	163	71	117	223	51							
Volume Left	163	0	0	223	0							
Volume Right	0	0	8	0	51							
cSH	1350	1700	1700	405	944							
Volume to Capacity	0.12	0.04	0.07	0.55	0.05							
Queue Length 95th (ft)	10	0	0	80	4							
Control Delay (s)	8.0	0.0	0.0	24.3	9.0							
Lane LOS	A			C	A							
Approach Delay (s)	5.6		0.0	21.4								
Approach LOS				C								
Intersection Summary												
Average Delay			11.5									
Intersection Capacity Utilization			33.0%			ICU Level of Service			A			
Analysis Period (min)			15									











3: Ave 18.5 & Road 23
2010 No Project PM











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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	396	96	32	218	0	66	0	60	23	74	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	430	104	35	237	0	72	0	65	25	80	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	237			535			948	789	483	854	841	237
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	237			535			948	789	483	854	841	237
tC, single (s)	4.3			4.3			7.3	6.7	6.4	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.9	4.4	3.7
p0 queue free %	100			96			47	100	88	88	68	83
cM capacity (veh/h)	1231			952			135	289	543	205	253	717
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	535	272	72	65	224							
Volume Left	0	35	72	0	25							
Volume Right	104	0	0	65	118							
cSH	1700	952	135	543	370							
Volume to Capacity	0.31	0.04	0.53	0.12	0.60							
Queue Length 95th (ft)	0	3	64	10	95							
Control Delay (s)	0.0	1.5	58.3	12.5	28.5							
Lane LOS		A	F	B	D							
Approach Delay (s)	0.0	1.5	36.5		28.5							
Approach LOS			E		D							
Intersection Summary												
Average Delay			10.1									
Intersection Capacity Utilization			64.0%		ICU Level of Service				B			
Analysis Period (min)			15									

4: Ave 18.5 & Pistacchio
2010 No Project PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	347	181	212	139	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	377	197	230	151	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	427				598	197
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	427				598	197
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				66	99
cM capacity (veh/h)	1042				439	812
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	389	197	230	158		
Volume Left	12	0	0	151		
Volume Right	0	0	230	7		
cSH	1042	1700	1700	448		
Volume to Capacity	0.01	0.12	0.14	0.35		
Queue Length 95th (ft)	1	0	0	39		
Control Delay (s)	0.4	0.0	0.0	17.3		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		17.3		
Approach LOS				C		
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		41.9%		ICU Level of Service	A	
Analysis Period (min)		15				

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	106	80	120	172	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	115	87	130	187	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	217				204	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	217				204	87
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				73	100
cM capacity (veh/h)	1352				685	852
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	116	87	130	190		
Volume Left	1	0	0	187		
Volume Right	0	0	130	3		
cSH	1352	1700	1700	688		
Volume to Capacity	0.00	0.05	0.08	0.28		
Queue Length 95th (ft)	0	0	0	28		
Control Delay (s)	0.1	0.0	0.0	12.2		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.2		
Approach LOS				B		
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization		22.8%		ICU Level of Service		A
Analysis Period (min)		15				

6: Ave 18 & Road 23
2010 No Project PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	36	4	67	114	29	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	39	4	73	124	32	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	422	437	168	390	376	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422	437	168	390	376	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	96	100			98		
cM capacity (veh/h)	482	486	853	533	535	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	55	201	201								
Volume Left	1	0	4	32								
Volume Right	7	39	124	2								
cSH	547	753	1316	1296								
Volume to Capacity	0.05	0.07	0.00	0.02								
Queue Length 95th (ft)	4	6	0	2								
Control Delay (s)	11.9	10.2	0.2	1.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.9	10.2	0.2	1.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			33.9%		ICU Level of Service				A			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2010 No Project PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	53	568	0	0	688	126	241	2	550	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	617	0	0	748	137	262	2	598	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	885			617			1480	1617	617	2079	1480	748
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	885			617			1480	1617	617	2079	1480	748
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			0	98	0	0	100	100
cM capacity (veh/h)	752			963			97	95	486	0	117	416
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	58	617	748	137	264	598						
Volume Left	58	0	0	0	262	0						
Volume Right	0	0	0	137	0	598						
cSH	752	1700	1700	1700	96	486						
Volume to Capacity	0.08	0.36	0.44	0.08	2.74	1.23						
Queue Length 95th (ft)	6	0	0	0	623	588						
Control Delay (s)	10.2	0.0	0.0	0.0	879.1	146.5						
Lane LOS	B				F	F						
Approach Delay (s)	0.9		0.0		371.0							
Approach LOS					F							
Intersection Summary												
Average Delay			132.3									
Intersection Capacity Utilization			70.6%		ICU Level of Service				C			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
2010 No Project PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	799	591	0	151	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	868	642	0	164	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	642				1511	642
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	642				1511	642
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	100				0	87
cM capacity (veh/h)	933				129	465
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	868	642	164	62		
Volume Left	0	0	164	0		
Volume Right	0	0	0	62		
cSH	1700	1700	129	465		
Volume to Capacity	0.51	0.38	1.27	0.13		
Queue Length 95th (ft)	0	0	259	11		
Control Delay (s)	0.0	0.0	235.2	13.9		
Lane LOS			F	B		
Approach Delay (s)	0.0	0.0	174.5			
Approach LOS			F			
Intersection Summary						
Average Delay			22.7			
Intersection Capacity Utilization			57.1%		ICU Level of Service	B
Analysis Period (min)			15			

10: Ave 17 & GS Blvd
2010 No Project PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	418	47	116	368	164	66	46	189	192	28	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	454	51	126	400	178	72	50	205	209	30	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	578			505			1185	1330	454	1472	1292	489
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	578			505			1185	1330	454	1472	1292	489
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			88			39	62	66	0	77	97
cM capacity (veh/h)	986			1044			118	132	604	42	133	557
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	23	454	51	126	578	72	50	205	257			
Volume Left	23	0	0	126	0	72	0	0	209			
Volume Right	0	0	51	0	178	0	0	205	17			
cSH	986	1700	1700	1044	1700	118	132	604	49			
Volume to Capacity	0.02	0.27	0.03	0.12	0.34	0.61	0.38	0.34	5.29			
Queue Length 95th (ft)	2	0	0	10	0	76	40	38	Err			
Control Delay (s)	8.7	0.0	0.0	8.9	0.0	74.2	48.0	14.0	Err			
Lane LOS	A			A		F	E	B	F			
Approach Delay (s)	0.4			1.6		32.4			Err			
Approach LOS						D			F			
Intersection Summary												
Average Delay		1418.8										
Intersection Capacity Utilization		62.4%			ICU Level of Service					B		
Analysis Period (min)		15										

11: Ave 17 & Road 23
2010 No Project PM













10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	132	38	46	127	8	34	110	66	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	143	41	50	138	9	37	120	72	12	147	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	483	441	152	518	410	155	157			191		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483	441	152	518	410	155	157			191		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	71	95	85	73	99	97			99		
cM capacity (veh/h)	376	492	895	331	505	877	1359			1313		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	185	197	228	168								
Volume Left	0	50	37	12								
Volume Right	41	9	72	10								
cSH	547	453	1359	1313								
Volume to Capacity	0.34	0.43	0.03	0.01								
Queue Length 95th (ft)	37	54	2	1								
Control Delay (s)	14.9	18.9	1.4	0.6								
Lane LOS	B	C	A	A								
Approach Delay (s)	14.9	18.9	1.4	0.6								
Approach LOS	B	C										
Intersection Summary												
Average Delay			8.9									
Intersection Capacity Utilization			49.5%		ICU Level of Service				A			
Analysis Period (min)			15									

12: Ellis & Road 26
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.986			0.984	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3490	0	1770	3483	0
Flt Permitted		0.747			0.761		0.950			0.950		
Satd. Flow (perm)	0	1391	1583	0	1418	1583	1770	3490	0	1770	3483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			15			138		16			20	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	57	1	14	52	4	127	11	619	62	118	571	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	1	15	57	4	138	12	673	67	128	621	76
Lane Group Flow (vph)	0	63	15	0	61	138	12	740	0	128	697	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		9.4	9.4		9.4	9.4	7.5	31.5		10.3	38.2	
Actuated g/C Ratio		0.17	0.17		0.17	0.17	0.13	0.62		0.19	0.75	
v/c Ratio		0.26	0.05		0.25	0.36	0.05	0.34		0.39	0.27	
Control Delay		20.8	10.5		20.5	7.2	23.7	10.1		20.3	5.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		20.8	10.5		20.5	7.2	23.7	10.1		20.3	5.0	
LOS		C	B		C	A	C	B		C	A	
Approach Delay		18.8			11.3			10.3			7.4	
Approach LOS		B			B			B			A	

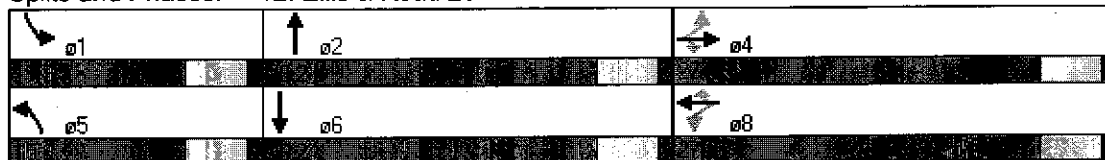
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		15	0		14	0	3	79		29	31	
Queue Length 95th (ft)		47	13		45	37	16	146		80	117	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		501	579		510	658	355	2247		397	2623	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.13	0.03		0.12	0.21	0.03	0.33		0.32	0.27	










Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 50.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 9.5
 Intersection Capacity Utilization 45.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A










Splits and Phases: 12: Ellis & Road 26












						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	210	3	0	168	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	228	3	0	183	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	265		452	224		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	265		452	224		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1293		565	816		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	228	3	265			
Volume Left	0	3	0			
Volume Right	0	0	83			
cSH	1700	565	1700			
Volume to Capacity	0.13	0.01	0.16			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.4	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.4	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			24.0%	ICU Level of Service		A
Analysis Period (min)			15			

14: Gateway & Ave 16 Connector
2010 No Project PM













10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	76	3	108	261	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	83	3	117	284	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121				145	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				145	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				67	100
cM capacity (veh/h)	1461				848	1003
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	83	121	284			
Volume Left	0	0	284			
Volume Right	0	117	0			
cSH	1700	1700	848			
Volume to Capacity	0.05	0.07	0.33			
Queue Length 95th (ft)	0	0	37			
Control Delay (s)	0.0	0.0	11.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.4			
Approach LOS			B			
Intersection Summary						
Average Delay			6.6			
Intersection Capacity Utilization		28.0%		ICU Level of Service		A
Analysis Period (min)			15			

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	261	210	167	0	0	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	284	228	182	0	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked					0.98	
vC, conflicting volume	182				977	182
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	182				977	182
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	80				100	86
cM capacity (veh/h)	1394				216	856
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	512	182	117			
Volume Left	284	0	0			
Volume Right	0	0	117			
cSH	1394	1700	856			
Volume to Capacity	0.20	0.11	0.14			
Queue Length 95th (ft)	19	0	12			
Control Delay (s)	5.4	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	5.4	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization		41.0%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
2010 No Project PM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				3		330
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	378	273	3	73	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	411	297	3	79	330
Lane Group Flow (vph)	98	411	297	3	79	330
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	14.9	38.3	23.4	23.4	21.7	21.7
Total Split (%)	24.8%	63.8%	39.0%	39.0%	36.2%	36.2%
Maximum Green (s)	10.0	33.4	18.5	18.5	17.2	17.2
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.5	19.9	13.3	13.3	8.9	8.9
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.23	0.23
v/c Ratio	0.27	0.42	0.46	0.01	0.19	0.53
Control Delay	18.8	6.5	14.5	9.0	16.3	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	6.5	14.5	9.0	16.3	6.1
LOS	B	A	B	A	B	A
Approach Delay		8.8	14.4		8.1	
Approach LOS		A	B		A	

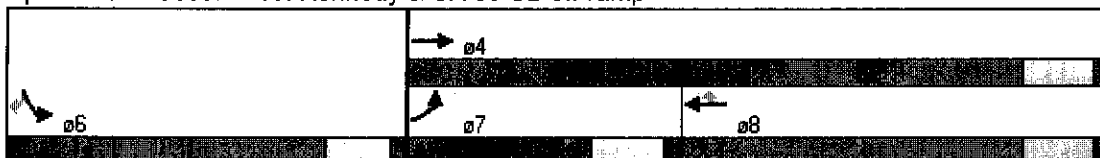
	↗	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	35	54	0	15	0
Queue Length 95th (ft)	64	105	139	4	49	51
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	443	1257	853	727	705	829
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.33	0.35	0.00	0.11	0.40

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 38
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 10.0
 Intersection Capacity Utilization 39.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.935			0.954				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3309	0	1770	3376	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3309	0	1770	3376	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			34				7		225	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	49	37	297	71	31	38	65	6	66	87	289
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	53	40	323	77	34	41	71	7	72	95	314
Lane Group Flow (vph)	3	93	0	323	111	0	41	71	7	72	409	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	19.0	31.0	0.0	8.9	21.2	21.2	8.9	21.2	0.0
Total Split (%)	12.7%	29.9%	0.0%	27.1%	44.3%	0.0%	12.7%	30.3%	30.3%	12.7%	30.3%	0.0%
Maximum Green (s)	4.0	16.0		14.1	26.1		4.0	16.3	16.3	4.0	16.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	4.9	7.4		14.0	21.2		4.9	20.2	20.2	4.9	23.7	
Actuated g/C Ratio	0.08	0.12		0.24	0.37		0.08	0.35	0.35	0.08	0.41	
v/c Ratio	0.02	0.21		0.76	0.09		0.30	0.12	0.01	0.50	0.53	
Control Delay	28.3	16.7		34.5	9.5		33.7	17.3	10.5	40.5	11.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	28.3	16.7		34.5	9.5		33.7	17.3	10.5	40.5	11.0	
LOS	C	B		C	A		C	B	B	D	B	
Approach Delay		17.0			28.1			22.5		15.4		
Approach LOS		B			C			C		B		

17: Ave 16 & Aviation Drive
2010 No Project PM

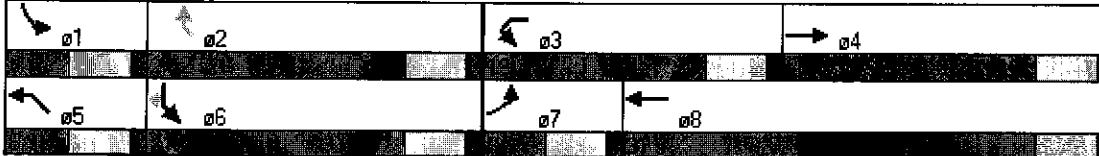
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	9		108	7		14	19	0	26	41	
Queue Length 95th (ft)	8	27		#226	26		41	47	8	#73	146	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	134	834		452	1461		138	617	557	145	779	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.11		0.71	0.08		0.30	0.12	0.01	0.50	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 58
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 21.2
 Intersection LOS: C
 Intersection Capacity Utilization 40.4%
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive















18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						165			98			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	132	955	0	0	1021	152	491	2	335	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	143	1038	0	0	1110	165	534	2	364	0	0	0
Lane Group Flow (vph)	143	1038	0	0	1110	165	267	269	364	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	12.7	48.5			31.8	31.8	28.5	28.5	28.5			
Actuated g/C Ratio	0.15	0.57			0.37	0.37	0.34	0.34	0.34			
v/c Ratio	0.55	0.52			0.84	0.24	0.47	0.48	0.61			
Control Delay	52.4	9.6			32.4	4.5	25.8	25.8	22.1			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	52.4	9.7			32.4	4.5	25.8	25.8	22.1			
LOS	D	A			C	A	C	C	C			
Approach Delay		14.9			28.8			24.3				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 No Project PM

10/22/2008

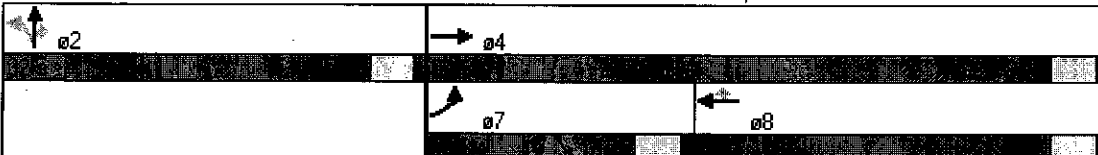
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			C				
Queue Length 50th (ft)	84	93			281	0	116	117	116			
Queue Length 95th (ft)	m141	167			#437	41	192	194	208			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	342	2000			1326	696	564	565	596			
Starvation Cap Reductn	0	153			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.42	0.56			0.84	0.24	0.47	0.48	0.61			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 22.7
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps















19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑						↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			534									72
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391				1434		886	
Travel Time (s)		23.6			7.6				32.6		20.1	
Volume (vph)	0	913	491	216	1296	0	0	0	0	172	2	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	992	534	235	1409	0	0	0	0	187	2	118
Lane Group Flow (vph)	0	992	534	235	1409	0	0	0	0	0	189	118
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	37.6	37.6	25.1	62.7	0.0	0.0	0.0	0.0	22.3	22.3	22.3
Total Split (%)	0.0%	44.2%	44.2%	29.5%	73.8%	0.0%	0.0%	0.0%	0.0%	26.2%	26.2%	26.2%
Maximum Green (s)		33.0	33.0	20.5	58.1					17.8	17.8	17.8
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		41.8	41.8	16.8	62.6					14.4	14.4	
Actuated g/C Ratio		0.49	0.49	0.20	0.74					0.17	0.17	
v/c Ratio		0.57	0.51	0.67	0.54					0.66	0.37	
Control Delay		18.4	3.6	42.5	6.1					43.7	16.9	
Queue Delay		0.0	0.0	0.0	0.3					0.0	0.0	
Total Delay		18.4	3.6	42.5	6.4					43.7	16.9	
LOS		B	A	D	A					D	B	
Approach Delay		13.2			11.6					33.4		

20: Ave 15.5/Cleveland & Road 23
 2010 No Project PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	38	1	34	0	153	71	40	168	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	41	1	37	0	166	77	43	183	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	512	513	183	476	474	205	183			243		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512	513	183	476	474	205	183			243		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	91	100	96	100			97		
cM capacity (veh/h)	439	448	860	479	467	828	1346			1245		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	79	243	226								
Volume Left	0	41	0	43								
Volume Right	1	37	77	0								
cSH	589	596	1346	1245								
Volume to Capacity	0.00	0.13	0.00	0.03								
Queue Length 95th (ft)	0	11	0	3								
Control Delay (s)	11.1	12.0	0.0	1.8								
Lane LOS	B	B		A								
Approach Delay (s)	11.1	12.0	0.0	1.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			44.3%		ICU Level of Service				A			
Analysis Period (min)			15									

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						C	
Queue Length 50th (ft)		191	0	135	136						95	21
Queue Length 95th (ft)		300	60	m180	187						155	65
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1741	1050	439	2606						364	381
Starvation Cap Reductn		0	0	0	521						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.57	0.51	0.54	0.68						0.52	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



21: SR 145/Madera & SR 99 NB ramps
 2010 No Project PM

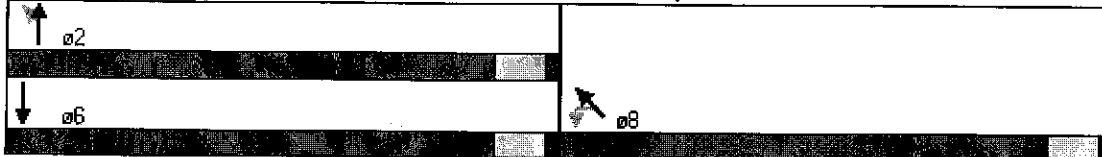
10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A						C	
Queue Length 50th (ft)	41	0			42					61	0	
Queue Length 95th (ft)	m49	m0			77					108	31	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	786	2766			2728					791	745	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.60	0.18			0.28					0.18	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 6.6
 Intersection Capacity Utilization 49.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.998				0.850
Flt Protected		0.966					0.950				0.988	
Satd. Flow (prot)	0	1765	1553	0	0	0	3433	3532	0	0	3463	1568
Flt Permitted		0.966					0.950				0.988	
Satd. Flow (perm)	0	1765	1553	0	0	0	3433	3532	0	0	3463	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			492					1				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	240	101	453	0	0	0	128	639	7	83	249	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	261	110	492	0	0	0	139	695	8	90	271	272
Lane Group Flow (vph)	0	371	492	0	0	0	139	703	0	0	361	272
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		18.4	18.4				23.0	23.0			21.6	21.6
Actuated g/C Ratio		0.25	0.25				0.31	0.31			0.29	0.29
v/c Ratio		0.85	0.65				0.13	0.65			0.36	0.42
Control Delay		42.6	9.7				20.6	26.7			26.9	9.2
Queue Delay		61.2	1.4				0.0	0.0			0.0	0.0
Total Delay		103.8	11.1				20.6	26.7			26.9	9.2
LOS		F	B				C	C			C	A
Approach Delay		51.0						25.7			19.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D						C			B	
Queue Length 50th (ft)		135	9				24	153			78	0
Queue Length 95th (ft)		m#256	m99				46	218			117	74
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		506	796				1051	1082			997	645
Starvation Cap Reductn		173	145				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		1.11	0.76				0.13	0.65			0.36	0.42

Intersection Summary







Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 33.3
 Intersection LOS: C
 Intersection Capacity Utilization 55.8%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
2010 No Project PM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						146
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	462	379	0	332	134
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	502	412	0	361	146
Lane Group Flow (vph)	0	502	412	0	361	146
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		46.3	46.3		20.7	20.7
Actuated g/C Ratio		0.62	0.62		0.28	0.28
v/c Ratio		0.23	0.19		0.78	0.28
Control Delay		7.8	5.1		36.6	4.7
Queue Delay		0.0	0.3		0.1	0.0
Total Delay		7.8	5.4		36.7	4.7
LOS		A	A		D	A
Approach Delay		7.8	5.4		27.5	

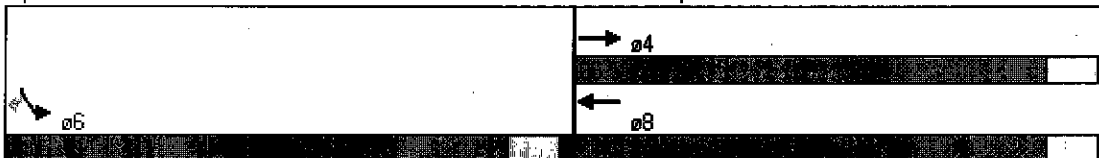
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		47	16		156	0
Queue Length 95th (ft)		95	53		210	33
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2184	2184		769	767
Starvation Cap Reductn		0	1178		0	0
Spillback Cap Reductn		140	0		53	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.25	0.41		0.50	0.19

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 37.8%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A












Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2010 No Project PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	47	85	12	13	33	52	5	99	21	61	88	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	92	13	14	36	57	5	108	23	66	96	24
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	157	107	136	186								
Volume Left (vph)	51	14	5	66								
Volume Right (vph)	13	57	23	24								
Hadj (s)	0.07	-0.12	0.09	0.27								
Departure Headway (s)	4.9	4.8	4.9	5.0								
Degree Utilization, x	0.21	0.14	0.19	0.26								
Capacity (veh/h)	676	683	685	674								
Control Delay (s)	9.3	8.6	9.0	9.8								
Approach Delay (s)	9.3	8.6	9.0	9.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.3									
HCM Level of Service			A									
Intersection Capacity Utilization		37.1%			ICU Level of Service				A			
Analysis Period (min)			15									

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	381	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	414	91	125	286	91	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	450	125			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450	125			411	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	20	90			92	
cM capacity (veh/h)	516	918			1137	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	414	91	125	286	234	
Volume Left	414	0	0	0	91	
Volume Right	0	91	0	286	0	
cSH	516	918	1700	1700	1137	
Volume to Capacity	0.80	0.10	0.07	0.17	0.08	
Queue Length 95th (ft)	190	8	0	0	7	
Control Delay (s)	34.5	9.4	0.0	0.0	3.7	
Lane LOS	D	A			A	
Approach Delay (s)	30.0		0.0		3.7	
Approach LOS	D					
Intersection Summary						
Average Delay			13.9			
Intersection Capacity Utilization			46.0%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.946			0.877				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1680	0	1752	1618	0	1719	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1680	0	1752	1618	0	1719	1810	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			32		24			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	229	29	14	286	160	46	18	85	424	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	249	32	15	311	174	50	20	92	461	30	65
Lane Group Flow (vph)	217	249	32	15	485	0	50	112	0	461	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	21.0	51.9	51.9	9.5	40.4	0.0	13.0	20.6	0.0	38.0	45.6	45.6
Total Split (%)	17.5%	43.3%	43.3%	7.9%	33.7%	0.0%	10.8%	17.2%	0.0%	31.7%	38.0%	38.0%
Maximum Green (s)	16.4	47.3	47.3	4.9	35.8		8.5	16.1		33.5	41.1	41.1
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	17.0	53.6	53.6	5.5	36.4		8.2	17.1		33.5	44.4	44.4
Actuated g/C Ratio	0.14	0.45	0.45	0.05	0.30		0.07	0.14		0.28	0.37	0.37
v/c Ratio	0.92	0.32	0.05	0.19	0.92		0.42	0.36		0.96	0.04	0.11
Control Delay	91.5	23.9	7.5	62.9	43.4		64.2	16.9		75.8	26.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	91.5	23.9	7.5	62.9	43.4		64.2	16.9		75.8	26.4	6.9
LOS	F	C	A	E	D		E	B		E	C	A
Approach Delay		52.3			44.0			31.5			65.0	

26: Ave 12 & GS Blvd
 2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			E	
Queue Length 50th (ft)	168	114	0	12	227		38	14		350	15	0
Queue Length 95th (ft)	#317	202	20	m16	#533		80	67		#557	37	31
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	237	785	686	77	526		131	310		487	670	610
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.92	0.32	0.05	0.19	0.92		0.38	0.36		0.95	0.04	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 79 (66%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 52.0
 Intersection LOS: D
 Intersection Capacity Utilization 76.0%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.921				0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	1827	0	0	1683	0	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	1827	0	0	1683	0	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					93				153			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	164	574	0	0	281	393	179	1	141	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	178	624	0	0	305	427	195	1	153	0	0	0
Lane Group Flow (vph)	178	624	0	0	732	0	0	196	153	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	24.0	94.0	0.0	0.0	70.0	0.0	26.0	26.0	26.0	0.0	0.0	0.0
Total Split (%)	20.0%	78.3%	0.0%	0.0%	58.3%	0.0%	21.7%	21.7%	21.7%	0.0%	0.0%	0.0%
Maximum Green (s)	19.4	89.4			65.4		21.4	21.4	21.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	17.1	93.5			72.4			18.5	18.5			
Actuated g/C Ratio	0.14	0.78			0.60			0.15	0.15			
v/c Ratio	0.72	0.44			0.70			0.75	0.42			
Control Delay	58.8	2.2			19.7			66.2	10.4			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	58.8	2.2			19.7			66.2	10.4			
LOS	E	A			B			E	B			
Approach Delay		14.8			19.7			41.7				

27: Ave 12 & SR 99 NB Ramps
2010 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			D				
Queue Length 50th (ft)	142	113			335			146	0			
Queue Length 95th (ft)	m157	m35			540			224	58			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	289	1423			1053			310	402			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.62	0.44			0.70			0.63	0.38			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 21.7
 Intersection Capacity Utilization 67.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 7

OPENING DAY (2010) NO PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99-NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

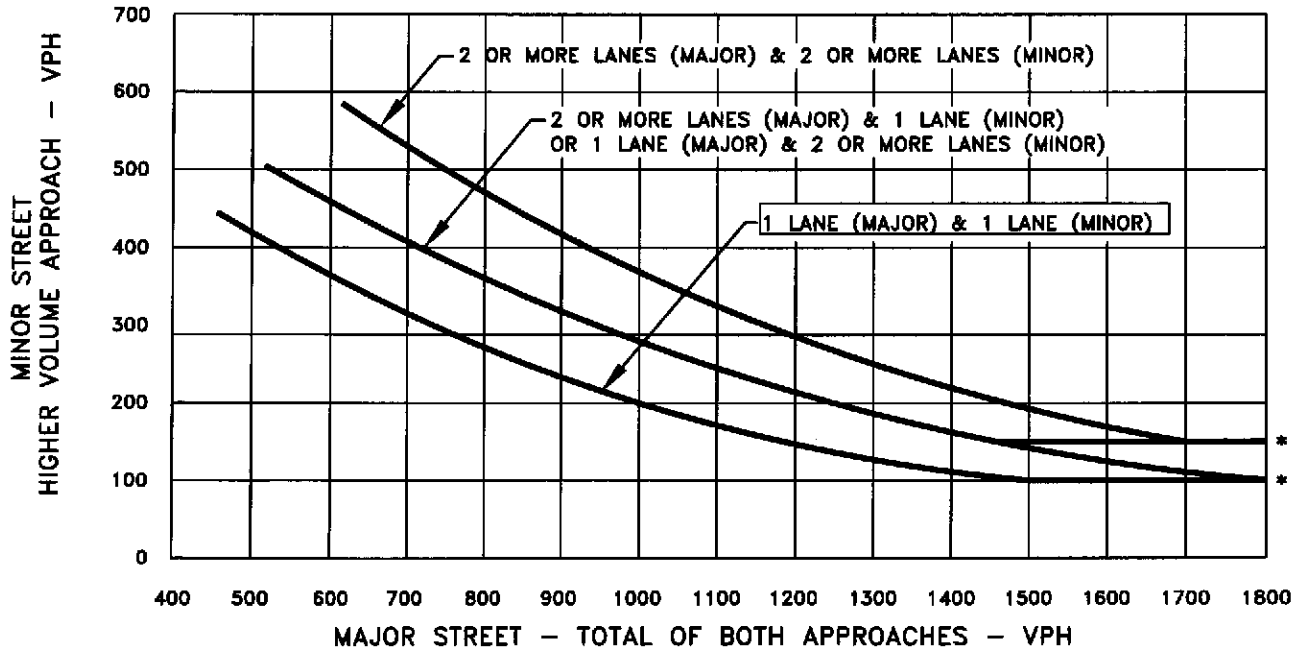
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
Both Approaches - Major Street	✓		319	323			
Highest Approaches - Minor Street	✓		217	252			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB ON RAMP/ ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

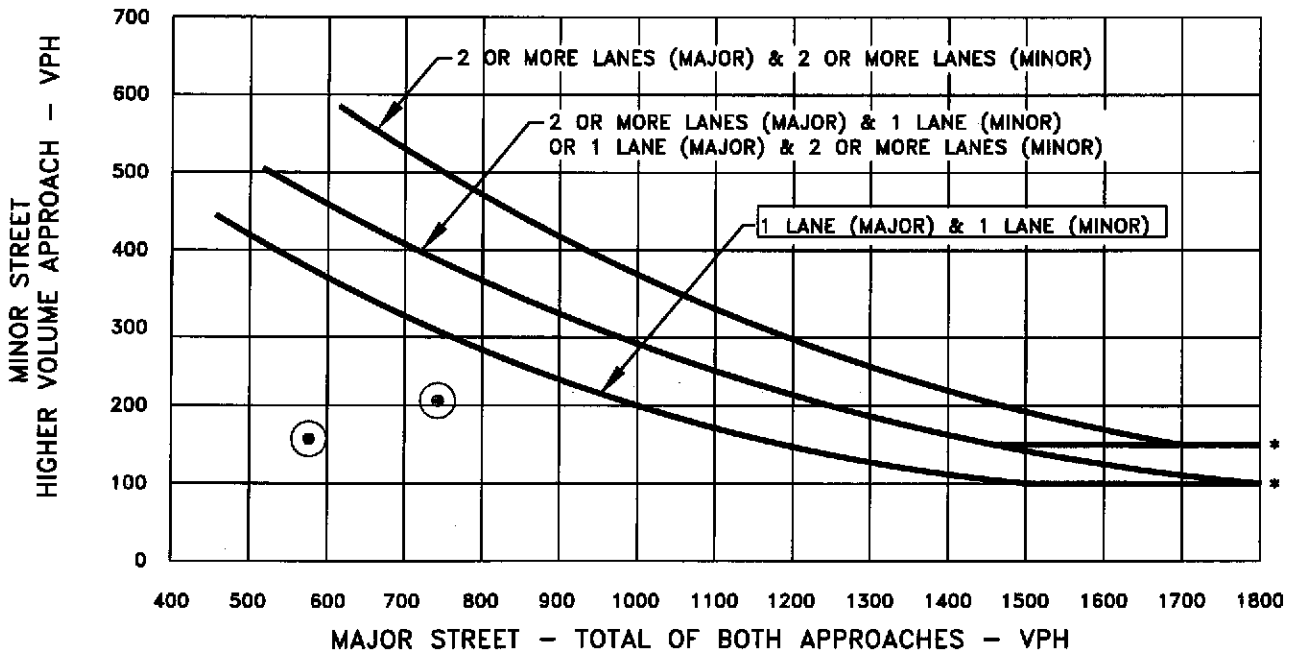
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		576	742	
Highest Approaches - Minor Street	✓		157	206	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

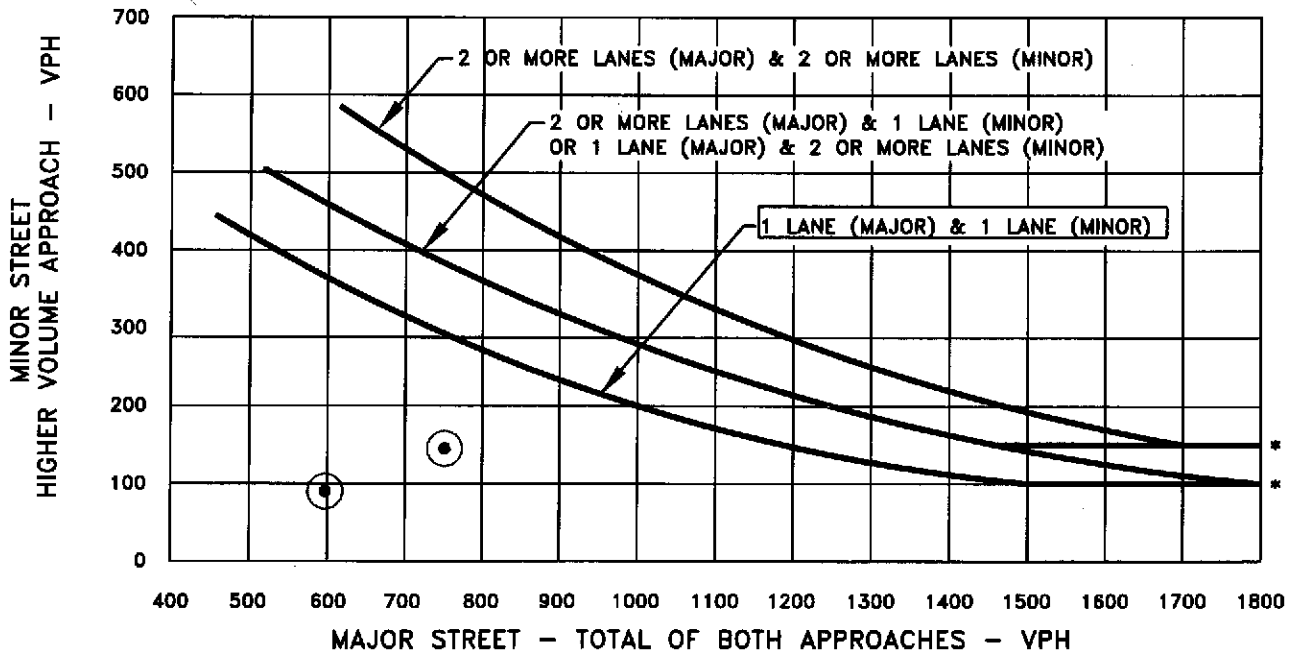
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		597	751	
Highest Approaches - Minor Street	✓		90	145	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

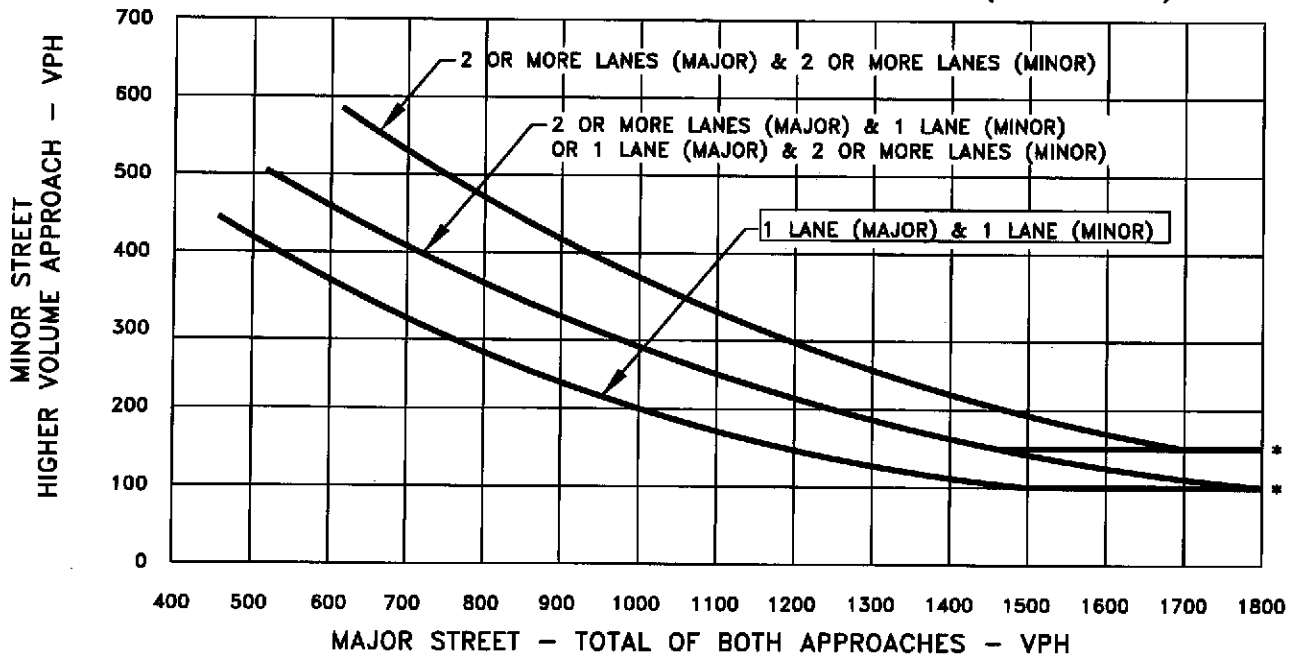
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		274	307	
Highest Approaches - Minor Street	✓		148	175	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

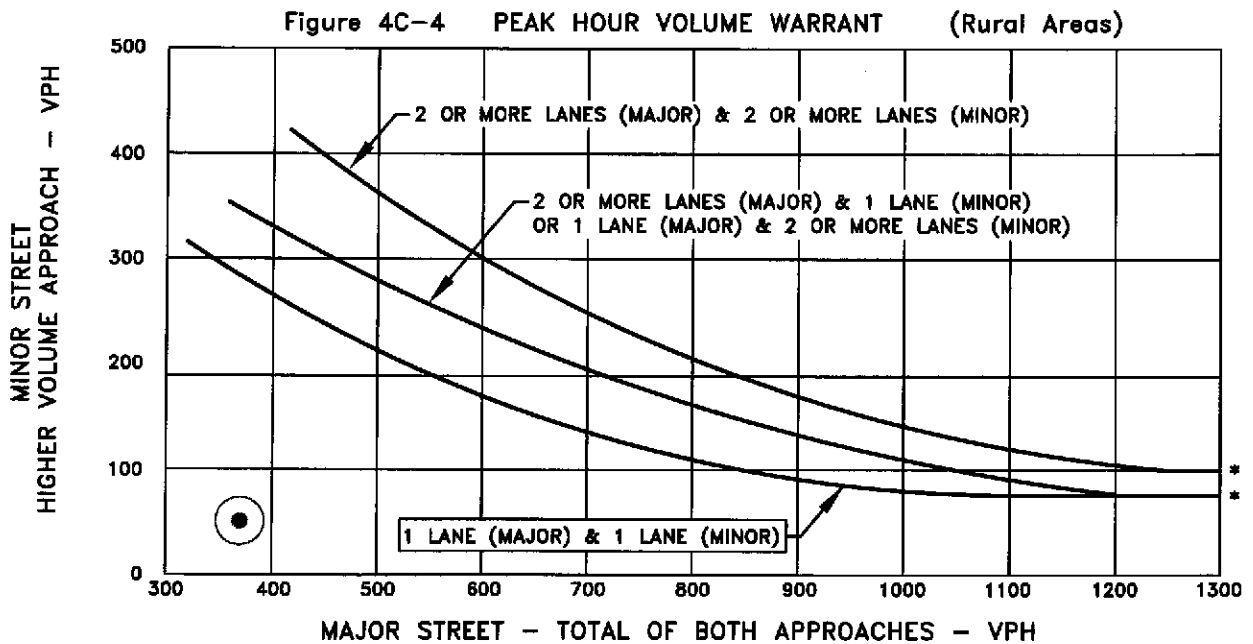
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>		256	370		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		31	51		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ----- or

RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

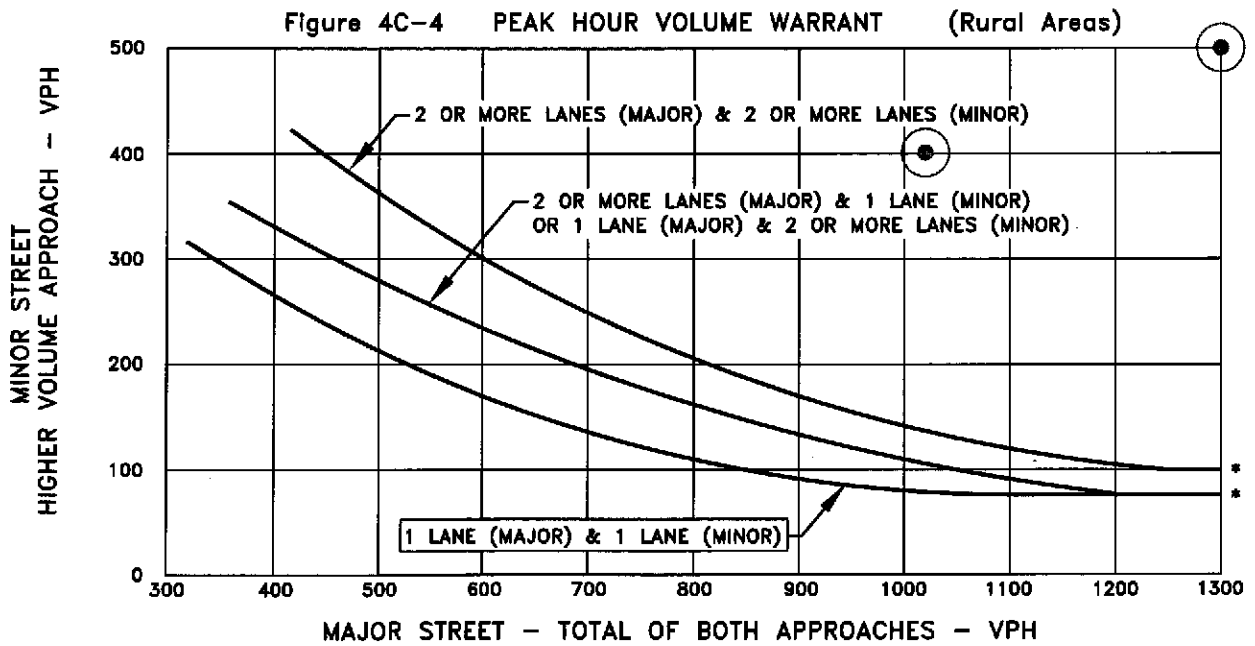
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One		2 or more		AM PEAK		PM PEAK		Hour
	One	Two	Two	More	AM	PM	AM	PM	
Both Approaches - Major Street	<input checked="" type="checkbox"/>				1020	1435			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>				401	793			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 SB OFF RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

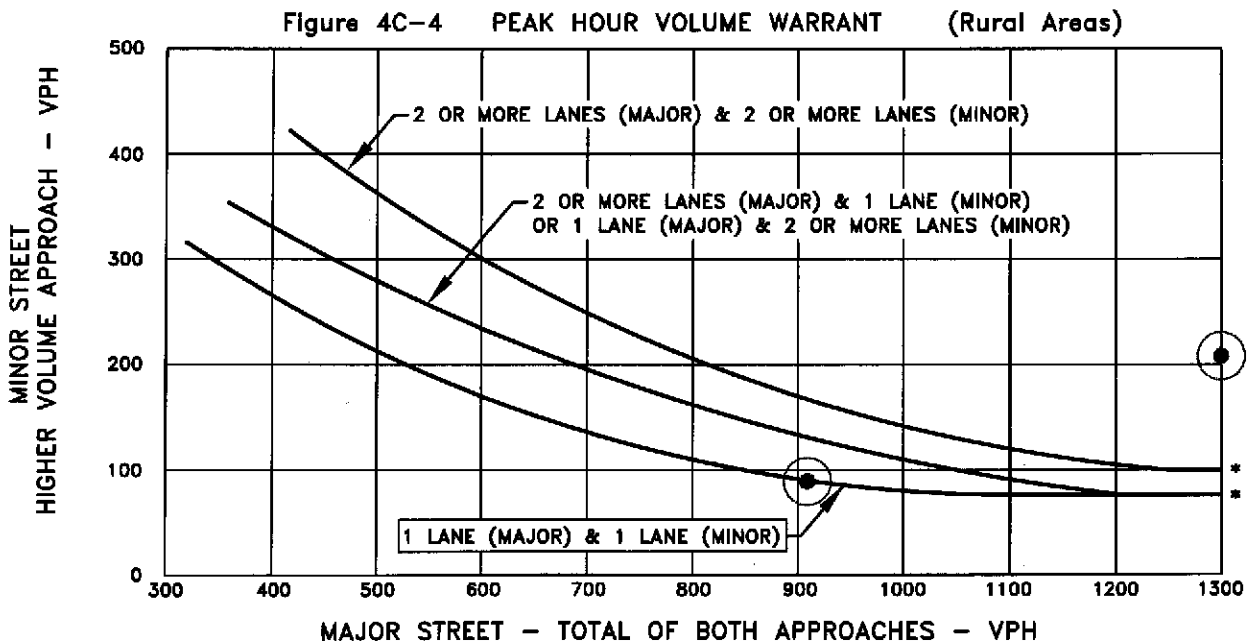
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		909	1390		
Highest Approaches - Minor Street	✓		89	208		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: AIRPORT ROAD/ GOLDEN STATE

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

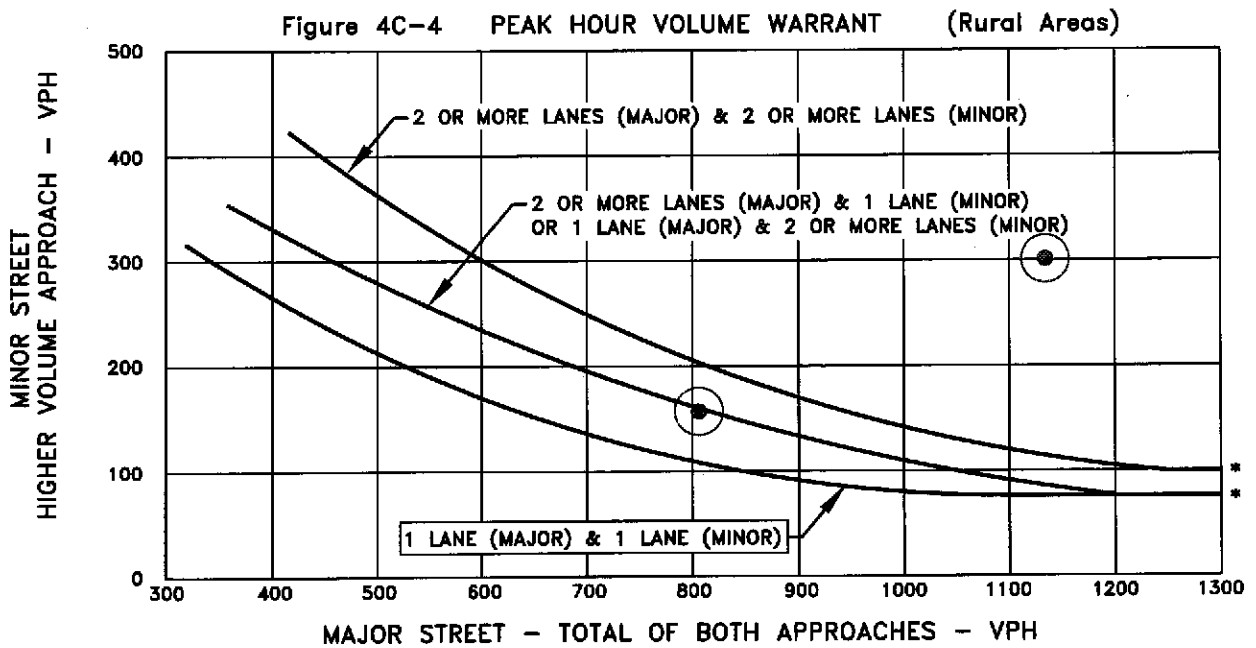
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		806	1134		
Highest Approaches - Minor Street	✓		157	301		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

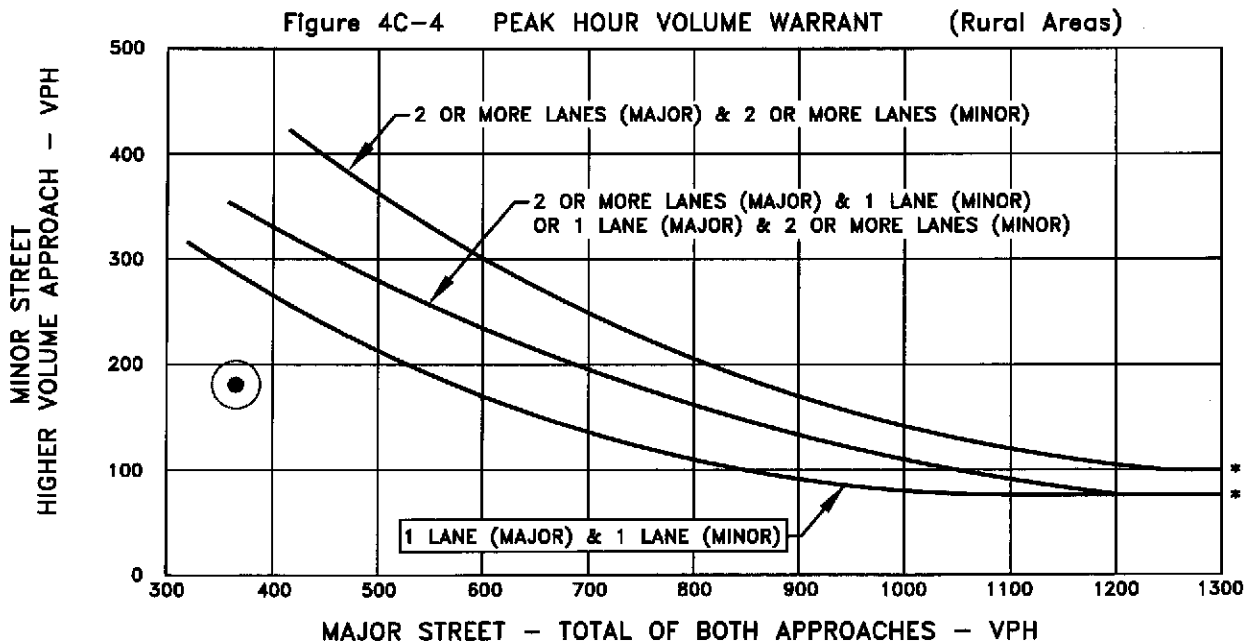
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		281	365		
Highest Approaches - Minor Street	✓		128	181		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB ON RAMP

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16/ GATEWAY

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

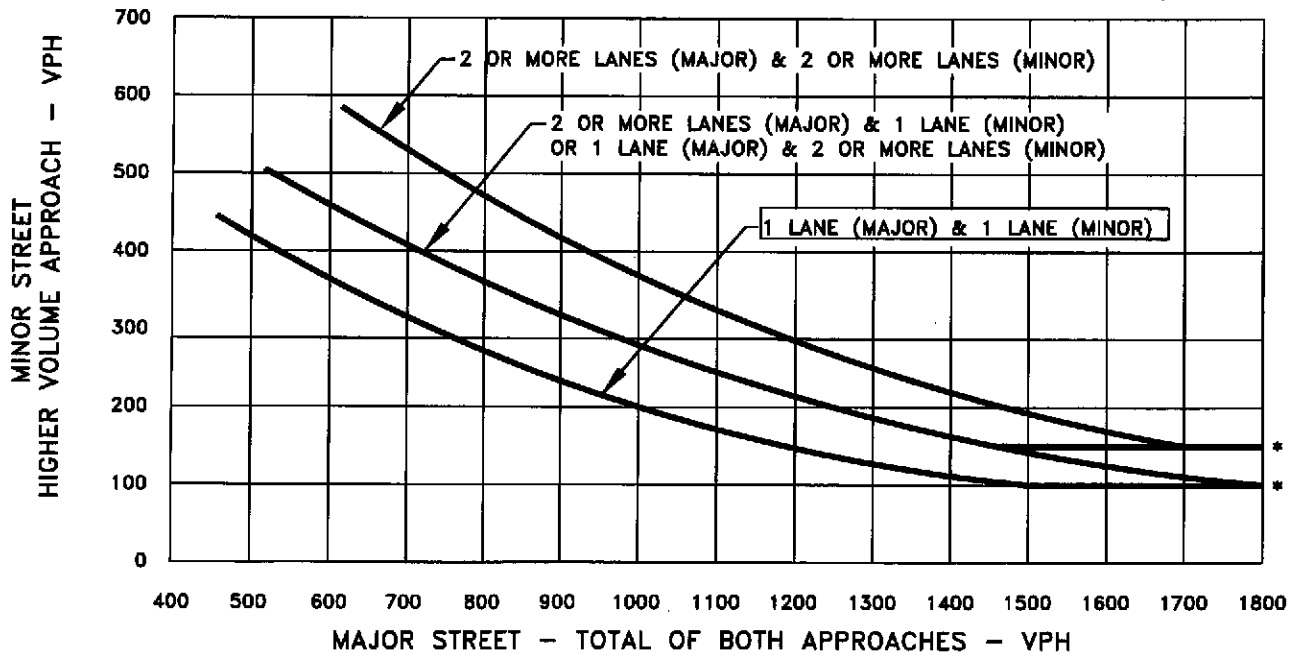
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		148	247	
Highest Approaches - Minor Street	✓		138	210	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 16

Critical Approach Speed 35 mph

MINOR STREET: SR-99 NB ON CONNECTOR

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

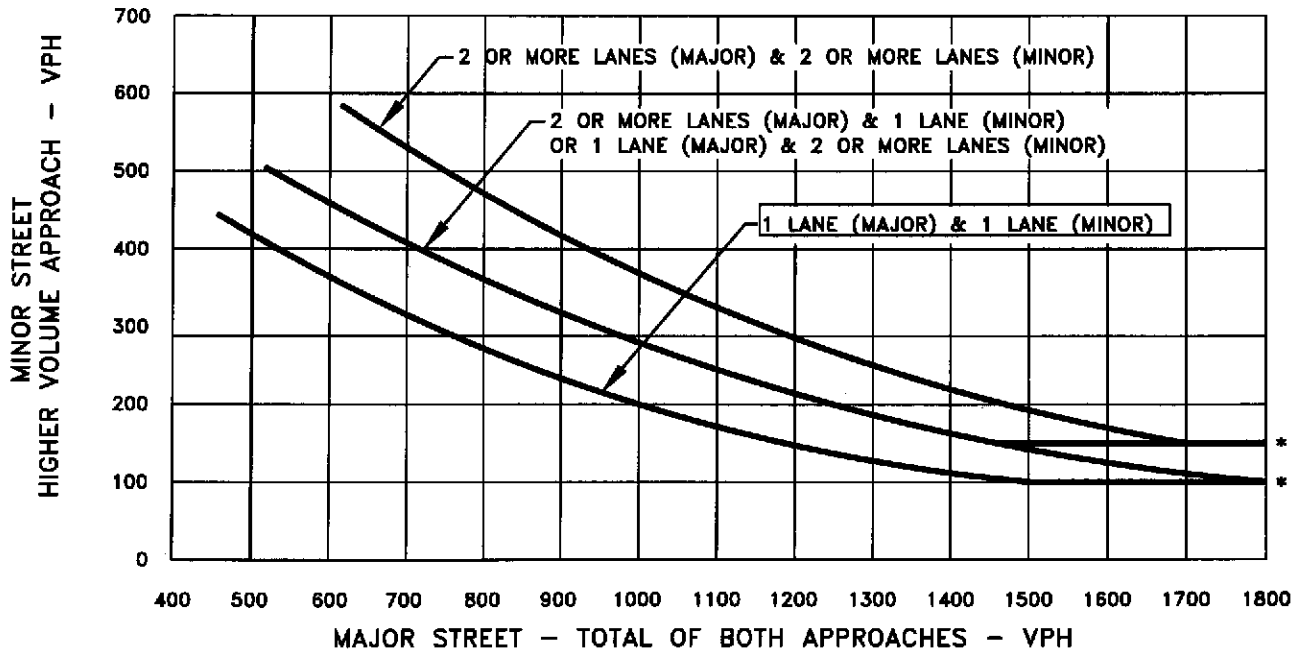
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		190	261	
Highest Approaches - Minor Street	✓		64	111	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16 CONNECTOR

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

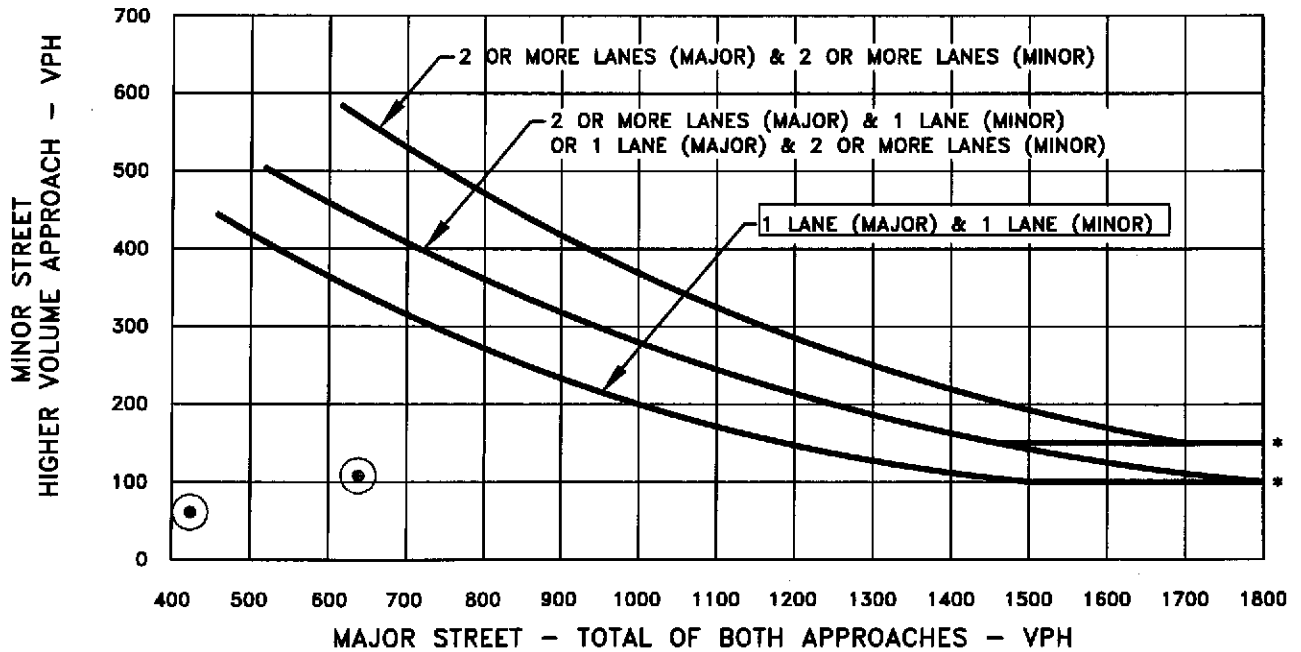
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		424	638	
Highest Approaches - Minor Street	✓		61	108	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

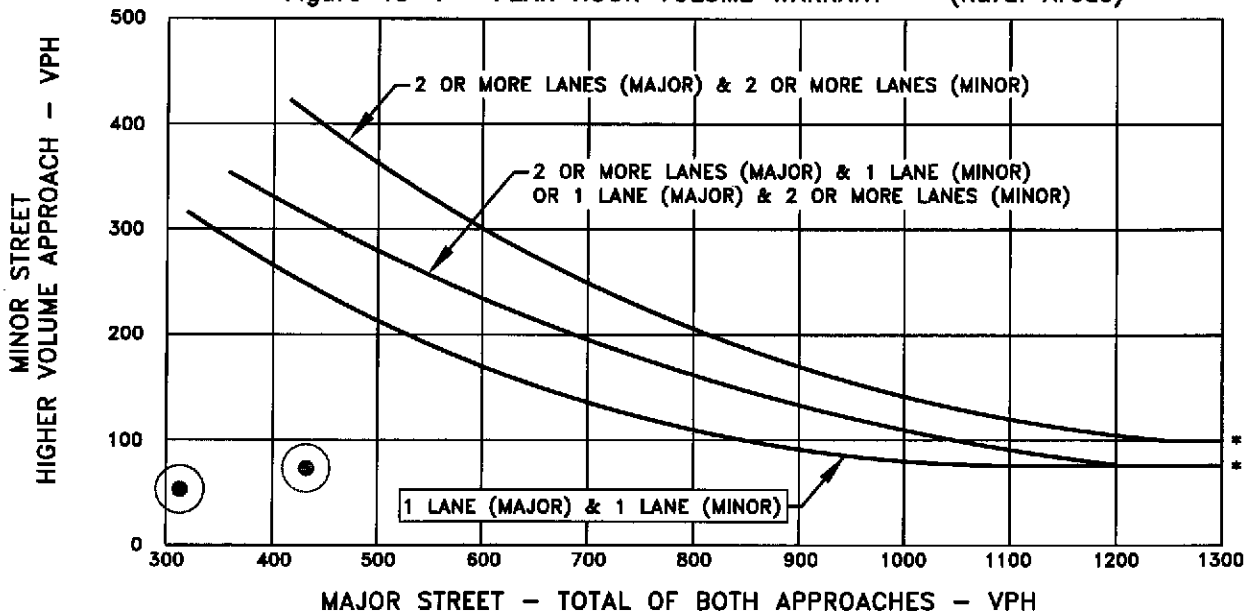
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK		PM PEAK		Hour
	One	2 or more					
Both Approaches - Major Street	✓		313	432			
Highest Approaches - Minor Street	✓		53	73			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

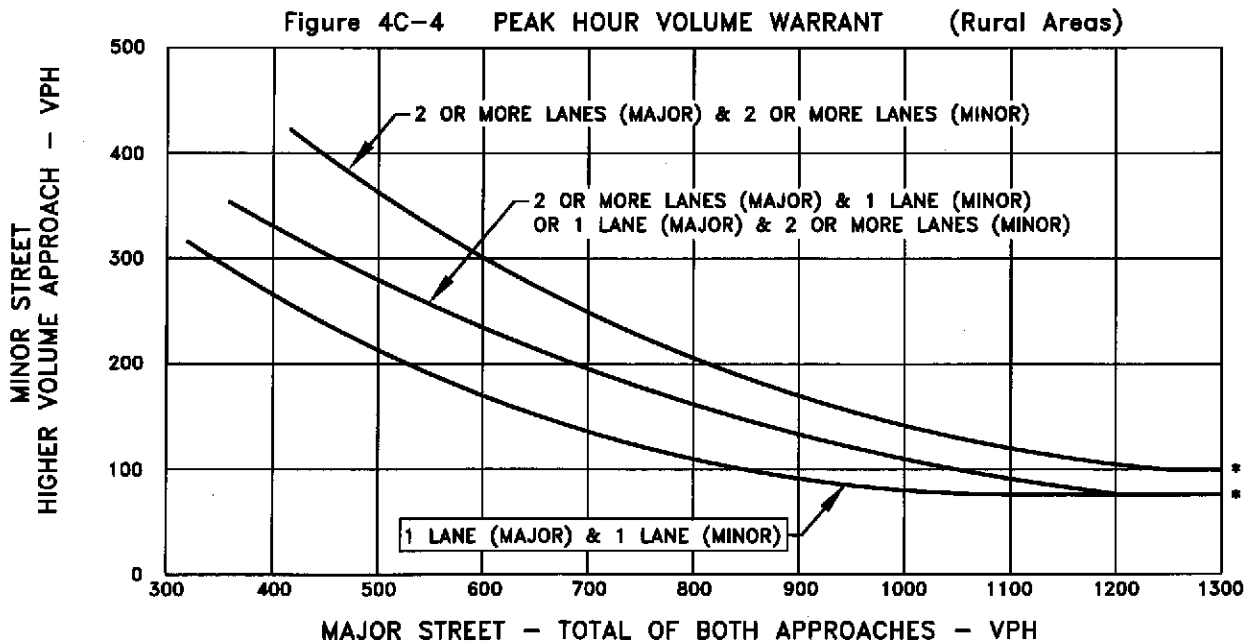
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		225	296		
Highest Approaches - Minor Street	✓		132	144		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB RAMPS/ GOLDEN STATE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 NO PROJECT

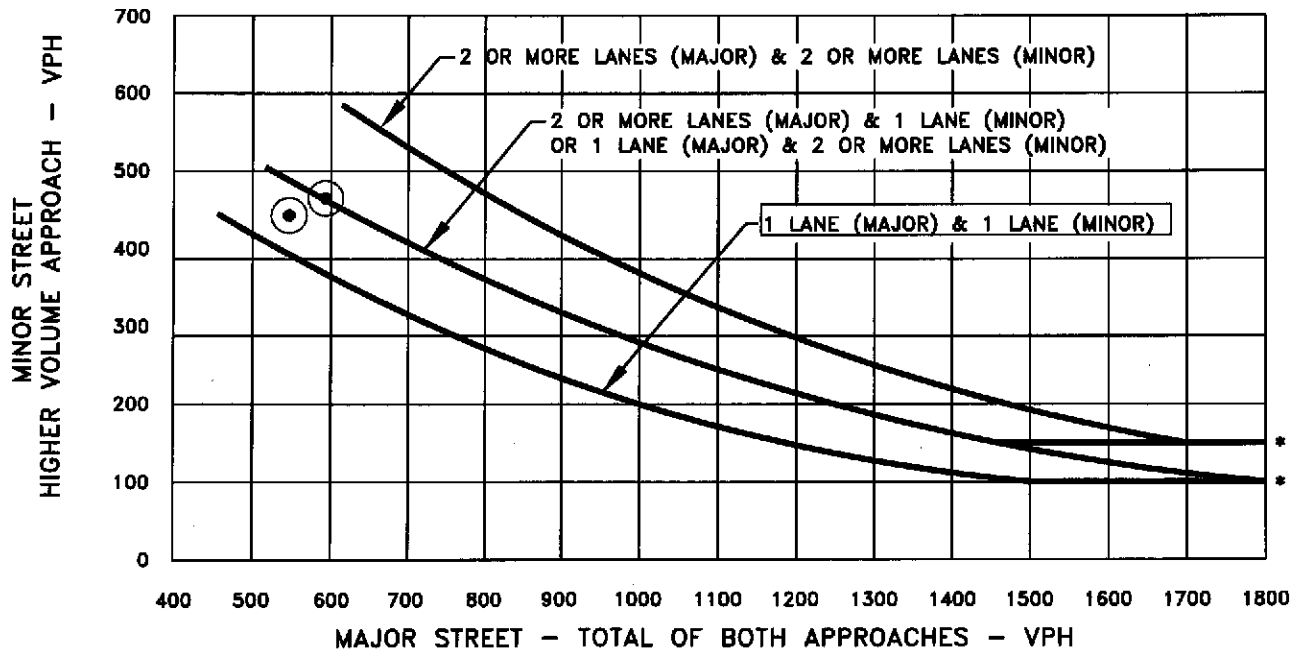
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		546	593	
Highest Approaches - Minor Street	✓		443	465	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

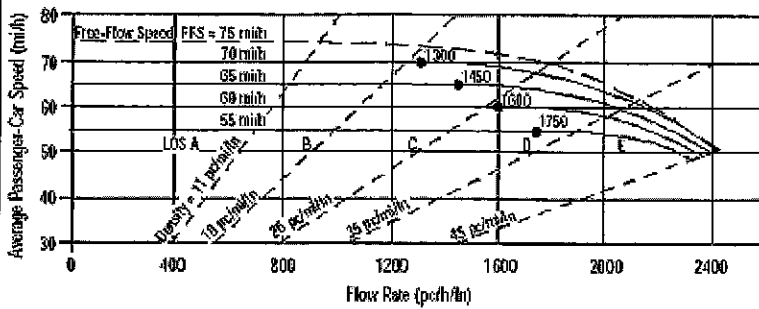
ATTACHMENT VI – C - 8

OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2622	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

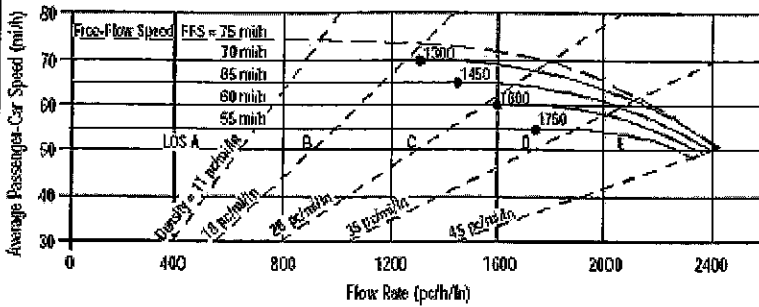
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1675 pc/h/ln	Design LOS	
S	69.0 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.3 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	2705	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

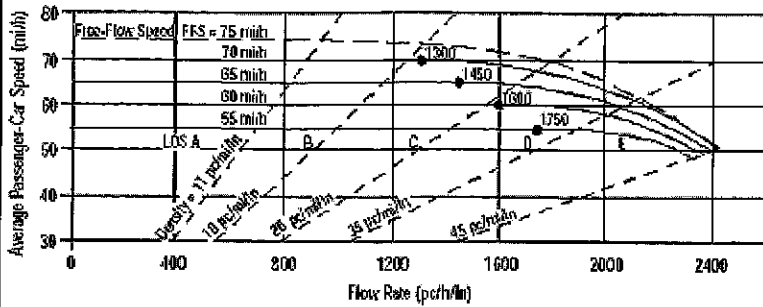
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1728 pc/h/ln	Design LOS	
S	68.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.2 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2189	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AAADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	2		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

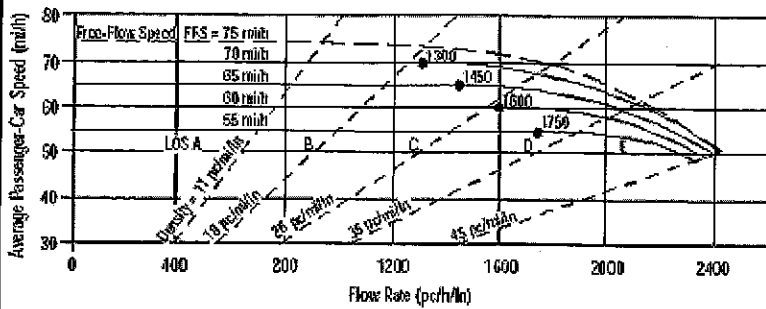
Operational (LOS)			Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1398	pc/h/ln	Design LOS	
S	70.0	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	20.0	pc/mi/ln	S	mi/h
LOS	C		D = v _p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	3233	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	2		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

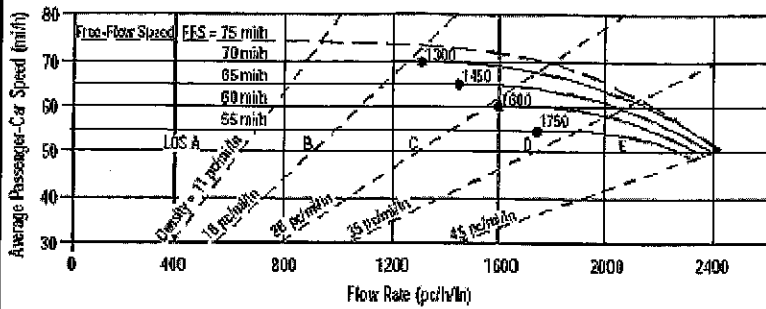
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	2065	pc/h/ln	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)
S	63.5	mi/h	S
D = v _p / S	32.5	pc/mi/ln	D = v _p / S
LOS	D		Required Number of Lanes, N

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

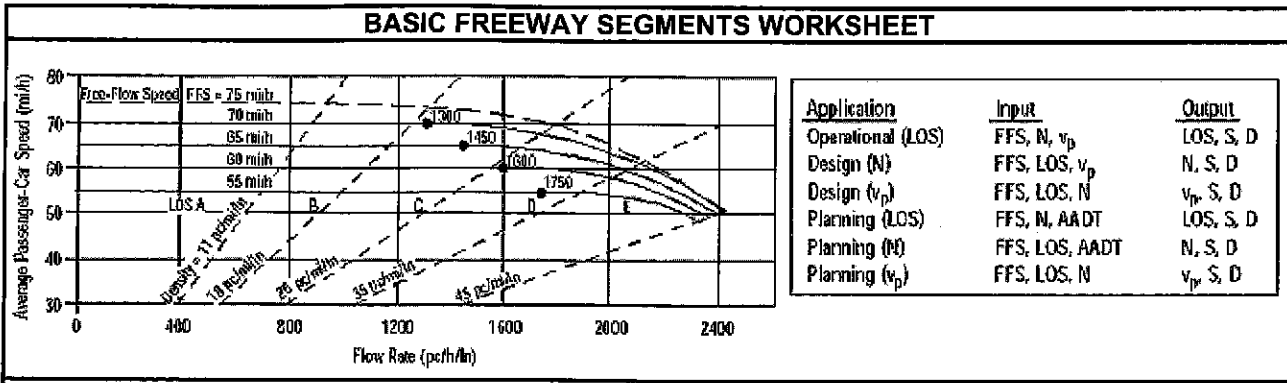
Flow Inputs			
Volume, V	2718	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1736 pc/h/ln	Design LOS	
S	68.5 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	
D = v _p / S	25.3 pc/mi/ln	S	
LOS	C	D = v _p / S	
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs

Volume, V	2858	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P_T	24
Peak-Hr Prop. of AAADT, K			% RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

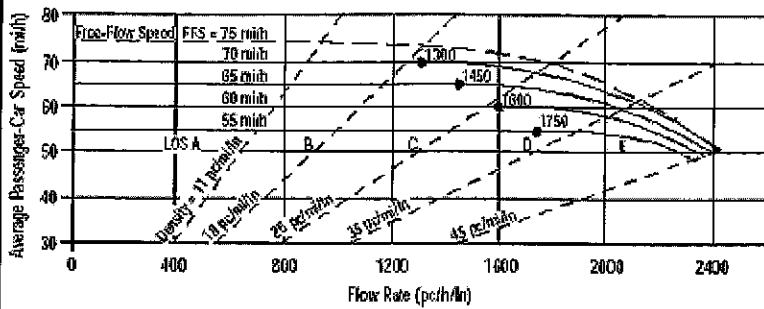
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	f_{LW}
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}
Interchange Density	0.50	l/mi	f_{ID}
Number of Lanes, N	2		f_N
FFS (measured)	70.0	mi/h	FFS
Base free-flow Speed, BFFS		mi/h	70.0

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	Design LOS
v_p	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$
S	f_p
$D = v_p / S$	S
LOS	$D = v_p / S$
	Required Number of Lanes, N

Glossary	Factor Location
N - Number of lanes	E_R - Exhibits 23-8, 23-10
V - Hourly volume	E_T - Exhibits 23-8, 23-10, 23-11
v_p - Flow rate	f_p - Page 23-12
LOS - Level of service	LOS, S, FFS, v_p - Exhibits 23-2, 23-3
DDHV - Directional design hour volume	f_{LW} - Exhibit 23-4
S - Speed	f_{LC} - Exhibit 23-5
D - Density	f_N - Exhibit 23-6
FFS - Free-flow speed	f_{ID} - Exhibit 23-7
BFFS - Base free-flow speed	

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2295	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

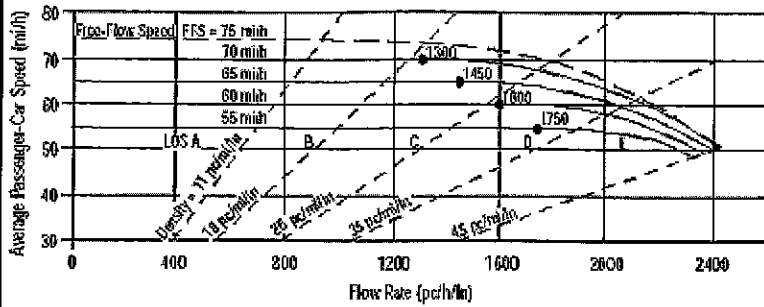
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1466 pc/h/ln	Design LOS	
S	69.9 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	
D = v _p / S	21.0 pc/mi/ln	S	
LOS	C	D = v _p / S	
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

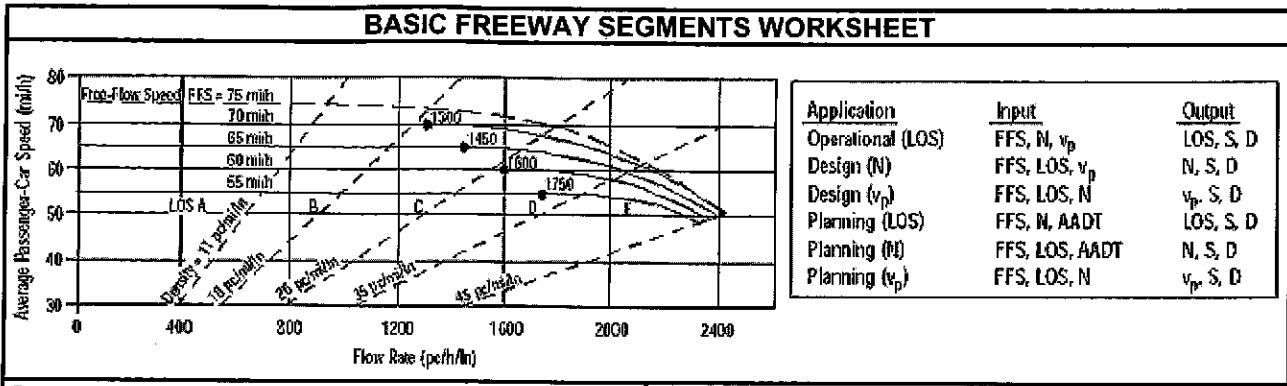
Flow Inputs			
Volume, V	3423	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2186 pc/h/ln	Design LOS	
S	60.5 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	36.1 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

<input checked="" type="checkbox"/> Oper.(LOS)	<input checked="" type="checkbox"/> Des.(N)	<input checked="" type="checkbox"/> Planning Data
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Flow Inputs

Volume, V	3175	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P_T	24
Peak-Hr Prop. of AAADT, K			% RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T (E_T - 1) + P_R (E_R - 1)]$	0.890

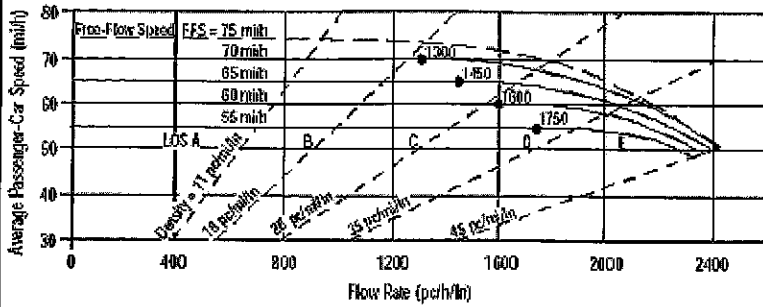
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 1/mi	f_{ID}	mi/h
Number of Lanes, N	2	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	Design LOS
v_p	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$
S	f_p
$D = v_p / S$	S
LOS	$D = v_p / S$
	Required Number of Lanes, N

Glossary	Factor Location
N - Number of lanes	E_R - Exhibits 23-8, 23-10
V - Hourly volume	E_T - Exhibits 23-8, 23-10, 23-11
v_p - Flow rate	f_p - Page 23-12
LOS - Level of service	LOS, S, FFS, v_p - Exhibits 23-2, 23-3
DDHV - Directional design hour volume	f_{LW} - Exhibit 23-4
S - Speed	f_{LC} - Exhibit 23-5
D - Density	f_N - Exhibit 23-6
FFS - Free-flow speed	f_{ID} - Exhibit 23-7
BFFS - Base free-flow speed	

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different density and free-flow speed (FFS) conditions. Key points on the curves are labeled with flow rates: 1300, 1450, 1600, and 1750. Density values shown include 11, 13, 20, 25, 35, and 45 pc/mi/ln. FFS values shown include 75, 70, 65, 60, and 55 mi/h. A horizontal line for LOS A is drawn at approximately 50 mi/h.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 Project Alt A PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3535	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			% RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade %																			
Driver type adjustment	1.00		Length mi																			
			Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T + (E_T - 1) * P_R * (E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	2		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF * N * f_{HV} * S)$	2258	pc/h/ln	Design LOS																			
S	58.4	mi/h	$v_p = (V \text{ or DDHV}) / (PHF * N * f_{HV} * S)$																			
$D = v_p / S$	38.7	pc/mi/ln	f_p																			
LOS	E		S																			
			$D = v_p / S$																			
			Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2660	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

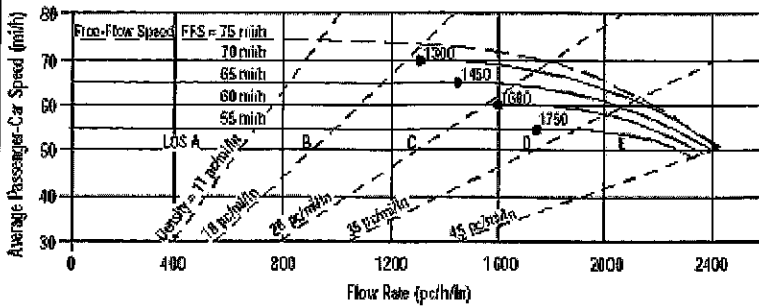
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T + (E _T - 1) * P _R * (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1699 pc/h/ln	Design LOS	
S	68.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.7 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt A PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4137	veh/h	Peak-Hour Factor, PHF
AAADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AAADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AAADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2642 pc/h/ln	Design LOS	
S	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	pc/mi/ln	S	mi/h
LOS	F	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 9

OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

INTERSECTION LEVEL OF SERVICE CALCULATIONS


















1: Ave 18.5 & SR 99 NB ramps
2010 Project AM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	170	51	0	0	94	12	184	2	39	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	55	0	0	102	13	200	2	42	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115			55			534	540	55	577	534	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115			55			534	540	55	577	534	109
tC, single (s)	4.5			4.3			7.4	6.8	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.6			2.4			3.8	4.3	3.6	3.5	4.0	3.3
p0 queue free %	85			100			46	99	95	100	100	100
cM capacity (veh/h)	1259			1447			369	351	938	363	388	950
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	185	55	115	200	45							
Volume Left	185	0	0	200	0							
Volume Right	0	0	13	0	42							
cSH	1259	1700	1700	369	867							
Volume to Capacity	0.15	0.03	0.07	0.54	0.05							
Queue Length 95th (ft)	13	0	0	77	4							
Control Delay (s)	8.4	0.0	0.0	25.7	9.4							
Lane LOS	A			D	A							
Approach Delay (s)	6.4		0.0	22.7								
Approach LOS				C								
Intersection Summary												
Average Delay			11.8									
Intersection Capacity Utilization			32.9%		ICU Level of Service				A			
Analysis Period (min)			15									











3: Ave 18.5 & Road 23
 2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	314	64	16	211	0	81	0	89	12	54	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	341	70	17	229	0	88	0	97	13	59	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	229			411			750	640	376	737	675	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229			411			750	640	376	737	675	229
tC, single (s)	4.4			4.3			7.4	6.8	6.5	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.5			2.4			3.7	4.2	3.5	3.8	4.3	3.6
p0 queue free %	100			98			61	100	84	95	82	89
cM capacity (veh/h)	1171			1044			226	356	618	246	330	732
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	411	247	88	97	152							
Volume Left	0	17	88	0	13							
Volume Right	70	0	0	97	80							
cSH	1700	1044	226	618	447							
Volume to Capacity	0.24	0.02	0.39	0.16	0.34							
Queue Length 95th (ft)	0	1	43	14	37							
Control Delay (s)	0.0	0.8	30.7	11.9	17.2							
Lane LOS		A	D	B	C							
Approach Delay (s)	0.0	0.8	20.8		17.2							
Approach LOS			C		C							
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			46.8%		ICU Level of Service				A			
Analysis Period (min)			15									







4: Ave 18.5 & Pistacchio
 2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	276	211	140	94	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	300	229	152	102	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	382				532	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				532	229
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				78	99
cM capacity (veh/h)	1026				460	741
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	301	229	152	107		
Volume Left	1	0	0	102		
Volume Right	0	0	152	4		
cSH	1026	1700	1700	467		
Volume to Capacity	0.00	0.13	0.09	0.23		
Queue Length 95th (ft)	0	0	0	22		
Control Delay (s)	0.0	0.0	0.0	15.0		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			29.9%		ICU Level of Service	A
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
 2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↕	↕	↕	↕
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	80	83	126	152	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	87	90	137	165	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	227				184	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227				184	90
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				75	99
cM capacity (veh/h)	1335				673	811
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	90	90	137	170		
Volume Left	3	0	0	165		
Volume Right	0	0	137	4		
cSH	1335	1700	1700	676		
Volume to Capacity	0.00	0.05	0.08	0.25		
Queue Length 95th (ft)	0	0	0	25		
Control Delay (s)	0.3	0.0	0.0	12.1		
Lane LOS	A			B		
Approach Delay (s)	0.3	0.0		12.1		
Approach LOS				B		
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			22.0%		ICU Level of Service	A
Analysis Period (min)			15			



















6: Ave 18 & Road 23
2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	39	1	129	0	26	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	42	1	140	0	28	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357	313	114	322	313	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357	313	114	322	313	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	95	100			98		
cM capacity (veh/h)	546	577	920	589	571	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	49	141	142								
Volume Left	0	4	1	28								
Volume Right	3	42	0	0								
cSH	632	824	1323	1283								
Volume to Capacity	0.02	0.06	0.00	0.02								
Queue Length 95th (ft)	2	5	0	2								
Control Delay (s)	10.8	9.6	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.8	9.6	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			30.1%		ICU Level of Service				A			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	60	382	0	0	772	90	350	1	233	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	415	0	0	839	98	380	1	253	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	937			415			1385	1483	415	1639	1385	839
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	937			415			1385	1483	415	1639	1385	839
tC, single (s)	4.3			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	90			100			0	99	60	100	100	100
cM capacity (veh/h)	670			1128			109	111	629	45	131	369
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	65	415	839	98	382	253						
Volume Left	65	0	0	0	380	0						
Volume Right	0	0	0	98	0	253						
cSH	670	1700	1700	1700	109	629						
Volume to Capacity	0.10	0.24	0.49	0.06	3.48	0.40						
Queue Length 95th (ft)	8	0	0	0	Err	49						
Control Delay (s)	11.0	0.0	0.0	0.0	Err	14.5						
Lane LOS	B				F	B						
Approach Delay (s)	1.5		0.0		6015.5							
Approach LOS					F							
Intersection Summary												
Average Delay			1861.1									
Intersection Capacity Utilization			73.4%		ICU Level of Service				D			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	741	669	0	56	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	805	727	0	61	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	727				1533	727
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	727				1533	727
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.5
p0 queue free %	100				47	78
cM capacity (veh/h)	815				115	392
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	805	727	61	85		
Volume Left	0	0	61	0		
Volume Right	0	0	0	85		
cSH	1700	1700	115	392		
Volume to Capacity	0.47	0.43	0.53	0.22		
Queue Length 95th (ft)	0	0	62	20		
Control Delay (s)	0.0	0.0	66.6	16.7		
Lane LOS			F	C		
Approach Delay (s)	0.0	0.0	37.6			
Approach LOS			E			
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			49.0%		ICU Level of Service	A
Analysis Period (min)			15			













10: Ave 17 & GS Blvd
2010 Project AM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Volume (veh/h)	32	470	14	137	460	150	108	41	89	182	25	22	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	35	511	15	149	500	163	117	45	97	198	27	24	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	663			526			1416	1541	511	1579	1475	582	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	663			526			1416	1541	511	1579	1475	582	
tC, single (s)	4.2			4.2			7.4	6.8	6.5	7.2	6.6	6.3	
tC, 2 stage (s)													
tF (s)	2.3			2.3			3.7	4.2	3.5	3.6	4.1	3.4	
p0 queue free %	96			85			0	47	81	0	72	95	
cM capacity (veh/h)	889			997			66	83	518	35	99	497	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1				
Volume Total	35	511	15	149	663	117	45	97	249				
Volume Left	35	0	0	149	0	117	0	0	198				
Volume Right	0	0	15	0	163	0	0	97	24				
cSH	889	1700	1700	997	1700	66	83	518	41				
Volume to Capacity	0.04	0.30	0.01	0.15	0.39	1.78	0.53	0.19	6.05				
Queue Length 95th (ft)	3	0	0	13	0	264	58	17	Err				
Control Delay (s)	9.2	0.0	0.0	9.2	0.0	506.6	89.7	13.5	Err				
Lane LOS	A			A		F	F	B	F				
Approach Delay (s)	0.6			1.7		250.4			Err				
Approach LOS						F			F				
Intersection Summary													
Average Delay			1358.9										
Intersection Capacity Utilization			66.1%	ICU Level of Service							C		
Analysis Period (min)			15										

11: Ave 17 & Road 23
2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	125	28	46	112	3	16	134	40	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	136	30	50	122	3	17	146	43	10	104	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	390	348	104	424	326	167	104			189		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	390	348	104	424	326	167	104			189		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.3			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.4			2.4		
p0 queue free %	100	76	97	88	79	100	99			99		
cM capacity (veh/h)	465	563	948	410	569	859	1382			1258		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	166	175	207	114								
Volume Left	0	50	17	10								
Volume Right	30	3	43	0								
cSH	608	515	1382	1258								
Volume to Capacity	0.27	0.34	0.01	0.01								
Queue Length 95th (ft)	28	37	1	1								
Control Delay (s)	13.1	15.5	0.7	0.7								
Lane LOS	B	C	A	A								
Approach Delay (s)	13.1	15.5	0.7	0.7								
Approach LOS	B	C										
Intersection Summary												
Average Delay			7.8									
Intersection Capacity Utilization			40.4%		ICU Level of Service				A			
Analysis Period (min)			15									

12: Ellis & Road 26
 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.985			0.991	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3387	0	1752	3473	0
Flt Permitted		0.728			0.730		0.950			0.950		
Satd. Flow (perm)	0	1356	1583	0	1360	1583	1719	3387	0	1752	3473	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			7			103		17			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	38	0	6	41	0	95	6	362	40	55	491	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	41	0	7	45	0	103	7	393	43	60	534	34
Lane Group Flow (vph)	0	41	7	0	45	103	7	436	0	60	568	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.4	10.4		10.4	10.4	8.1	32.7		9.7	36.6	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.61		0.16	0.68	
v/c Ratio		0.17	0.02		0.18	0.28	0.03	0.21		0.21	0.24	
Control Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		14.1			8.9			8.0			6.5	

12: Ellis & Road 26
 2010 Project AM Alternative A

10/22/2008

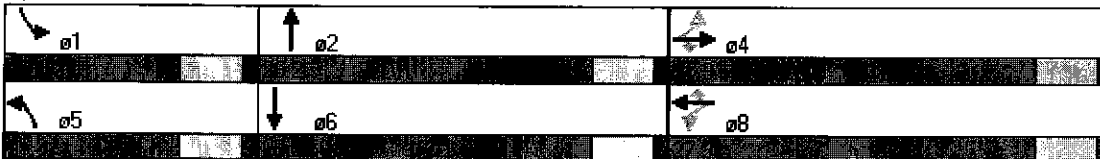
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		4	0		4	0	1	15		6	22	
Queue Length 95th (ft)		29	8		31	29	10	76		38	91	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		521	613		523	672	360	2331		391	2518	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.01		0.09	0.15	0.02	0.19		0.15	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 36.8%
 Analysis Period (min) 15










Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			19.1%		ICU Level of Service	A
Analysis Period (min)			15			







14: Gateway & Ave 16 Connector
 2010 Project AM Alternative A

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↓		↑	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			21.9%		ICU Level of Service	A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 2010 Project AM Alternative A







10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑			↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
2010 Project AM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				1		237
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	285	165	1	49	218
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	310	179	1	53	237
Lane Group Flow (vph)	130	310	179	1	53	237
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.5	10.7	10.7	13.7	13.7
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.38	0.38
v/c Ratio	0.34	0.35	0.36	0.00	0.08	0.33
Control Delay	17.0	5.7	14.3	10.0	14.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	5.7	14.3	10.0	14.5	4.5
LOS	B	A	B	A	B	A
Approach Delay		9.0	14.3		6.3	

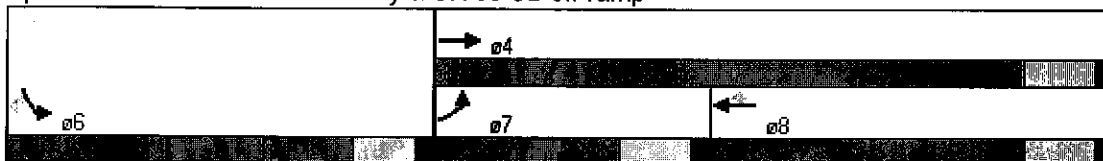
						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	30	0	9	0
Queue Length 95th (ft)	71	68	82	3	34	42
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	456	1177	710	604	887	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.25	0.00	0.06	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.2
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 28.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.939			0.951				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			22				3		207	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	50	34	147	42	20	20	41	3	47	79	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	54	37	160	46	22	22	45	3	51	86	228
Lane Group Flow (vph)	4	91	0	160	68	0	22	45	3	51	314	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.5	7.1		8.7	15.9		4.5	17.1	17.1	16.6	34.6	
Actuated g/C Ratio	0.06	0.11		0.14	0.25		0.07	0.27	0.27	0.26	0.55	
v/c Ratio	0.04	0.23		0.66	0.08		0.19	0.09	0.01	0.11	0.33	
Control Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
LOS	C	B		D	B		C	B	B	C	A	
Approach Delay		19.7			34.0			23.9		7.3		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	10		62	6		9	14	0	16	18	
Queue Length 95th (ft)	10	30		#143	23		29	37	6	41	73	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	114	763		252	1054		117	479	431	465	958	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.12		0.63	0.06		0.19	0.09	0.01	0.11	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 63.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 18.5
 Intersection Capacity Utilization 34.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔			↔↔	↔	↔	↔	↔			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						135			174			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35				35			30			30
Link Distance (ft)		391				1686			1254			906
Travel Time (s)		7.6				32.8			28.5			20.6
Volume (vph)	82	533	0	0	673	124	350	0	160	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	89	579	0	0	732	135	380	0	174	0	0	0
Lane Group Flow (vph)	89	579	0	0	732	135	190	190	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.8	48.5			36.8	36.8	28.5	28.5	28.5			
Actuated g/C Ratio	0.12	0.57			0.43	0.43	0.34	0.34	0.34			
v/c Ratio	0.45	0.29			0.49	0.18	0.35	0.35	0.28			
Control Delay	31.4	6.0			19.8	4.0	23.6	23.6	4.7			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	31.4	6.0			19.8	4.0	23.6	23.6	4.7			
LOS	C	A			B	A	C	C	A			
Approach Delay		9.4			17.4			17.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project AM Alternative A

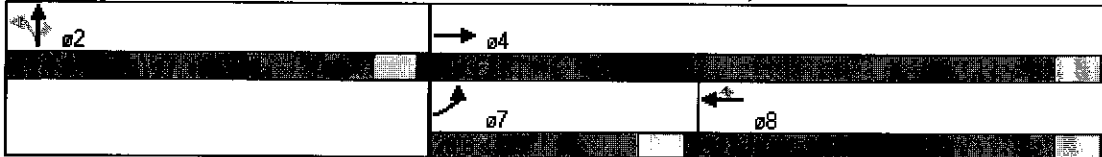
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	46	102			150	0	80	80	0			
Queue Length 95th (ft)	m37	0			214	34	137	137	42			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	339	1981			1505	750	543	543	627			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.26	0.29			0.49	0.18	0.35	0.35	0.28			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 14.9
 Intersection LOS: B
 Intersection Capacity Utilization 54.0%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			393									111
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	503	362	278	745	0	0	0	0	112	0	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	547	393	302	810	0	0	0	0	122	0	111
Lane Group Flow (vph)	0	547	393	302	810	0	0	0	0	0	122	111
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	28.2	28.2	32.3	60.5	0.0	0.0	0.0	0.0	24.5	24.5	24.5
Total Split (%)	0.0%	33.2%	33.2%	38.0%	71.2%	0.0%	0.0%	0.0%	0.0%	28.8%	28.8%	28.8%
Maximum Green (s)		23.6	23.6	27.7	55.9					20.0	20.0	20.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		41.2	41.2	19.9	65.0						12.0	12.0
Actuated g/C Ratio		0.48	0.48	0.23	0.76						0.14	0.14
v/c Ratio		0.33	0.42	0.75	0.31						0.54	0.37
Control Delay		16.2	3.7	36.3	9.0						42.2	10.2
Queue Delay		0.0	0.0	0.0	0.4						0.0	0.0
Total Delay		16.2	3.7	36.3	9.3						42.2	10.2
LOS		B	A	D	A						D	B
Approach Delay		11.0			16.7						27.0	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						C	
Queue Length 50th (ft)		92	0	160	145						62	0
Queue Length 95th (ft)		163	58	196	203						108	42
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1634	933	572	2630						385	429
Starvation Cap Reductn		0	0	0	1153						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.33	0.42	0.53	0.55						0.32	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 60.4 (71%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.4
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
2010 Project AM Alternative A

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	1	22	0	167	29	18	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	1	24	0	182	32	20	136	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	388	136	372	372	197	136			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	388	136	372	372	197	136			213		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	540	538	913	578	549	844	1350			1262		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	61	213	155								
Volume Left	0	36	0	20								
Volume Right	0	24	32	0								
cSH	1700	659	1350	1262								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	8	0	1								
Control Delay (s)	0.0	11.0	0.0	1.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.0	0.0	1.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2010 Project AM Alternative A

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.976							0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3293	0	0	0	0	1752	1568	0
Flt Permitted	0.389									0.950		
Satd. Flow (perm)	1315	3312	0	0	3293	0	0	0	0	1752	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					48						458	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	394	351	0	0	474	90	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	428	382	0	0	515	98	0	0	0	158	0	78
Lane Group Flow (vph)	428	382	0	0	613	0	0	0	0	158	78	0
Turn Type	Perm						Perm					
Protected Phases		2			6							8
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	46.5	46.5	0.0	0.0	46.5	0.0	0.0	0.0	0.0	28.5	28.5	0.0
Total Split (%)	62.0%	62.0%	0.0%	0.0%	62.0%	0.0%	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%
Maximum Green (s)	41.9	41.9			41.9					24.0	24.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	58.1	58.1			58.1					11.9	11.9	
Actuated g/C Ratio	0.77	0.77			0.77					0.16	0.16	
v/c Ratio	0.42	0.15			0.24					0.57	0.12	
Control Delay	2.7	0.4			3.4					36.7	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	2.7	0.4			3.4					36.7	0.4	
LOS	A	A			A					D	A	
Approach Delay		1.6			3.4						24.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 Project AM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A						C	
Queue Length 50th (ft)	9	0			34					69	0	
Queue Length 95th (ft)	m22	m4			66					117	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1019	2567			2564					572	821	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.42	0.15			0.24					0.28	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 5.6
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frnt			0.850					0.994				0.850
Flt Protected		0.965					0.950				0.991	
Satd. Flow (prot)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Flt Permitted		0.965					0.950				0.991	
Satd. Flow (perm)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			358					5				212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	203	78	329	0	0	0	93	546	21	50	229	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	221	85	358	0	0	0	101	593	23	54	249	212
Lane Group Flow (vph)	0	306	358	0	0	0	101	616	0	0	303	212
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		16.6	16.6				24.8	24.8			21.6	21.6
Actuated g/C Ratio		0.22	0.22				0.33	0.33			0.29	0.29
v/c Ratio		0.79	0.58				0.09	0.56			0.31	0.35
Control Delay		35.9	8.0				19.4	23.9			24.3	8.3
Queue Delay		6.1	0.6				0.0	0.0			0.0	0.0
Total Delay		42.0	8.6				19.4	23.9			24.3	8.3
LOS		D	A				B	C			C	A
Approach Delay		24.0						23.3			17.7	

22: AVE 14/Olive & SR 145/Madera
 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			B	
Queue Length 50th (ft)		126	12				16	120			63	1
Queue Length 95th (ft)		m0	m35				36	191			98	63
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		501	696				1064	1093			991	598
Starvation Cap Reductn		142	111				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		0.85	0.61				0.09	0.56			0.31	0.35

Intersection Summary







Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 22.0
 Intersection Capacity Utilization 48.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
 2010 Project AM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	331	287	0	279	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	360	312	0	303	187
Lane Group Flow (vph)	0	360	312	0	303	187
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.0	49.0		18.0	18.0
Actuated g/C Ratio		0.65	0.65		0.24	0.24
v/c Ratio		0.16	0.14		0.76	0.37
Control Delay		6.1	4.2		38.1	5.6
Queue Delay		0.0	0.3		0.1	0.0
Total Delay		6.1	4.5		38.1	5.6
LOS		A	A		D	A
Approach Delay		6.1	4.5		25.7	

23: AVe 14/Olive & SR 99 SB off-ramp
 2010 Project AM Alternative A

10/22/2008

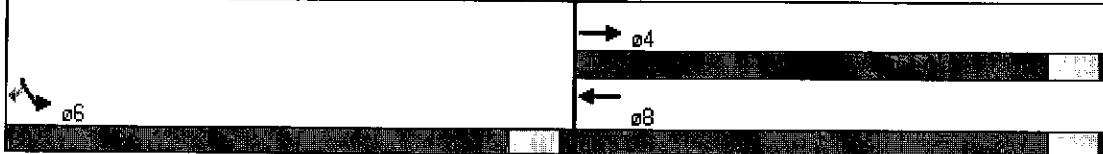
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		28	12		132	0
Queue Length 95th (ft)		61	38		187	40
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2290	2290		769	789
Starvation Cap Reductn		0	1399		0	0
Spillback Cap Reductn		0	0		44	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.16	0.35		0.42	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 31.3%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp














24: Ave 14/Olive & Road 23
 2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	16	68	6	14	67	54	8	75	8	49	82	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	7	15	73	59	9	82	9	53	89	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	147	99	172								
Volume Left (vph)	17	15	9	53								
Volume Right (vph)	7	59	9	29								
Hadj (s)	0.13	0.02	0.30	0.25								
Departure Headway (s)	4.9	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.14	0.23								
Capacity (veh/h)	678	708	669	693								
Control Delay (s)	8.7	8.9	8.9	9.4								
Approach Delay (s)	8.7	8.9	8.9	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
HCM Level of Service			A									
Intersection Capacity Utilization		30.9%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
 2010 Project AM Alternative A

10/22/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	387	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	421	82	125	239	155	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	510	125			364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	125			364	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	6	91			87	
cM capacity (veh/h)	449	915			1189	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	421	82	125	239	229	
Volume Left	421	0	0	0	155	
Volume Right	0	82	0	239	0	
cSH	449	915	1700	1700	1189	
Volume to Capacity	0.94	0.09	0.07	0.14	0.13	
Queue Length 95th (ft)	273	7	0	0	11	
Control Delay (s)	58.7	9.3	0.0	0.0	6.1	
Lane LOS	F	A			A	
Approach Delay (s)	50.7		0.0		6.1	
Approach LOS	F					
Intersection Summary						
Average Delay			24.5			
Intersection Capacity Utilization			46.3%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frft			0.850		0.952			0.871				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1518	0	1687	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1518	0	1687	1776	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			17		21			18				62
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		30
Link Distance (ft)		1843			818			837		408		
Travel Time (s)		35.9			15.9			19.0		9.3		
Volume (vph)	180	234	16	14	320	152	16	3	17	387	11	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	196	254	17	15	348	165	17	3	18	421	12	62
Lane Group Flow (vph)	196	254	17	15	513	0	17	21	0	421	12	62
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	54.7	54.7	9.7	44.4	0.0	9.7	20.6	0.0	35.0	45.9	45.9
Total Split (%)	16.7%	45.6%	45.6%	8.1%	37.0%	0.0%	8.1%	17.2%	0.0%	29.2%	38.3%	38.3%
Maximum Green (s)	15.4	50.1	50.1	5.1	39.8		5.2	16.1		30.5	41.4	41.4
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	16.0	56.5	56.5	5.7	40.4		5.7	16.6		31.0	47.7	47.7
Actuated g/C Ratio	0.13	0.47	0.47	0.05	0.34		0.05	0.14		0.26	0.40	0.40
v/c Ratio	0.91	0.32	0.02	0.19	0.92		0.22	0.09		0.97	0.02	0.10
Control Delay	93.9	22.2	8.7	64.1	42.6		61.7	21.9		79.9	24.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	93.9	22.2	8.7	64.1	42.6		61.7	21.9		79.9	24.7	6.9
LOS	F	C	A	E	D		E	C		E	C	A
Approach Delay		51.8			43.3			39.7			69.4	

26: Ave 12 & GS Blvd
 2010 Project AM Alternative A

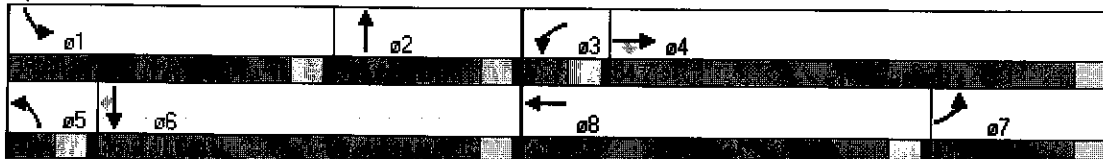
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			D			E	
Queue Length 50th (ft)	152	111	0	12	238		13	2		323	5	0
Queue Length 95th (ft)	#294	200	14	m17	#561		38	26		#527	20	30
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	215	799	688	77	558		79	226		436	706	637
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.91	0.32	0.02	0.19	0.92		0.22	0.09		0.97	0.02	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 54.3
 Intersection LOS: D
 Intersection Capacity Utilization 74.2%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.923				0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1656	1743	0	0	1654	0	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	1743	0	0	1654	0	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					96				129			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	81	557	0	0	292	387	194	0	119	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	88	605	0	0	317	421	211	0	129	0	0	0
Lane Group Flow (vph)	88	605	0	0	738	0	0	211	129	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	17.0	91.0	0.0	0.0	74.0	0.0	29.0	29.0	29.0	0.0	0.0	0.0
Total Split (%)	14.2%	75.8%	0.0%	0.0%	61.7%	0.0%	24.2%	24.2%	24.2%	0.0%	0.0%	0.0%
Maximum Green (s)	12.4	86.4			69.4		24.4	24.4	24.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	11.4	91.5			78.5		20.5	20.5				
Actuated g/C Ratio	0.10	0.76			0.65		0.17	0.17				
v/c Ratio	0.56	0.45			0.66		0.78	0.37				
Control Delay	57.1	2.3			16.4		66.2	9.9				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	57.1	2.3			16.4		66.2	9.9				
LOS	E	A			B		E	A				
Approach Delay		9.3			16.4		44.9					

27: Ave 12 & SR 99 NB Ramps
 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	70	117			309			157	0			
Queue Length 95th (ft)	m80	m2			511			236	52			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	180	1330			1115			333	400			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.49	0.45			0.66			0.63	0.32			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 19.1
 Intersection Capacity Utilization 64.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	154	66	0	0	106	7	239	0	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	167	72	0	0	115	8	260	0	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			72			526	529	72	581	526	119
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			72			526	529	72	581	526	119
tC, single (s)	4.3			4.2			7.3	6.7	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.7	4.2	3.5	3.5	4.0	3.3
p0 queue free %	88			100			34	100	94	100	100	100
cM capacity (veh/h)	1344			1456			394	377	943	364	403	938
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	167	72	123	260	55							
Volume Left	167	0	0	260	0							
Volume Right	0	0	8	0	55							
cSH	1344	1700	1700	394	943							
Volume to Capacity	0.12	0.04	0.07	0.66	0.06							
Queue Length 95th (ft)	11	0	0	114	5							
Control Delay (s)	8.1	0.0	0.0	30.1	9.1							
Lane LOS	A			D	A							
Approach Delay (s)	5.6		0.0	26.4								
Approach LOS				D								
Intersection Summary												
Average Delay			14.3									
Intersection Capacity Utilization			35.1%		ICU Level of Service				A			
Analysis Period (min)			15									







3: Ave 18.5 & Road 23
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	435	103	32	252	0	79	0	65	23	75	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	473	112	35	274	0	86	0	71	25	82	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	274			585			1032	872	529	943	928	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			585			1032	872	529	943	928	274
tC, single (s)	4.3			4.3			7.3	6.7	6.4	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.9	4.4	3.7
p0 queue free %	100			96			23	100	86	86	63	83
cM capacity (veh/h)	1192			911			111	257	511	174	223	682
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	585	309	86	71	225							
Volume Left	0	35	86	0	25							
Volume Right	112	0	0	71	118							
cSH	1700	911	111	511	330							
Volume to Capacity	0.34	0.04	0.77	0.14	0.68							
Queue Length 95th (ft)	0	3	108	12	118							
Control Delay (s)	0.0	1.4	104.2	13.2	36.5							
Lane LOS		A	F	B	E							
Approach Delay (s)	0.0	1.4	63.1		36.5							
Approach LOS			F		E							
Intersection Summary												
Average Delay			14.5									
Intersection Capacity Utilization			66.4%		ICU Level of Service				C			
Analysis Period (min)			15									

4: Ave 18.5 & Pistacchio
 2010 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	376	212	228	156	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	409	230	248	170	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	478				663	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478				663	230
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				58	99
cM capacity (veh/h)	997				402	778
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	421	230	248	176		
Volume Left	12	0	0	170		
Volume Right	0	0	248	7		
cSH	997	1700	1700	409		
Volume to Capacity	0.01	0.14	0.15	0.43		
Queue Length 95th (ft)	1	0	0	53		
Control Delay (s)	0.4	0.0	0.0	20.3		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		20.3		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization		44.3%		ICU Level of Service	A	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	117	93	138	190	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	127	101	150	207	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	251				230	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251				230	101
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				69	100
cM capacity (veh/h)	1314				661	836
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	128	101	150	210		
Volume Left	1	0	0	207		
Volume Right	0	0	150	3		
cSH	1314	1700	1700	663		
Volume to Capacity	0.00	0.06	0.09	0.32		
Queue Length 95th (ft)	0	0	0	34		
Control Delay (s)	0.1	0.0	0.0	12.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		24.3%		ICU Level of Service	A	
Analysis Period (min)		15				

6: Ave 18 & Road 23
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	54	4	67	114	37	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	59	4	73	124	40	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	454	168	408	393	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	454	168	408	393	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	94	100			97		
cM capacity (veh/h)	442	472	853	515	520	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	75	201	210								
Volume Left	1	0	4	40								
Volume Right	7	59	124	2								
cSH	532	780	1316	1296								
Volume to Capacity	0.05	0.10	0.00	0.03								
Queue Length 95th (ft)	4	8	0	2								
Control Delay (s)	12.1	10.1	0.2	1.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.1	10.1	0.2	1.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			35.1%		ICU Level of Service				A			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↑	↗		↑	↗			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	74	854	0	0	1081	191	422	2	720	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	928	0	0	1175	208	459	2	783	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1383			928			2264	2472	928	3048	2264	1175
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1383			928			2264	2472	928	3048	2264	1175
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			100			0	91	0	0	100	100
cM capacity (veh/h)	486			737			25	25	322	0	34	236
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	80	928	1175	208	461	783						
Volume Left	80	0	0	0	459	0						
Volume Right	0	0	0	208	0	783						
cSH	486	1700	1700	1700	25	322						
Volume to Capacity	0.17	0.55	0.69	0.12	18.54	2.43						
Queue Length 95th (ft)	15	0	0	0	Err	1557						
Control Delay (s)	13.9	0.0	0.0	0.0	Err	678.5						
Lane LOS	B				F	F						
Approach Delay (s)	1.1		0.0		4133.0							
Approach LOS					F							
Intersection Summary												
Average Delay			1414.2									
Intersection Capacity Utilization			96.2%		ICU Level of Service				F			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
 2010 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1253	1010	0	209	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1362	1098	0	227	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1098				2460	1098
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1098				2460	1098
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	100				0	61
cM capacity (veh/h)	628				32	253
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	1362	1098	227	99		
Volume Left	0	0	227	0		
Volume Right	0	0	0	99		
cSH	1700	1700	32	253		
Volume to Capacity	0.80	0.65	7.01	0.39		
Queue Length 95th (ft)	0	0	Err	44		
Control Delay (s)	0.0	0.0	Err	28.1		
Lane LOS			F	D		
Approach Delay (s)	0.0	0.0	6974.5			
Approach LOS			F			
Intersection Summary						
Average Delay		816.4				
Intersection Capacity Utilization		84.2%		ICU Level of Service		E
Analysis Period (min)		15				

10: Ave 17 & GS Blvd
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	42	673	85	162	637	302	126	84	241	339	49	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	732	92	176	692	328	137	91	262	368	53	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1021			824			1929	2196	732	2339	2124	857
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1021			824			1929	2196	732	2339	2124	857
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	93			78			0	0	38	0	0	90
cM capacity (veh/h)	672			793			0	32	420	0	34	341
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	46	732	92	176	1021	137	91	262	457			
Volume Left	46	0	0	176	0	137	0	0	368			
Volume Right	0	0	92	0	328	0	0	262	35			
cSH	672	1700	1700	793	1700	0	32	420	0			
Volume to Capacity	0.07	0.43	0.05	0.22	0.60	Err	2.81	0.62	Err			
Queue Length 95th (ft)	5	0	0	21	0	Err	265	103	Err			
Control Delay (s)	10.7	0.0	0.0	10.8	0.0	Err	1077.8	26.8	Err			
Lane LOS	B			B		F	F	D	F			
Approach Delay (s)	0.6			1.6		Err			Err			
Approach LOS						F			F			
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			95.2%		ICU Level of Service				F			
Analysis Period (min)			15									

11: Ave 17 & Road 23
2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	187	53	70	188	8	45	114	88	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	203	58	76	204	9	49	124	96	12	147	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	556	493	152	604	450	172	157			220		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	556	493	152	604	450	172	157			220		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	55	94	68	57	99	96			99		
cM capacity (veh/h)	281	456	895	238	475	859	1359			1282		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	261	289	268	168								
Volume Left	0	76	49	12								
Volume Right	58	9	96	10								
cSH	511	380	1359	1282								
Volume to Capacity	0.51	0.76	0.04	0.01								
Queue Length 95th (ft)	72	155	3	1								
Control Delay (s)	19.2	39.0	1.7	0.6								
Lane LOS	C	E	A	A								
Approach Delay (s)	19.2	39.0	1.7	0.6								
Approach LOS	C	E										
Intersection Summary												
Average Delay			17.1									
Intersection Capacity Utilization			62.8%		ICU Level of Service				B			
Analysis Period (min)			15									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr't			0.850			0.850		0.988			0.979	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3497	0	1770	3465	0
Flt Permitted		0.704			0.729		0.950			0.950		
Satd. Flow (perm)	0	1311	1583	0	1358	1583	1770	3497	0	1770	3465	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			15			233		13			27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		40
Link Distance (ft)		1408			1120			1056		2208		
Travel Time (s)		24.0			19.1			18.0		37.6		
Volume (vph)	99	1	14	57	4	214	11	780	67	195	752	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	1	15	62	4	233	12	848	73	212	817	132
Lane Group Flow (vph)	0	109	15	0	66	233	12	921	0	212	949	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.7	10.7		10.7	10.7	7.0	26.5		10.7	36.3	
Actuated g/C Ratio		0.19	0.19		0.19	0.19	0.11	0.50		0.19	0.68	
v/c Ratio		0.43	0.05		0.25	0.47	0.06	0.53		0.62	0.40	
Control Delay		25.4	10.0		21.5	6.8	26.5	15.1		29.7	7.3	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.4	10.0		21.5	6.8	26.5	15.1		29.7	7.3	
LOS		C	A		C	A	C	B		C	A	
Approach Delay		23.5			10.0			15.2			11.4	
Approach LOS		C			B			B			B	

12: Ellis & Road 26
 2010 Project PM Alternative A

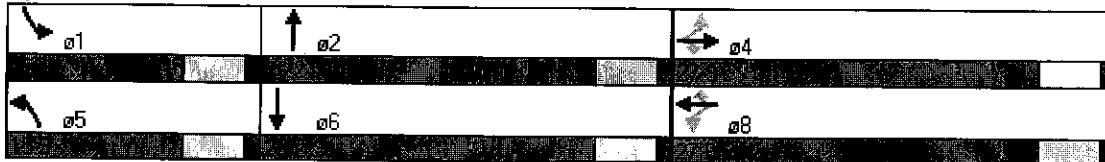
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		33	0		19	0	4	128		65	58	
Queue Length 95th (ft)		72	12		47	46	17	214		#150	194	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		459	563		475	705	319	1784		373	2366	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.24	0.03		0.14	0.33	0.04	0.52		0.57	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.3
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 13.3
 Intersection LOS: B
 Intersection Capacity Utilization 56.7%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.










Splits and Phases: 12: Ellis & Road 26



Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations		↗	↘		↖	↗
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	215	3	0	174	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	234	3	0	189	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	274		465	232		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274		465	232		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1283		556	808		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	234	3	274			
Volume Left	0	3	0			
Volume Right	0	0	85			
cSH	1700	556	1700			
Volume to Capacity	0.14	0.01	0.16			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.5	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.5	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		24.4%		ICU Level of Service		A
Analysis Period (min)			15			







14: Gateway & AVE 16 Connector
2010 Project PM Alternative A

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	78	3	108	297	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	3	117	323	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121				147	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				147	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				62	100
cM capacity (veh/h)	1461				846	1003
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	85	121	323			
Volume Left	0	0	323			
Volume Right	0	117	0			
cSH	1700	1700	846			
Volume to Capacity	0.05	0.07	0.38			
Queue Length 95th (ft)	0	0	45			
Control Delay (s)	0.0	0.0	11.9			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			30.0%		ICU Level of Service	A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 2010 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑			↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	297	215	173	0	0	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	323	234	188	0	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked					0.96	
vC, conflicting volume	188				1067	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				1070	188
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	77				100	86
cM capacity (veh/h)	1386				179	849
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	557	188	117			
Volume Left	323	0	0			
Volume Right	0	0	117			
cSH	1386	1700	849			
Volume to Capacity	0.23	0.11	0.14			
Queue Length 95th (ft)	23	0	12			
Control Delay (s)	5.8	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	5.8	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization		43.5%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
 2010 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				3		410
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	394	279	3	78	377
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	428	303	3	85	410
Lane Group Flow (vph)	98	428	303	3	85	410
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	13.9	36.5	22.6	22.6	23.5	23.5
Total Split (%)	23.2%	60.8%	37.7%	37.7%	39.2%	39.2%
Maximum Green (s)	9.0	31.6	17.7	17.7	19.0	19.0
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.4	19.9	13.4	13.4	9.4	9.4
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.24	0.24
v/c Ratio	0.28	0.44	0.47	0.01	0.20	0.59
Control Delay	19.6	7.1	15.0	9.3	15.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	7.1	15.0	9.3	15.7	6.1
LOS	B	A	B	A	B	A
Approach Delay		9.5	14.9		7.8	
Approach LOS		A	B		A	

16: Kennedy & SR 99 SB off-ramp
 2010 Project PM Alternative A

10/22/2008

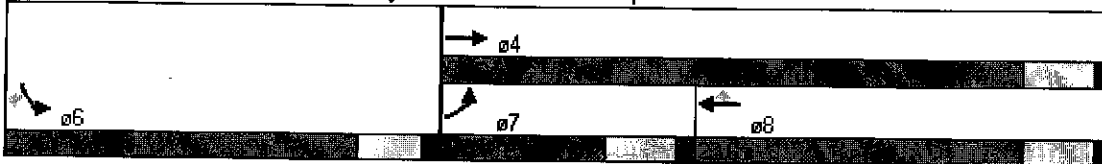
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	38	56	0	17	0
Queue Length 95th (ft)	66	121	144	5	50	54
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	406	1221	829	706	744	903
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.35	0.37	0.00	0.11	0.45

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 38.5
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 44.7%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 Project PM Alternative A

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations	↖	↕	↗	↖	↕	↗	↖	↖	↗	↖	↗	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.943			0.963				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3337	0	1770	3408	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3337	0	1770	3408	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			34				7		142	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	70	43	319	97	31	39	90	6	86	141	310
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	76	47	347	105	34	42	98	7	93	153	337
Lane Group Flow (vph)	3	123	0	347	139	0	42	98	7	93	490	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	22.0	34.0	0.0	8.9	23.3	23.3	13.8	28.2	0.0
Total Split (%)	11.1%	26.1%	0.0%	27.5%	42.5%	0.0%	11.1%	29.1%	29.1%	17.3%	35.3%	0.0%
Maximum Green (s)	4.0	16.0		17.1	29.1		4.0	18.4	18.4	8.9	23.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	5.0	8.0		16.6	24.4		4.9	22.6	22.6	8.8	27.8	
Actuated g/C Ratio	0.07	0.12		0.25	0.36		0.07	0.34	0.34	0.13	0.42	
v/c Ratio	0.03	0.29		0.79	0.11		0.34	0.16	0.01	0.41	0.66	
Control Delay	34.0	20.8		39.4	11.6		40.2	21.4	12.3	34.6	19.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	20.8		39.4	11.6		40.2	21.4	12.3	34.6	19.7	
LOS	C	C		D	B		D	C	B	C	B	
Approach Delay		21.1			31.4			26.4		22.1		
Approach LOS		C			C			C		C		

17: Ave 16 & Aviation Drive
 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	16		141	13		18	33	0	38	134	
Queue Length 95th (ft)	9	39		#277	36		48	71	9	82	#301	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	119	763		472	1449		124	598	540	249	740	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.16		0.74	0.10		0.34	0.16	0.01	0.37	0.66	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 66.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 25.9

Intersection LOS: C

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Fit Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Fit Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						212			60			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	206	1136	0	0	1178	195	714	2	360	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	224	1235	0	0	1280	212	776	2	391	0	0	0
Lane Group Flow (vph)	224	1235	0	0	1280	212	388	390	391	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	15.0	48.5			29.5	29.5	28.5	28.5	28.5			
Actuated g/C Ratio	0.18	0.57			0.35	0.35	0.34	0.34	0.34			
v/c Ratio	0.72	0.62			1.04	0.31	0.69	0.69	0.68			
Control Delay	54.9	12.4			66.7	4.5	31.9	32.0	27.7			
Queue Delay	0.0	0.2			0.0	0.0	0.1	0.1	0.0			
Total Delay	54.9	12.6			66.7	4.5	32.0	32.1	27.7			
LOS	D	B			E	A	C	C	C			
Approach Delay		19.1			57.8			30.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project PM Alternative A

10/22/2008

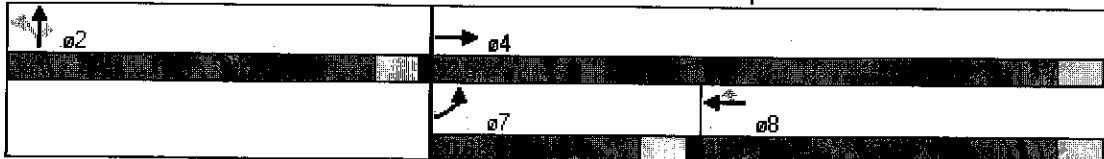
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			E			C				
Queue Length 50th (ft)	132	120			~414	0	186	187	151			
Queue Length 95th (ft)	m177	218			#542	46	292	293	254			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	342	2000			1229	688	564	565	571			
Starvation Cap Reductn	0	182			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	7	7	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.65	0.68			1.04	0.31	0.70	0.70	0.68			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 36.4
 Intersection Capacity Utilization 110.9%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑						↙	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			636									34
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1138	713	257	1635	0	0	0	0	200	2	179
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1237	775	279	1777	0	0	0	0	217	2	195
Lane Group Flow (vph)	0	1237	775	279	1777	0	0	0	0	0	219	195
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	37.6	37.6	25.1	62.7	0.0	0.0	0.0	0.0	22.3	22.3	22.3
Total Split (%)	0.0%	44.2%	44.2%	29.5%	73.8%	0.0%	0.0%	0.0%	0.0%	26.2%	26.2%	26.2%
Maximum Green (s)		33.0	33.0	20.5	58.1					17.8	17.8	17.8
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		39.4	39.4	18.2	61.6						15.4	15.4
Actuated g/C Ratio		0.46	0.46	0.21	0.72						0.18	0.18
v/c Ratio		0.75	0.72	0.74	0.69						0.71	0.65
Control Delay		24.3	8.6	38.8	9.0						45.6	36.3
Queue Delay		0.0	0.0	0.0	1.5						0.0	0.0
Total Delay		24.3	8.6	38.8	10.6						45.6	36.3
LOS		C	A	D	B						D	D
Approach Delay		18.2			14.4						41.2	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project PM Alternative A

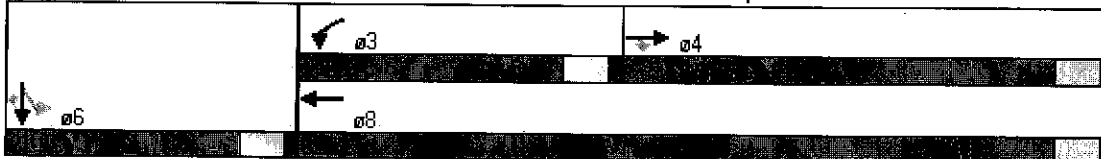
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						D	
Queue Length 50th (ft)		290	44	163	231						110	79
Queue Length 95th (ft)		#446	200	m189	m236						179	145
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1641	1075	439	2563						364	352
Starvation Cap Reductn		0	0	0	556						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.75	0.72	0.64	0.89						0.60	0.55

Intersection Summary













Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 18.6
 Intersection LOS: B
 Intersection Capacity Utilization 110.9%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2010 Project PM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	42	1	43	0	171	75	50	191	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	46	1	47	0	186	82	54	208	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	590	584	208	545	543	227	208			267		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	590	584	208	545	543	227	208			267		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	89	100	94	100			96		
cM capacity (veh/h)	381	405	833	428	423	805	1317			1220		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	93	267	262								
Volume Left	0	46	0	54								
Volume Right	1	47	82	0								
cSH	545	559	1317	1220								
Volume to Capacity	0.00	0.17	0.00	0.04								
Queue Length 95th (ft)	0	15	0	3								
Control Delay (s)	11.6	12.7	0.0	2.0								
Lane LOS	B	B		A								
Approach Delay (s)	11.6	12.7	0.0	2.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization		48.1%			ICU Level of Service				A			
Analysis Period (min)		15										

21: SR 145/Madera & SR 99 NB ramps
 2010 Project PM Alternative A

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.968							0.852
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3426	0	0	0	0	1770	1587	0
Flt Permitted	0.251									0.950		
Satd. Flow (perm)	898	3505	0	0	3426	0	0	0	0	1770	1587	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					59						65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	558	477	0	0	592	159	0	0	0	128	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	607	518	0	0	643	173	0	0	0	139	1	65
Lane Group Flow (vph)	607	518	0	0	816	0	0	0	0	139	66	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	37.5	37.5	0.0	0.0	37.5	0.0	0.0	0.0	0.0	37.5	37.5	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	32.9	32.9			32.9					33.0	33.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	59.2	59.2			59.2					10.7	10.7	
Actuated g/C Ratio	0.79	0.79			0.79					0.14	0.14	
v/c Ratio	0.86	0.19			0.30					0.55	0.23	
Control Delay	23.7	0.1			3.2					37.5	10.0	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	23.7	0.1			3.2					37.5	10.0	
LOS	C	A			A					D	A	
Approach Delay		12.8			3.2						28.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 Project PM Alternative A

10/22/2008

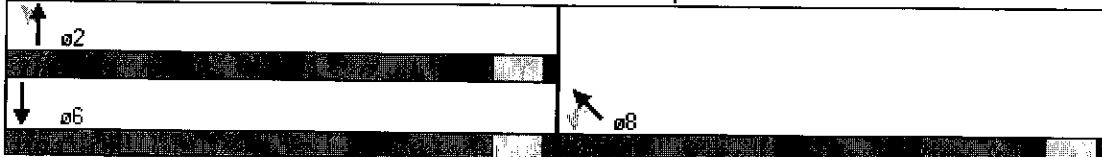
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			A						C	
Queue Length 50th (ft)	67	0			45					61	0	
Queue Length 95th (ft) m#146		m0			82					108	31	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	709	2766			2717					791	745	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.86	0.19			0.30					0.18	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 10.7
 Intersection Capacity Utilization 54.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↕			↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.999				0.850
Flt Protected		0.966					0.950				0.989	
Satd. Flow (prot)	0	1765	1553	0	0	0	3433	3536	0	0	3466	1568
Flt Permitted		0.966					0.950				0.989	
Satd. Flow (perm)	0	1765	1553	0	0	0	3433	3536	0	0	3466	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			620					1				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	251	101	570	0	0	0	133	784	7	83	275	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	273	110	620	0	0	0	145	852	8	90	299	272
Lane Group Flow (vph)	0	383	620	0	0	0	145	860	0	0	389	272
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		19.5	19.5				21.9	21.9			21.6	21.6
Actuated g/C Ratio		0.26	0.26				0.29	0.29			0.29	0.29
v/c Ratio		0.83	0.72				0.14	0.83			0.39	0.42
Control Delay		41.4	10.3				21.2	34.8			27.1	9.0
Queue Delay		88.4	2.1				0.0	0.0			0.0	0.0
Total Delay		129.8	12.4				21.2	34.8			27.1	9.0
LOS		F	B				C	C			C	A
Approach Delay		57.2						32.9			19.7	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E						C			B	
Queue Length 50th (ft)		174	65				26	203			84	0
Queue Length 95th (ft)		m230	m115				48	#316			125	74
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		506	887				1002	1032			998	645
Starvation Cap Reductn		182	145				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		1.18	0.84				0.14	0.83			0.39	0.42

Intersection Summary







Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 38.7
 Intersection LOS: D
 Intersection Capacity Utilization 61.1%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
 2010 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frnt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						172
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	473	384	0	449	158
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	514	417	0	488	172
Lane Group Flow (vph)	0	514	417	0	488	172
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		40.7	40.7		26.3	26.3
Actuated g/C Ratio		0.54	0.54		0.35	0.35
v/c Ratio		0.27	0.22		0.83	0.27
Control Delay		11.0	6.8		34.4	3.4
Queue Delay		0.0	0.3		2.4	0.0
Total Delay		11.0	7.1		36.8	3.4
LOS		B	A		D	A
Approach Delay		11.0	7.1		28.1	



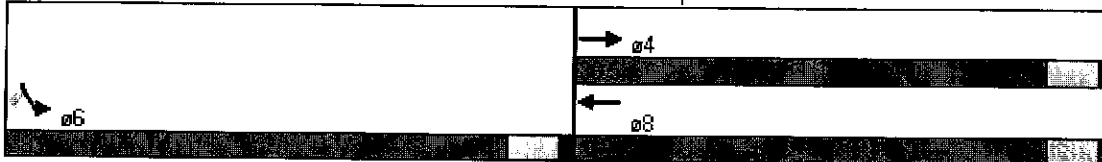
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		63	24		201	0
Queue Length 95th (ft)		115	58		266	30
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1919	1919		769	781
Starvation Cap Reductn		0	907		0	0
Spillback Cap Reductn		132	0		164	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.29	0.41		0.81	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 17.0
 Intersection Capacity Utilization 44.6%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2010 Project PM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	49	89	12	16	38	53	5	119	25	67	110	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	97	13	17	41	58	5	129	27	73	120	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	116	162	220								
Volume Left (vph)	53	17	5	73								
Volume Right (vph)	13	58	27	27								
Hadj (s)	0.07	-0.10	0.09	0.26								
Departure Headway (s)	5.1	5.0	5.0	5.1								
Degree Utilization, x	0.23	0.16	0.23	0.31								
Capacity (veh/h)	644	647	665	660								
Control Delay (s)	9.7	9.0	9.5	10.4								
Approach Delay (s)	9.7	9.0	9.5	10.4								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.8									
HCM Level of Service			A									
Intersection Capacity Utilization		43.9%			ICU Level of Service				A			
Analysis Period (min)			15									

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↓
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	438	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	476	91	125	286	91	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	450	125			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450	125			411	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	8	90			92	
cM capacity (veh/h)	516	918			1137	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	476	91	125	286	234	
Volume Left	476	0	0	0	91	
Volume Right	0	91	0	286	0	
cSH	516	918	1700	1700	1137	
Volume to Capacity	0.92	0.10	0.07	0.17	0.08	
Queue Length 95th (ft)	277	8	0	0	7	
Control Delay (s)	51.0	9.4	0.0	0.0	3.7	
Lane LOS	F	A			A	
Approach Delay (s)	44.3		0.0		3.7	
Approach LOS	E					
Intersection Summary						
Average Delay			21.5			
Intersection Capacity Utilization			49.1%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.947			0.877				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1618	0	1719	1810	1538
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1618	0	1719	1810	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			32		24			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	238	29	14	289	160	46	18	85	481	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	259	32	15	314	174	50	20	92	523	30	65
Lane Group Flow (vph)	217	259	32	15	488	0	50	112	0	523	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	49.9	49.9	9.5	39.4	0.0	13.0	20.6	0.0	40.0	47.6	47.6
Total Split (%)	16.7%	41.6%	41.6%	7.9%	32.8%	0.0%	10.8%	17.2%	0.0%	33.3%	39.7%	39.7%
Maximum Green (s)	15.4	45.3	45.3	4.9	34.8		8.5	16.1		35.5	43.1	43.1
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	16.0	51.6	51.6	5.5	35.4		8.2	16.6		36.0	46.4	46.4
Actuated g/C Ratio	0.13	0.43	0.43	0.05	0.30		0.07	0.14		0.30	0.39	0.39
v/c Ratio	0.97	0.34	0.05	0.19	0.95		0.42	0.37		1.01	0.04	0.10
Control Delay	106.0	25.5	7.9	63.4	47.1		64.2	17.1		85.2	25.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	106.0	25.5	7.9	63.4	47.1		64.2	17.1		85.2	25.0	6.5
LOS	F	C	A	E	D		E	B		F	C	A
Approach Delay		58.8			47.6			31.7			74.0	

26: Ave 12 & GS Blvd
 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			C			E	
Queue Length 50th (ft)	170	124	0	12	229		38	14		~416	15	0
Queue Length 95th (ft)	#328	217	21	m14	#548		80	67		#642	36	30
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	223	756	661	77	513		131	303		516	700	635
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.34	0.05	0.19	0.95		0.38	0.37		1.01	0.04	0.10

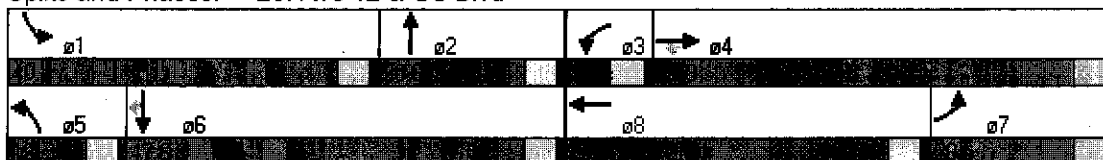
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 83 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 58.4
 Intersection Capacity Utilization 79.4%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service D

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.916				0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	1827	0	0	1673	0	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	1827	0	0	1673	0	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					118				153			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	164	640	0	0	284	466	179	1	141	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	178	696	0	0	309	507	195	1	153	0	0	0
Lane Group Flow (vph)	178	696	0	0	816	0	0	196	153	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	22.0	96.0	0.0	0.0	74.0	0.0	24.0	24.0	24.0	0.0	0.0	0.0
Total Split (%)	18.3%	80.0%	0.0%	0.0%	61.7%	0.0%	20.0%	20.0%	20.0%	0.0%	0.0%	0.0%
Maximum Green (s)	17.4	91.4			69.4		19.4	19.4	19.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	16.4	94.1			73.7		17.9	17.9	17.9			
Actuated g/C Ratio	0.14	0.78			0.61		0.15	0.15	0.15			
v/c Ratio	0.75	0.49			0.76		0.78	0.43	0.43			
Control Delay	61.0	2.1			20.8		69.8	10.9	10.9			
Queue Delay	0.0	0.2			0.0		0.0	0.0	0.0			
Total Delay	61.0	2.3			20.8		69.8	10.9	10.9			
LOS	E	A			C		E	B	B			
Approach Delay		14.2			20.8		44.0					

27: Ave 12 & SR 99 NB Ramps
2010 Project PM Alternative A

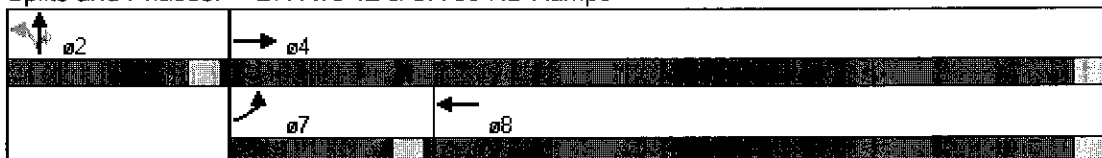
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			D				
Queue Length 50th (ft)	143	126			408			145	0			
Queue Length 95th (ft)	m152	m34			602			#240	59			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	261	1433			1073			282	379			
Starvation Cap Reductn	0	178			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.68	0.55			0.76			0.70	0.40			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 21.9
 Intersection LOS: C
 Intersection Capacity Utilization 72.6%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 10

OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99-NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

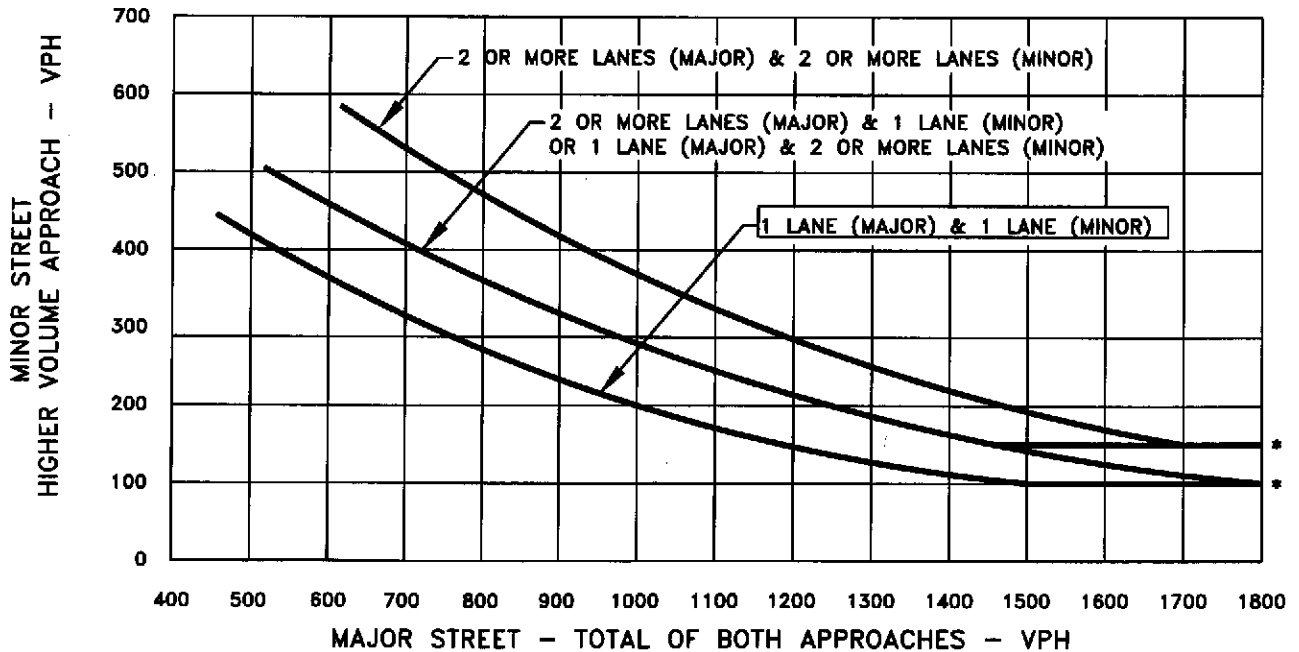
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
Both Approaches - Major Street	✓		327	333			
Highest Approaches - Minor Street	✓		225	290			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB ON RAMP/ ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

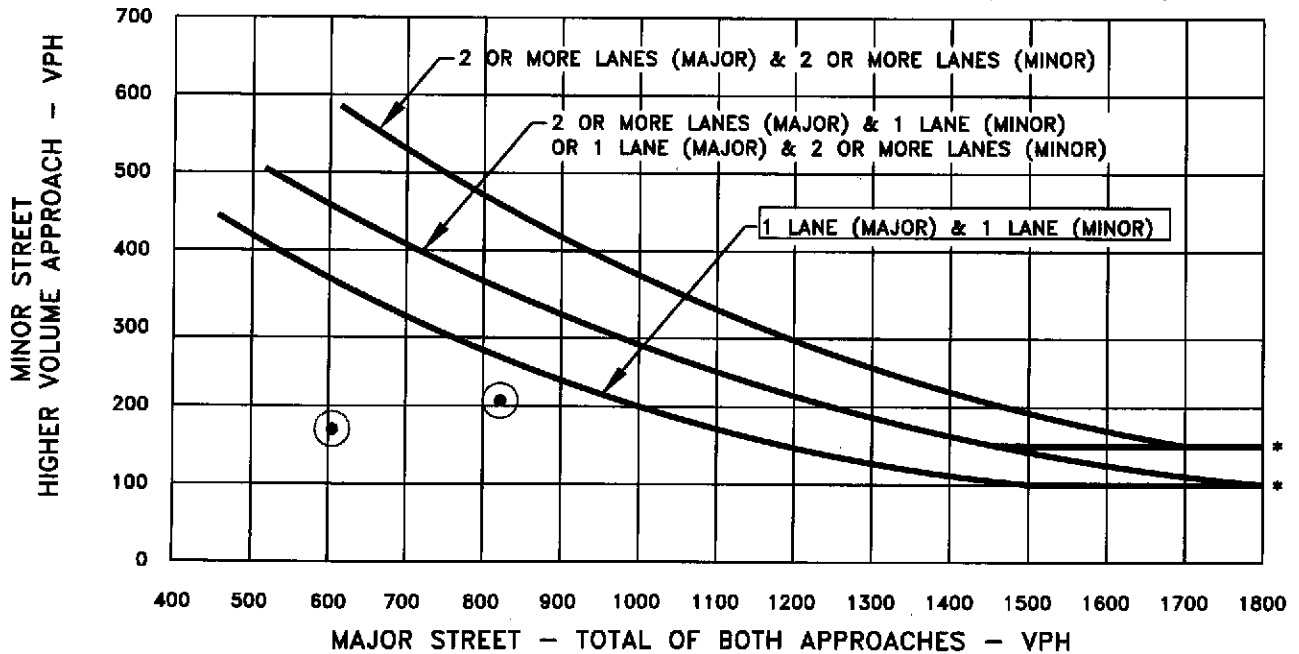
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour	
Both Approaches - Major Street	✓		605	822		
Highest Approaches - Minor Street	✓		170	207		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

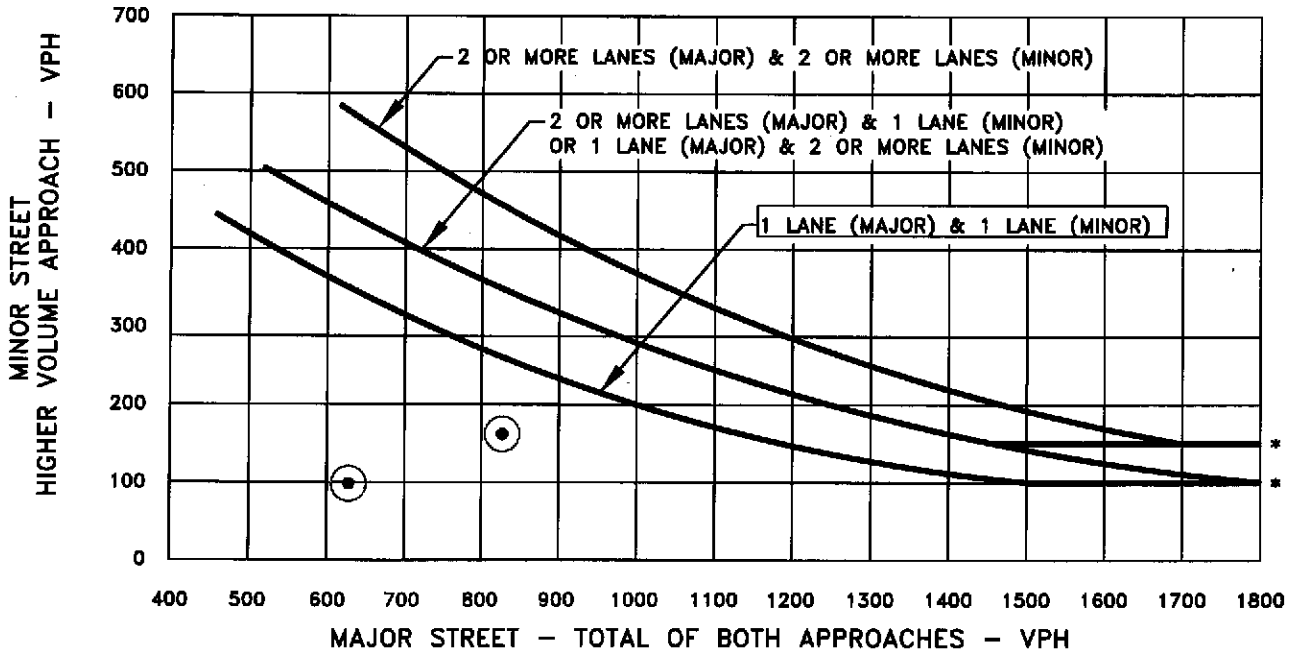
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour	
Both Approaches - Major Street	✓		628	827		
Highest Approaches - Minor Street	✓		98	162		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

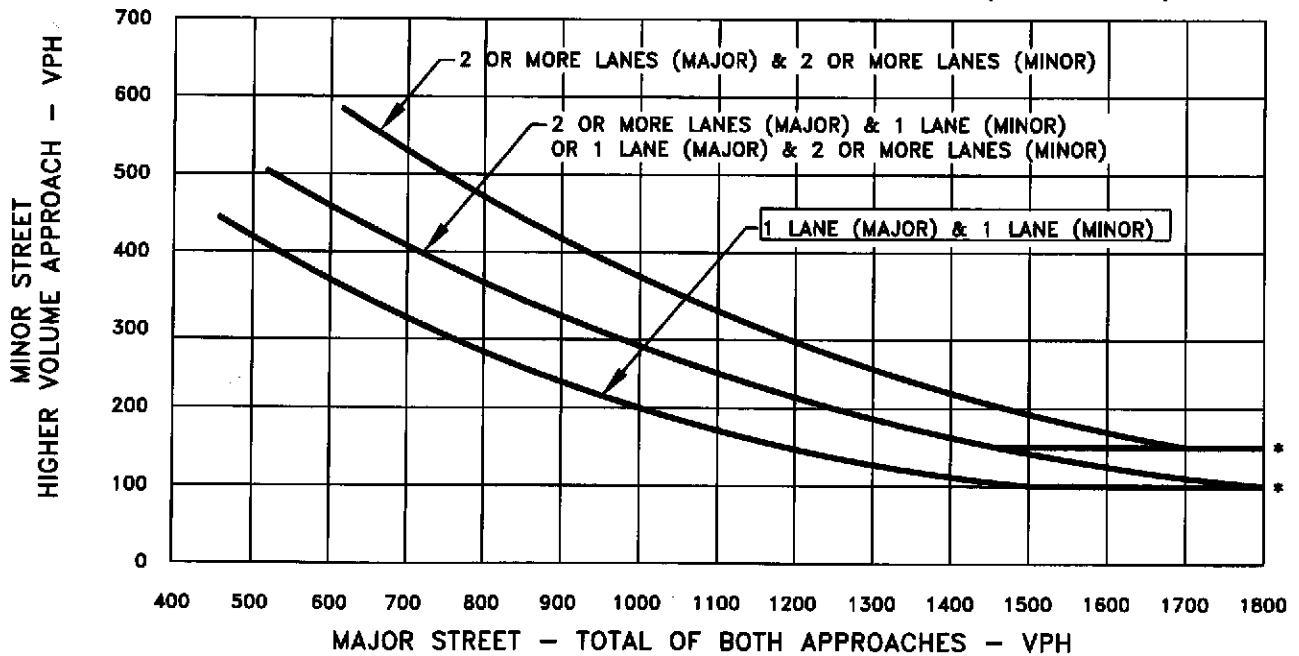
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		292	349	
Highest Approaches - Minor Street	✓		156	193	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

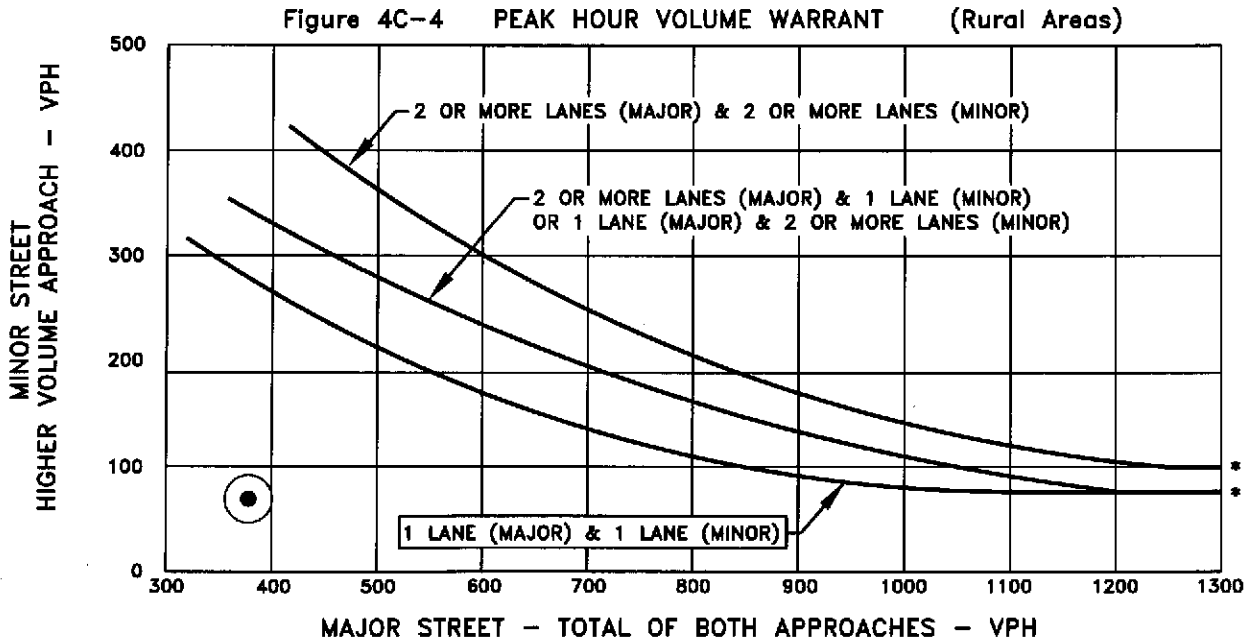
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		261	378		
Highest Approaches - Minor Street	✓		45	69		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

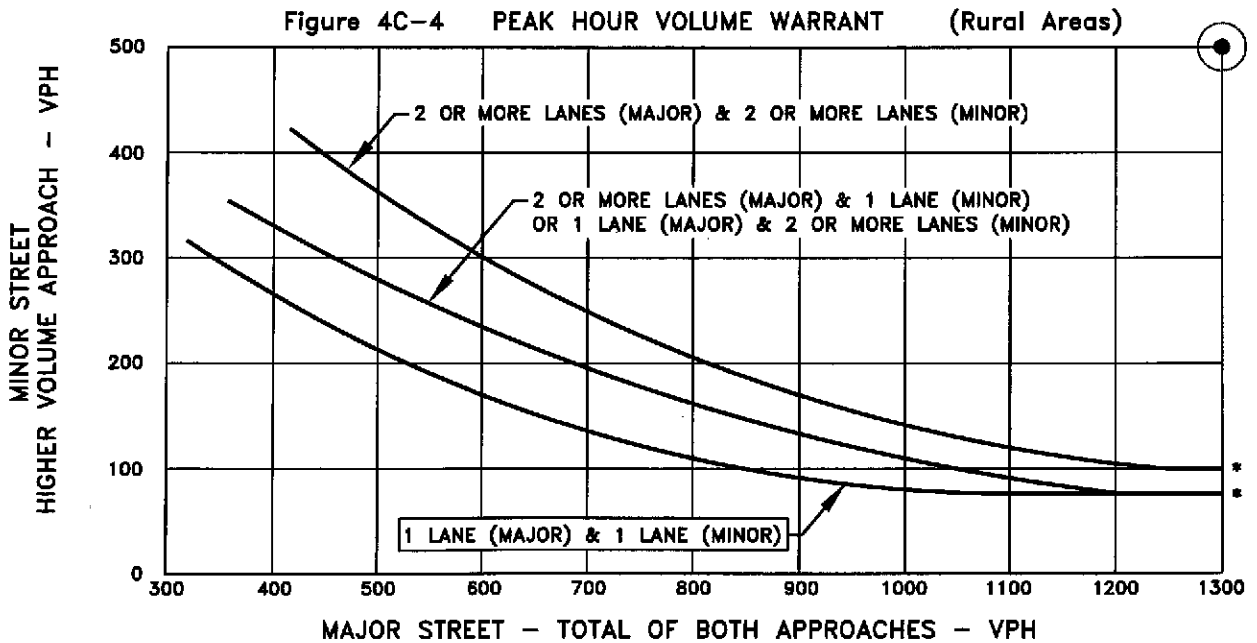
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK	PM PEAK			Hour
	One	2 or more					
Both Approaches - Major Street	<input checked="" type="checkbox"/>		1304	2200			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		584	1144			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 SB OFF RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

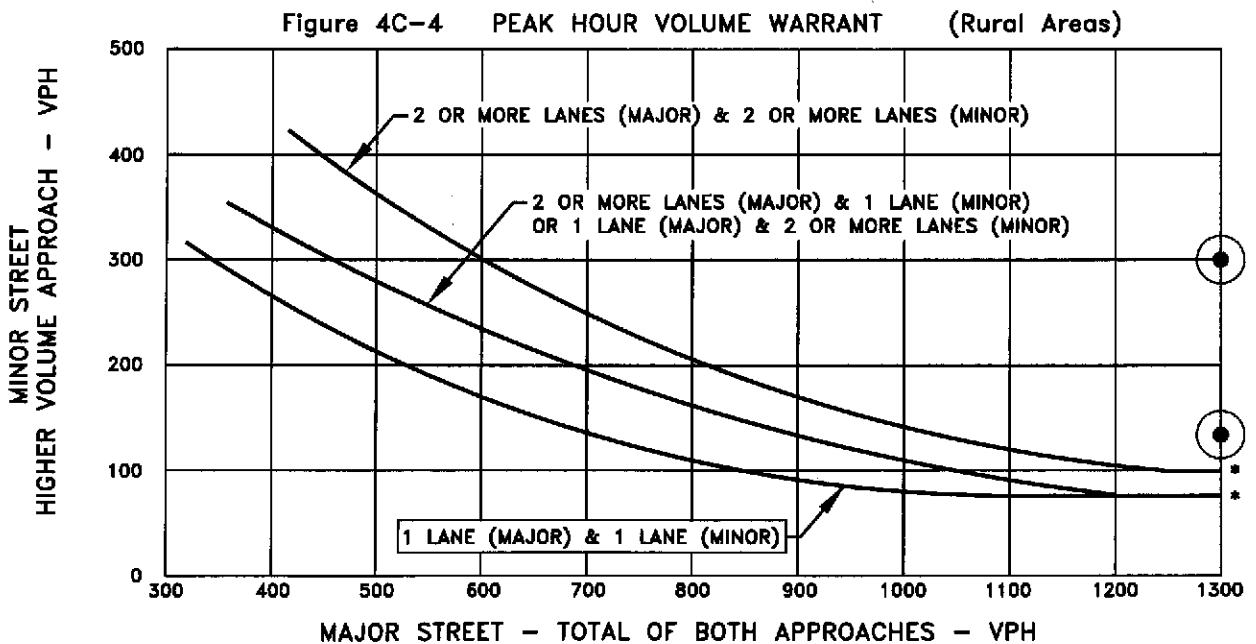
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		1410	2263		
Highest Approaches - Minor Street	✓		134	300		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: AIRPORT ROAD/ GOLDEN STATE

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

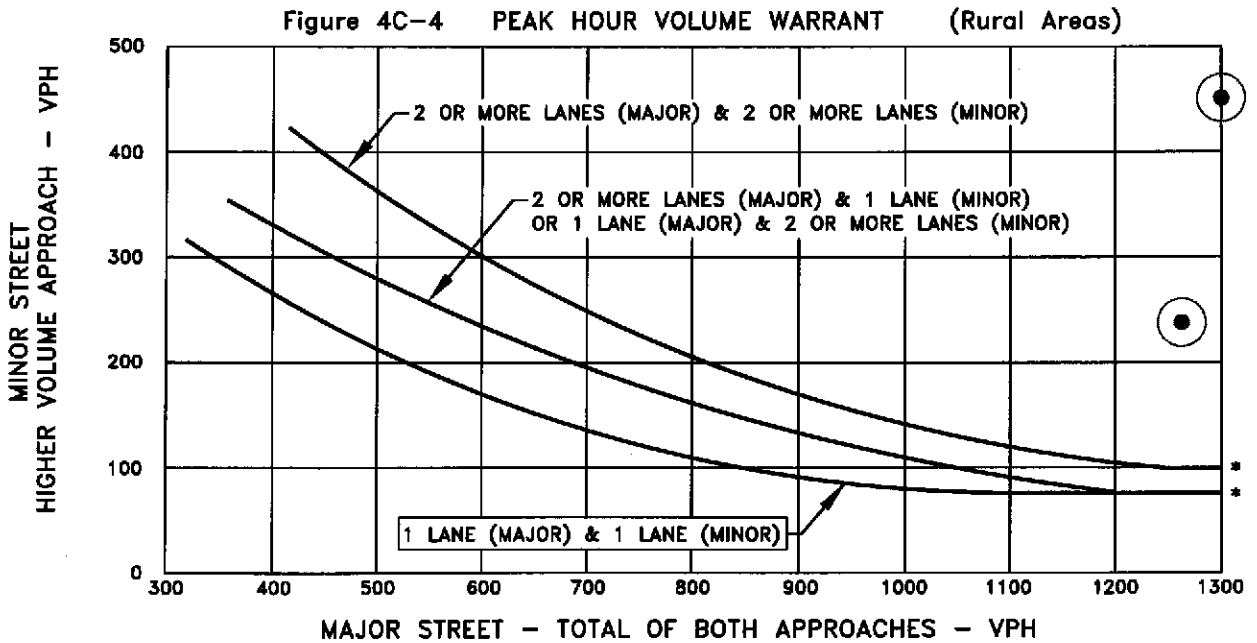
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		1263	1901		
Highest Approaches - Minor Street	✓		238	451		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

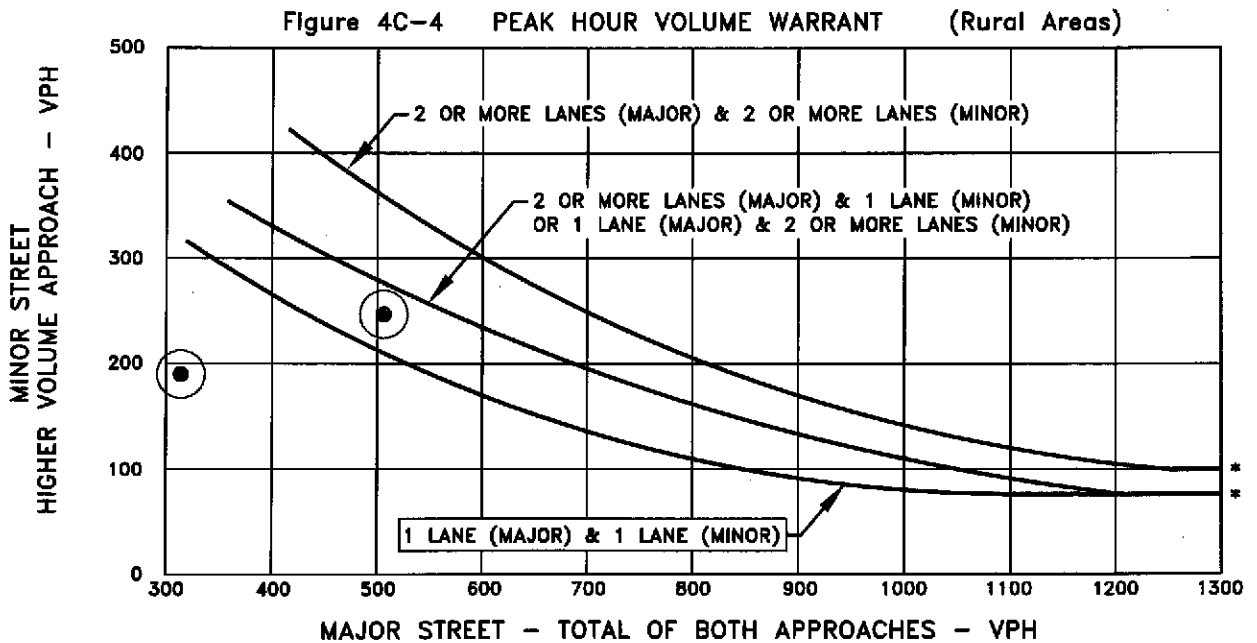
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour					
			AM PEAK	PM PEAK				
Both Approaches - Major Street	✓		314	506				
Highest Approaches - Minor Street	✓		190	247				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB ON RAMP

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16/ GATEWAY

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

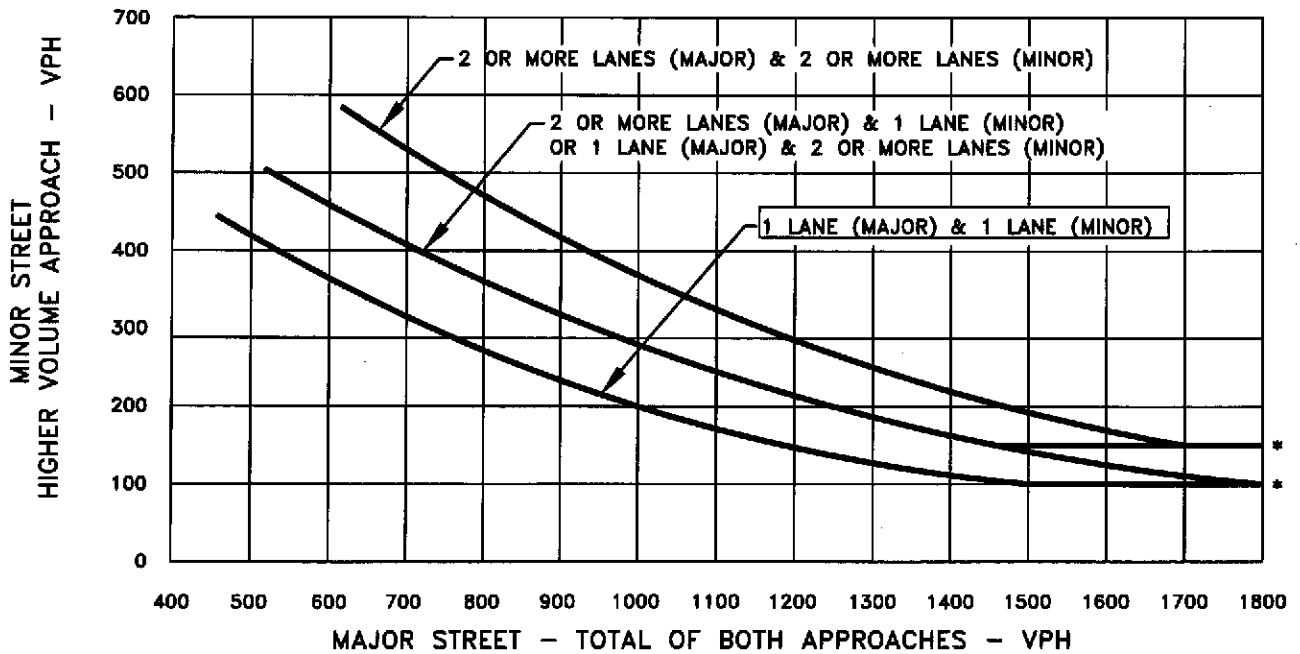
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		162	255	
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		140	215	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 16

Critical Approach Speed 35 mph

MINOR STREET: SR-99 NB ON CONNECTOR

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

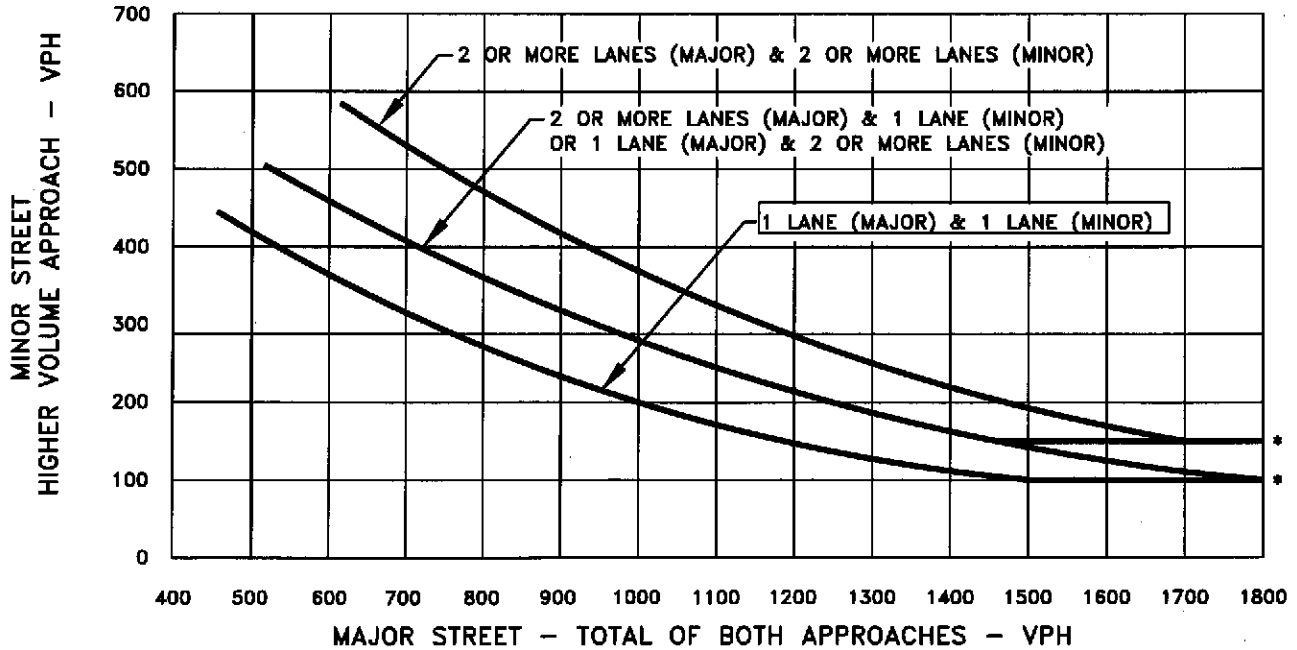
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		204	297	
Highest Approaches - Minor Street	✓		64	111	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16 CONNECTOR

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

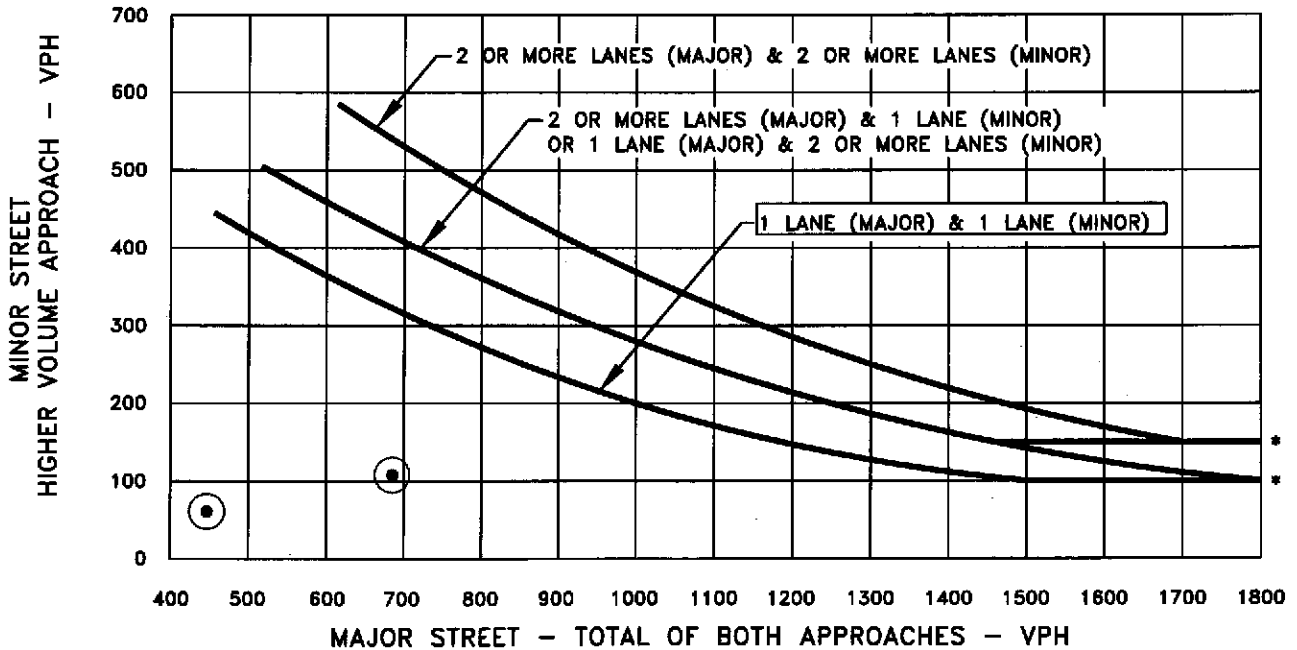
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		447	685	
Highest Approaches - Minor Street	✓		61	108	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

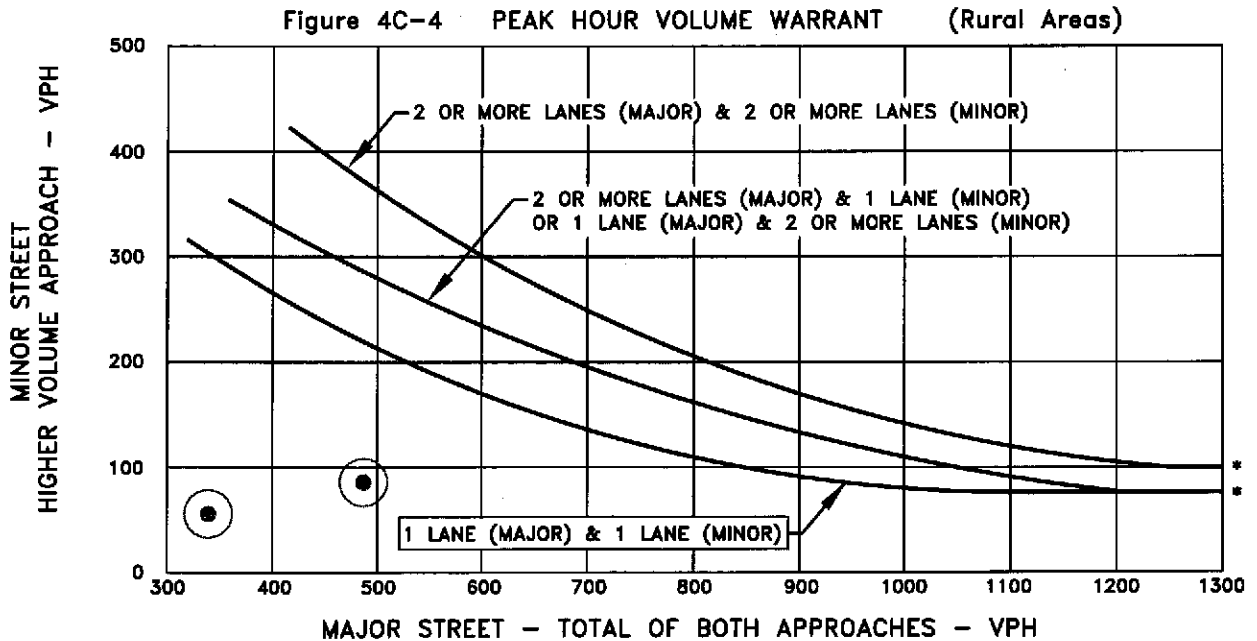
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK	PM PEAK			Hour
	One	2 or more					
Both Approaches - Major Street	✓		339	487			
Highest Approaches - Minor Street	✓		56	86			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

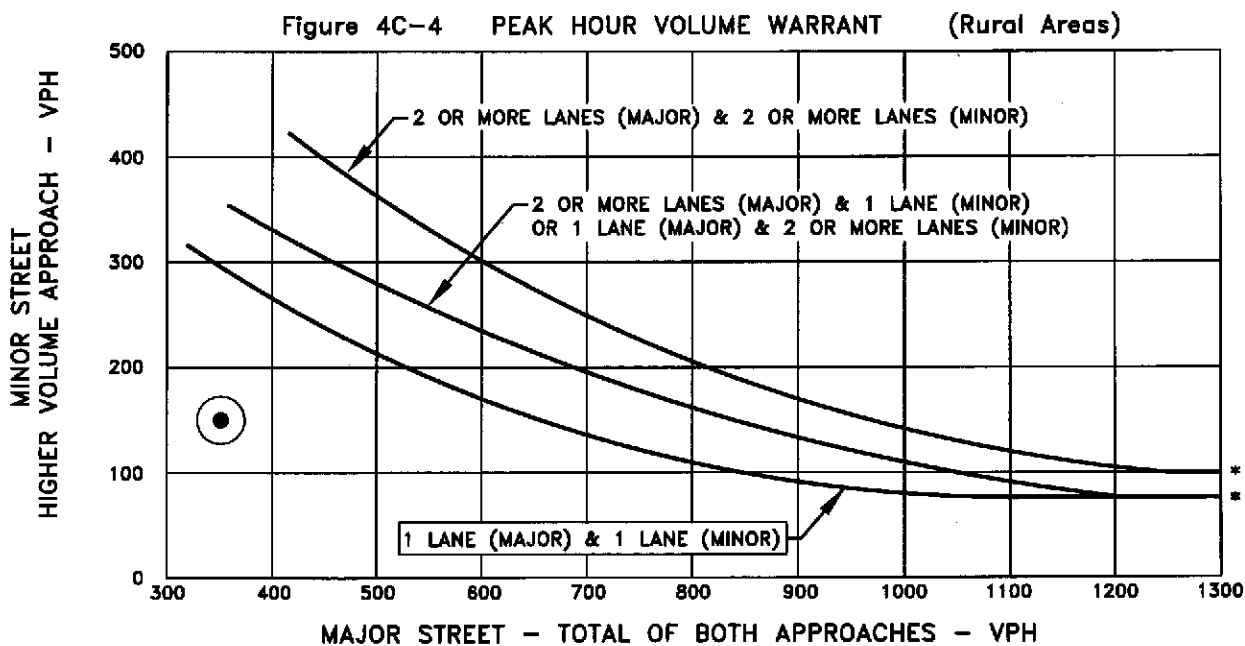
CONDITION: 2010 PROJECT ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		249	351		
Highest Approaches - Minor Street	✓		135	150		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB RAMPS/ GOLDEN STATE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE A

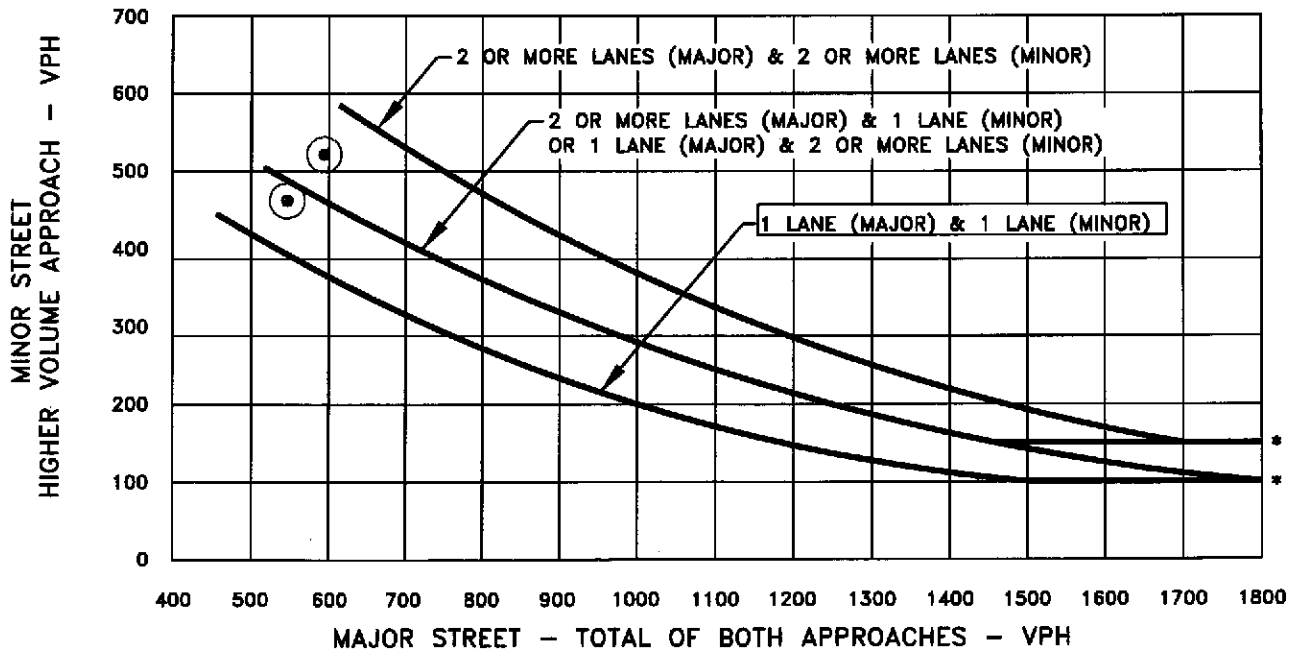
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK		Hour
Both Approaches - Major Street	✓		546	593		
Highest Approaches - Minor Street	✓		462	522		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 11

OPENING DAY (2010) PROJECT CONDITIONS

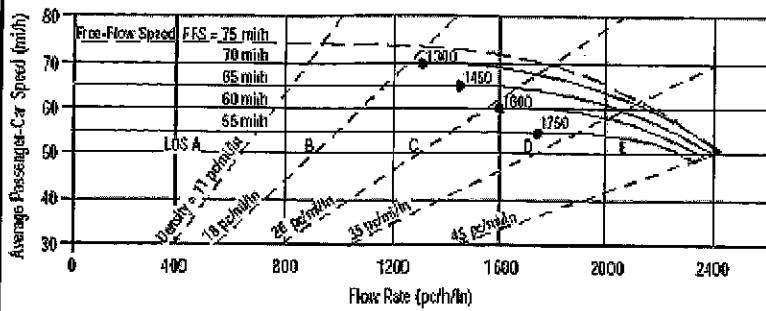
MADERA SITE - ALTERNATIVE B

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET																									
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows four curves representing Level of Service (LOS) A, B, C, and D. Dashed lines indicate densities of 11, 18, 25, 35, and 45 pc/mi/ln. A horizontal line for Free-Flow Speed (FFS) is set at 75 mi/h.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>				Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																							
Operational (LOS)	FFS, N, v_p	LOS, S, D																							
Design (N)	FFS, LOS, v_p	N, S, D																							
Design (v_p)	FFS, LOS, N	v_p , S, D																							
Planning (LOS)	FFS, N, AADT	LOS, S, D																							
Planning (N)	FFS, LOS, AADT	N, S, D																							
Planning (v_p)	FFS, LOS, N	v_p , S, D																							
General Information		Site Information																							
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																						
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																						
Date Performed	9/22/08	Jurisdiction	Caltrans																						
Analysis Time Period		Analysis Year	2010																						
Project Description 04-837.2 Northfork Casino Alt B																									
<input checked="" type="checkbox"/> Oper. (LOS)		<input type="checkbox"/> Des. (N)		<input type="checkbox"/> Planning Data																					
Flow Inputs																									
Volume, V	2620	veh/h	Peak-Hour Factor, PHF	0.88																					
AAADT		veh/day	% Trucks and Buses, P_T	24																					
Peak-Hr Prop. of AAADT, K			% RVs, P_R	2																					
Peak-Hr Direction Prop., D			General Terrain:	Level																					
DDHV = AAADT x K x D		veh/h	Grade %	Length mi																					
Driver type adjustment	1.00		Up/Down %																						
Calculate Flow Adjustments																									
f_p	1.00		E_R	1.2																					
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																					
Speed Inputs		Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f_{LW}	mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h																					
Interchange Density	0.50	1/mi	f_{ID}	mi/h																					
Number of Lanes, N	2		f_N	mi/h																					
FFS (measured)	70.0	mi/h	FFS	70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																							
LOS and Performance Measures		Design (N)																							
Operational (LOS)		Design (N)																							
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																							
v_p	1673	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h																					
S	69.0	mi/h	S	mi/h																					
$D = v_p / S$	24.2	pc/mi/ln	$D = v_p / S$	pc/mi/ln																					
LOS	C		Required Number of Lanes, N																						
Glossary		Factor Location																							
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																						
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																									

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	2010 Project Alt B PM	Analysis Year	2010																					
Project Description 04-837.2 Northfork Casino Alt b																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	2705	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	% Trucks and Buses, P _T																					
Peak-Hr Prop. of AADT, K			% RVs, P _R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT x K x D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = [P _T (E _T -1) + P _R (E _R -1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																					
Interchange Density	0.50	l/mi	f _{ID}																					
Number of Lanes, N	2		f _N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)		Design LOS																						
f _p	1728	pc/h/ln	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)																					
S	68.6	mi/h	f _p																					
D = v _p / S	25.2	pc/mi/ln	S																					
LOS	C		D = v _p / S																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt B AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2189	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

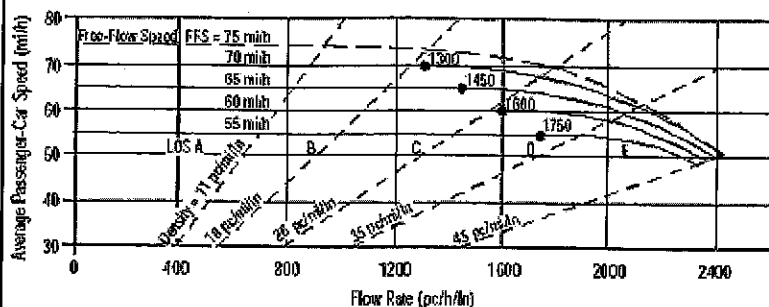
LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1398 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	20.0 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 1300, 1450, 1600, and 1750. Dashed lines indicate Level of Service (LOS) boundaries: LOS A (75 mi/h), LOS B (65 mi/h), LOS C (55 mi/h), and LOS D (45 mi/h). A density of 11 pc/mi is also indicated.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v _p	LOS, S, D																				
Design (N)	FFS, LOS, v _p	N, S, D																				
Design (v _p)	FFS, LOS, N	v _p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v _p)	FFS, LOS, N	v _p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 Project Alt B PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3233	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P _T																			
Peak-Hr Prop. of AADT, K			%RVs, P _R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f _p	1.00	E _R	1.2																			
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f _{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																			
Interchange Density	0.50	l/mi	f _{ID}																			
Number of Lanes, N	2		f _N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	2065	pc/h/ln	Design LOS																			
S	63.5	mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)																			
D = v _p / S	32.5	pc/mi/ln	S																			
LOS	D		D = v _p / S																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																			
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several density curves: 11 pc/mi/ln, 14 pc/mi/ln, 20 pc/mi/ln, 26 pc/mi/ln, and 45 pc/mi/ln. Regions A through F are marked on the graph, corresponding to different levels of service (LOS).</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 Project Alt B AM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	2718	veh/h	Peak-Hour Factor, PHF 0.88																			
AAADT		veh/day	% Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AAADT, K			% RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AAADT x K x D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / (P_T (E_T - 1) + P_R (E_R - 1))$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	2		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1736	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$ pc/h																			
S	68.5	mi/h	S mi/h																			
$D = v_p / S$	25.3	pc/mi/ln	$D = v_p / S$ pc/mi/ln																			
LOS	C		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst: R Davis
 Agency or Company: TPG Consulting, Inc.
 Date Performed: 9/22/08
 Analysis Time Period: 2010 Project Alt B PM

Site Information

Highway/Direction of Travel: SR 99 Northbound
 From/To: between Ave 18 1/2 & Ave 17
 Jurisdiction: Caltrans
 Analysis Year: 2010

Project Description: 04-837.2 Northfork Casino Alt B

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2858	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	l/mi
Number of Lanes, N	2	
FFS (measured)	70.0	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	70.0	mi/h

LOS and Performance Measures

Operational (LOS)			
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1825	pc/h/ln	
S	67.6	mi/h	
D = v _p / S	27.0	pc/mi/ln	
LOS	D		

Design (N)

Design (N)			
Design LOS			
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)		pc/h	
S		mi/h	
D = v _p / S		pc/mi/ln	
Required Number of Lanes, N			

Glossary

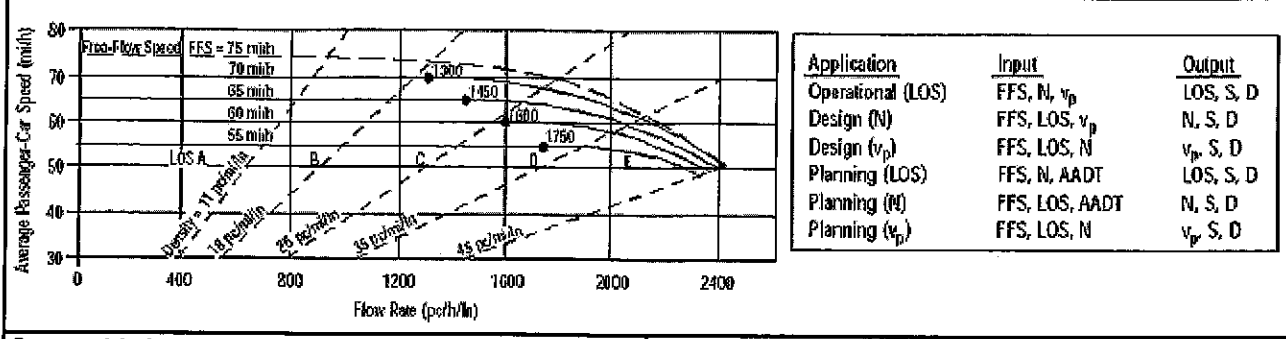
N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different Free-Flow Speeds (FFS) and Levels of Service (LOS). The curves are labeled with FFS values: 75 mi/h, 70 mi/h, 65 mi/h, 60 mi/h, 55 mi/h, and 50 mi/h. Corresponding LOS values are also indicated: LOS A, B, C, D, and E. Density values (pc/mi) are marked on the curves: 11 pc/mi, 13 pc/mi, 16 pc/mi, 20 pc/mi, 25 pc/mi, 30 pc/mi, 35 pc/mi, and 45 pc/mi. Specific flow rate points are marked: 1300, 1450, 1600, and 1750.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v _p	LOS, S, D																				
Design (N)	FFS, LOS, v _p	N, S, D																				
Design (v _p)	FFS, LOS, N	v _p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v _p)	FFS, LOS, N	v _p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 Project Alt B AM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	2295	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P _T																			
Peak-Hr Prop. of AADT, K			%RVs, P _R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade %																			
Driver type adjustment	1.00		Length																			
			Up/Down %																			
Calculate Flow Adjustments																						
f _p	1.00	E _R	1.2																			
E _T	1.5	f _{HV} = 1/P _T (E _T - 1) P _R (E _R - 1)	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f _{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																			
Interchange Density	0.50	l/mi	f _{ID}																			
Number of Lanes, N	2		f _N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)		Design LOS																				
	1466	pc/h/ln	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)																			
S	69.9	mi/h	S																			
D = v _p / S	21.0	pc/mi/ln	D = v _p / S																			
LOS	C		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																			
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt B PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	3423	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	2	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

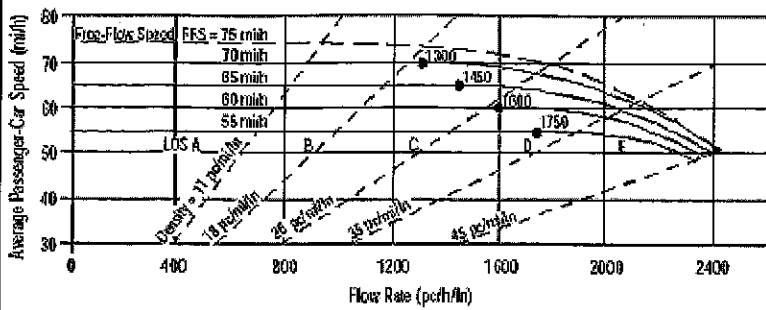
LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	2186 pc/h/ln	Design LOS	
S	60.5 mi/h	$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	36.1 pc/mi/ln	S	mi/h
LOS	E	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different density and Level of Service (LOS) conditions. Key points on the curves are labeled with flow rates: 1200, 1450, 1600, and 1750. Density curves are labeled as 11 pc/mi/ln, 15 pc/mi/ln, 20 pc/mi/ln, 25 pc/mi/ln, and 35 pc/mi/ln. LOS curves are labeled as LOS A, B, C, D, and E.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 Project Alt B AM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3173	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			% RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade %																			
Driver type adjustment	1.00		Length mi																			
			Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	2		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	2026	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
S	64.3	mi/h	f_p																			
$D = v_p / S$	31.5	pc/mi/ln	S																			
LOS	D		$D = v_p / S$																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 1300, 1450, 1600, and 1750. Dashed lines indicate densities of 11, 18, 25, 35, and 45 pc/mi/ln. Labels A, B, C, D, and E are placed along the curves.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst: R Davis		Highway/Direction of Travel: SR 99 Northbound																				
Agency or Company: TPG Consulting, Inc.		From/To: south of Avenue 17																				
Date Performed: 9/22/08		Jurisdiction: Caltrans																				
Analysis Time Period: 2010 Project Alt B PM		Analysis Year: 2010																				
Project Description: 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3533	veh/h	Peak-Hour Factor, PHF: 0.88																			
AADT		veh/day	% Trucks and Buses, P_T : 24																			
Peak-Hr Prop. of AADT, K			% RVs, P_R : 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AADT x K x D		veh/h	Grade % Length: mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	2		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	2256	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$ pc/h																			
S	58.4	mi/h	f_p mi/h																			
$D = v_p / S$	38.6	pc/mi/ln	S mi/h																			
LOS	E		$D = v_p / S$ pc/mi/ln																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt B AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2660	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			% RVs, P _R 2
Peak-Hr Direction Prop., D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T + (E _T - 1) * P _R * (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1699 pc/h/ln	Design LOS	
S	68.8 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.7 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different Free-Flow Speeds (FFS) and Levels of Service (LOS). The curves are labeled with FFS values: 75 mi/h, 70 mi/h, 65 mi/h, 60 mi/h, and 55 mi/h. The LOS regions are labeled A, B, C, D, and E. Density lines are also shown, ranging from 11 pc/mi/ln to 45 pc/mi/ln.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2010 Project Alt B PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4137	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			% RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	1/mi	f_{ID}																			
Number of Lanes, N	2		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	2642	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
f_p			f_p																			
S		mi/h	S																			
$D = v_p / S$		pc/mi/ln	$D = v_p / S$																			
LOS	F		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

ATTACHMENT VI – C - 12


















OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
2010 Project AM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	170	51	0	0	94	12	184	2	39	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	55	0	0	102	13	200	2	42	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115			55			534	540	55	577	534	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115			55			534	540	55	577	534	109
tC, single (s)	4.5			4.3			7.4	6.8	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.6			2.4			3.8	4.3	3.6	3.5	4.0	3.3
p0 queue free %	85			100			46	99	95	100	100	100
cM capacity (veh/h)	1259			1447			369	351	938	363	388	950
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	185	55	115	200	45							
Volume Left	185	0	0	200	0							
Volume Right	0	0	13	0	42							
cSH	1259	1700	1700	369	867							
Volume to Capacity	0.15	0.03	0.07	0.54	0.05							
Queue Length 95th (ft)	13	0	0	77	4							
Control Delay (s)	8.4	0.0	0.0	25.7	9.4							
Lane LOS	A			D	A							
Approach Delay (s)	6.4		0.0	22.7								
Approach LOS				C								
Intersection Summary												
Average Delay			11.8									
Intersection Capacity Utilization			32.9%		ICU Level of Service				A			
Analysis Period (min)			15									

3: Ave 18.5 & Road 23
2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	314	64	16	211	0	81	0	89	12	54	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	341	70	17	229	0	88	0	97	13	59	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	229			411			750	640	376	737	675	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229			411			750	640	376	737	675	229
tC, single (s)	4.4			4.3			7.4	6.8	6.5	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.5			2.4			3.7	4.2	3.5	3.8	4.3	3.6
p0 queue free %	100			98			61	100	84	95	82	89
cM capacity (veh/h)	1171			1044			226	356	618	246	330	732
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	411	247	88	97	152							
Volume Left	0	17	88	0	13							
Volume Right	70	0	0	97	80							
cSH	1700	1044	226	618	447							
Volume to Capacity	0.24	0.02	0.39	0.16	0.34							
Queue Length 95th (ft)	0	1	43	14	37							
Control Delay (s)	0.0	0.8	30.7	11.9	17.2							
Lane LOS		A	D	B	C							
Approach Delay (s)	0.0	0.8	20.8		17.2							
Approach LOS			C		C							
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			46.8%		ICU Level of Service				A			
Analysis Period (min)			15									












4: Ave 18.5 & Pistacchio
 2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	276	211	140	94	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	300	229	152	102	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	382				532	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				532	229
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				78	99
cM capacity (veh/h)	1026				460	741
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	301	229	152	107		
Volume Left	1	0	0	102		
Volume Right	0	0	152	4		
cSH	1026	1700	1700	467		
Volume to Capacity	0.00	0.13	0.09	0.23		
Queue Length 95th (ft)	0	0	0	22		
Control Delay (s)	0.0	0.0	0.0	15.0		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			29.9%		ICU Level of Service	A
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
 2010 Project AM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	80	83	126	152	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	87	90	137	165	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	227				184	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227				184	90
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				75	99
cM capacity (veh/h)	1335				673	811
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	90	90	137	170		
Volume Left	3	0	0	165		
Volume Right	0	0	137	4		
cSH	1335	1700	1700	676		
Volume to Capacity	0.00	0.05	0.08	0.25		
Queue Length 95th (ft)	0	0	0	25		
Control Delay (s)	0.3	0.0	0.0	12.1		
Lane LOS	A			B		
Approach Delay (s)	0.3	0.0		12.1		
Approach LOS				B		
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			22.0%		ICU Level of Service	A
Analysis Period (min)			15			

6: Ave 18 & Road 23
2010 Project AM Alternative B







10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	39	1	129	0	26	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	42	1	140	0	28	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357	313	114	322	313	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357	313	114	322	313	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	95	100			98		
cM capacity (veh/h)	546	577	920	589	571	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	49	141	142								
Volume Left	0	4	1	28								
Volume Right	3	42	0	0								
cSH	632	824	1323	1283								
Volume to Capacity	0.02	0.06	0.00	0.02								
Queue Length 95th (ft)	2	5	0	2								
Control Delay (s)	10.8	9.6	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.8	9.6	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			30.1%		ICU Level of Service				A			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↑	↗		↖	↗			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	60	382	0	0	774	90	348	1	233	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	415	0	0	841	98	378	1	253	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	939			415			1387	1485	415	1641	1387	841
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	939			415			1387	1485	415	1641	1387	841
tC, single (s)	4.3			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	90			100			0	99	60	100	100	100
cM capacity (veh/h)	668			1128			109	110	629	44	130	368
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	65	415	841	98	379	253						
Volume Left	65	0	0	0	378	0						
Volume Right	0	0	0	98	0	253						
cSH	668	1700	1700	1700	109	629						
Volume to Capacity	0.10	0.24	0.49	0.06	3.48	0.40						
Queue Length 95th (ft)	8	0	0	0	Err	49						
Control Delay (s)	11.0	0.0	0.0	0.0	Err	14.5						
Lane LOS	B				F	B						
Approach Delay (s)	1.5		0.0		6001.8							
Approach LOS					F							
Intersection Summary												
Average Delay			1850.5									
Intersection Capacity Utilization			73.4%		ICU Level of Service				D			
Analysis Period (min)			15									

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	741	669	0	56	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	805	727	0	61	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	727				1533	727
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	727				1533	727
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.5
p0 queue free %	100				47	78
cM capacity (veh/h)	815				115	392
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	805	727	61	85		
Volume Left	0	0	61	0		
Volume Right	0	0	0	85		
cSH	1700	1700	115	392		
Volume to Capacity	0.47	0.43	0.53	0.22		
Queue Length 95th (ft)	0	0	62	20		
Control Delay (s)	0.0	0.0	66.6	16.7		
Lane LOS			F	C		
Approach Delay (s)	0.0	0.0	37.6			
Approach LOS			E			
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			49.0%		ICU Level of Service	A
Analysis Period (min)			15			

10: Ave 17 & GS Blvd
2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	470	14	137	460	150	108	41	89	182	25	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	511	15	149	500	163	117	45	97	198	27	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	663			526			1416	1541	511	1579	1475	582
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	663			526			1416	1541	511	1579	1475	582
tC, single (s)	4.2			4.2			7.4	6.8	6.5	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.5	3.6	4.1	3.4
p0 queue free %	96			85			0	47	81	0	72	95
cM capacity (veh/h)	889			997			66	83	518	35	99	497
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	35	511	15	149	663	117	45	97	249			
Volume Left	35	0	0	149	0	117	0	0	198			
Volume Right	0	0	15	0	163	0	0	97	24			
cSH	889	1700	1700	997	1700	66	83	518	41			
Volume to Capacity	0.04	0.30	0.01	0.15	0.39	1.78	0.53	0.19	6.05			
Queue Length 95th (ft)	3	0	0	13	0	264	58	17	Err			
Control Delay (s)	9.2	0.0	0.0	9.2	0.0	506.6	89.7	13.5	Err			
Lane LOS	A			A		F	F	B	F			
Approach Delay (s)	0.6			1.7		250.4			Err			
Approach LOS						F			F			
Intersection Summary												
Average Delay			1358.9									
Intersection Capacity Utilization			66.1%		ICU Level of Service				C			
Analysis Period (min)			15									

11: Ave 17 & Road 23
2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	125	28	46	112	3	16	134	40	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	136	30	50	122	3	17	146	43	10	104	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	390	348	104	424	326	167	104			189		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	390	348	104	424	326	167	104			189		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.3			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.4			2.4		
p0 queue free %	100	76	97	88	79	100	99			99		
cM capacity (veh/h)	465	563	948	410	569	859	1382			1258		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	166	175	207	114								
Volume Left	0	50	17	10								
Volume Right	30	3	43	0								
cSH	608	515	1382	1258								
Volume to Capacity	0.27	0.34	0.01	0.01								
Queue Length 95th (ft)	28	37	1	1								
Control Delay (s)	13.1	15.5	0.7	0.7								
Lane LOS	B	C	A	A								
Approach Delay (s)	13.1	15.5	0.7	0.7								
Approach LOS	B	C										
Intersection Summary												
Average Delay			7.8									
Intersection Capacity Utilization			40.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frft			0.850			0.850		0.985			0.991	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3387	0	1752	3473	0
Flt Permitted		0.728			0.730		0.950			0.950		
Satd. Flow (perm)	0	1356	1583	0	1360	1583	1719	3387	0	1752	3473	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			7			103		17			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		40
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	38	0	6	41	0	95	6	362	40	55	491	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	41	0	7	45	0	103	7	393	43	60	534	34
Lane Group Flow (vph)	0	41	7	0	45	103	7	436	0	60	568	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.4	10.4		10.4	10.4	8.1	32.7		9.7	36.6	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.61		0.16	0.68	
v/c Ratio		0.17	0.02		0.18	0.28	0.03	0.21		0.21	0.24	
Control Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		14.1			8.9			8.0			6.5	

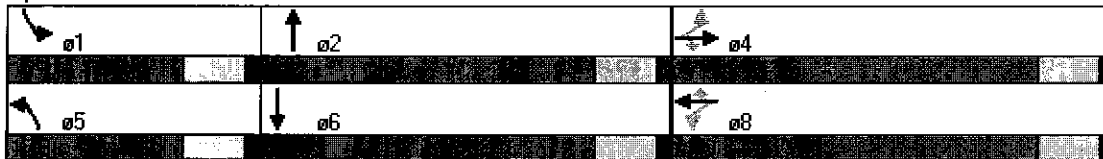
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		4	0		4	0	1	15		6	22	
Queue Length 95th (ft)		29	8		31	29	10	76		38	91	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		521	613		523	672	360	2331		391	2518	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.01		0.09	0.15	0.02	0.19		0.15	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 36.8%
 Analysis Period (min) 15










Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26












13: Kennedy & Gateway
 2010 Project AM Alternative B

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			19.1%		ICU Level of Service	A
Analysis Period (min)			15			

14: Gateway & AVE 16 Connector
 2010 Project AM Alternative B

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			21.9%		ICU Level of Service	A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
2010 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				1		237
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	285	165	1	49	218
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	310	179	1	53	237
Lane Group Flow (vph)	130	310	179	1	53	237
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.5	10.7	10.7	13.7	13.7
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.38	0.38
v/c Ratio	0.34	0.35	0.36	0.00	0.08	0.33
Control Delay	17.0	5.7	14.3	10.0	14.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	5.7	14.3	10.0	14.5	4.5
LOS	B	A	B	A	B	A
Approach Delay		9.0	14.3		6.3	

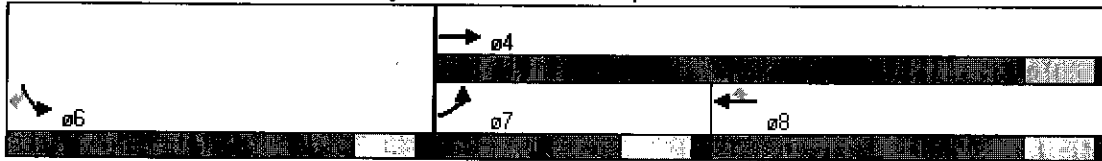
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	30	0	9	0
Queue Length 95th (ft)	71	68	82	3	34	42
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	456	1177	710	604	887	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.25	0.00	0.06	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.2
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 28.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.939			0.951				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			22				3		207	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	50	34	147	42	20	20	41	3	47	79	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	54	37	160	46	22	22	45	3	51	86	228
Lane Group Flow (vph)	4	91	0	160	68	0	22	45	3	51	314	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.5	7.1		8.7	15.9		4.5	17.1	17.1	16.6	34.6	
Actuated g/C Ratio	0.06	0.11		0.14	0.25		0.07	0.27	0.27	0.26	0.55	
v/c Ratio	0.04	0.23		0.66	0.08		0.19	0.09	0.01	0.11	0.33	
Control Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
LOS	C	B		D	B		C	B	B	C	A	
Approach Delay		19.7			34.0			23.9		7.3		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	10		62	6		9	14	0	16	18	
Queue Length 95th (ft)	10	30		#143	23		29	37	6	41	73	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	114	763		252	1054		117	479	431	465	958	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.12		0.63	0.06		0.19	0.09	0.01	0.11	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 63.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 18.5
 Intersection LOS: B
 Intersection Capacity Utilization 34.6%
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						135			174			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	82	533	0	0	673	124	350	0	160	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	89	579	0	0	732	135	380	0	174	0	0	0
Lane Group Flow (vph)	89	579	0	0	732	135	190	190	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.8	48.5			36.8	36.8	28.5	28.5	28.5			
Actuated g/C Ratio	0.12	0.57			0.43	0.43	0.34	0.34	0.34			
v/c Ratio	0.45	0.29			0.49	0.18	0.35	0.35	0.28			
Control Delay	31.4	6.0			19.8	4.0	23.6	23.6	4.7			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	31.4	6.0			19.8	4.0	23.6	23.6	4.7			
LOS	C	A			B	A	C	C	A			
Approach Delay		9.4			17.4			17.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project AM Alternative B

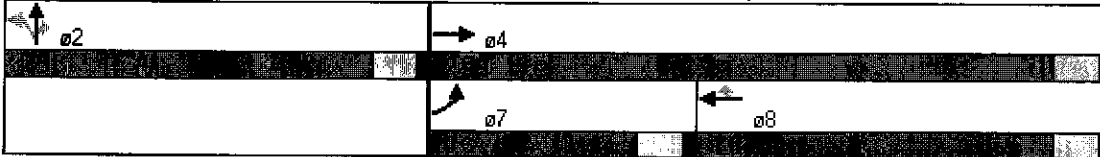
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	46	102			150	0	80	80	0			
Queue Length 95th (ft)	m37	0			214	34	137	137	42			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	339	1981			1505	750	543	543	627			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.26	0.29			0.49	0.18	0.35	0.35	0.28			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 14.9
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑						↙	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			393									111
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	503	362	278	745	0	0	0	0	112	0	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	547	393	302	810	0	0	0	0	122	0	111
Lane Group Flow (vph)	0	547	393	302	810	0	0	0	0	0	122	111
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	28.2	28.2	32.3	60.5	0.0	0.0	0.0	0.0	24.5	24.5	24.5
Total Split (%)	0.0%	33.2%	33.2%	38.0%	71.2%	0.0%	0.0%	0.0%	0.0%	28.8%	28.8%	28.8%
Maximum Green (s)		23.6	23.6	27.7	55.9					20.0	20.0	20.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		41.2	41.2	19.9	65.0						12.0	12.0
Actuated g/C Ratio		0.48	0.48	0.23	0.76						0.14	0.14
v/c Ratio		0.33	0.42	0.75	0.31						0.54	0.37
Control Delay		16.2	3.7	36.3	9.0						42.2	10.2
Queue Delay		0.0	0.0	0.0	0.4						0.0	0.0
Total Delay		16.2	3.7	36.3	9.3						42.2	10.2
LOS		B	A	D	A						D	B
Approach Delay		11.0			16.7						27.0	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project AM Alternative B

10/22/2008

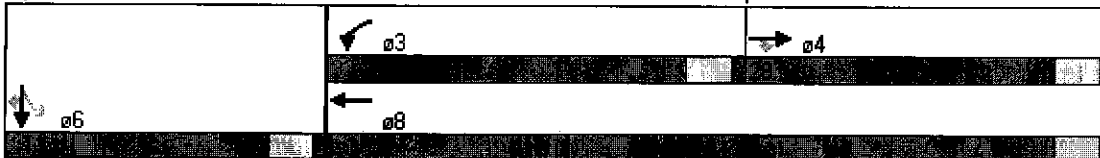
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						C	
Queue Length 50th (ft)		92	0	160	145						62	0
Queue Length 95th (ft)		163	58	196	203						108	42
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1634	933	572	2630						385	429
Starvation Cap Reductn		0	0	0	1153						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.33	0.42	0.53	0.55						0.32	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 60.4 (71%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.4
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	1	22	0	167	29	18	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	1	24	0	182	32	20	136	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	388	136	372	372	197	136			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	388	136	372	372	197	136			213		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	540	538	913	578	549	844	1350			1262		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	61	213	155								
Volume Left	0	36	0	20								
Volume Right	0	24	32	0								
cSH	1700	659	1350	1262								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	8	0	1								
Control Delay (s)	0.0	11.0	0.0	1.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.0	0.0	1.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2010 Project AM Alternative B

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.976						0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3293	0	0	0	0	1752	1568	0
Flt Permitted	0.389									0.950		
Satd. Flow (perm)	1315	3312	0	0	3293	0	0	0	0	1752	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					48						458	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	394	351	0	0	474	90	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	428	382	0	0	515	98	0	0	0	158	0	78
Lane Group Flow (vph)	428	382	0	0	613	0	0	0	0	158	78	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	46.5	46.5	0.0	0.0	46.5	0.0	0.0	0.0	0.0	28.5	28.5	0.0
Total Split (%)	62.0%	62.0%	0.0%	0.0%	62.0%	0.0%	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%
Maximum Green (s)	41.9	41.9			41.9					24.0	24.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	58.1	58.1			58.1					11.9	11.9	
Actuated g/C Ratio	0.77	0.77			0.77					0.16	0.16	
v/c Ratio	0.42	0.15			0.24					0.57	0.12	
Control Delay	2.7	0.4			3.4					36.7	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	2.7	0.4			3.4					36.7	0.4	
LOS	A	A			A					D	A	
Approach Delay		1.6			3.4						24.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 Project AM Alternative B

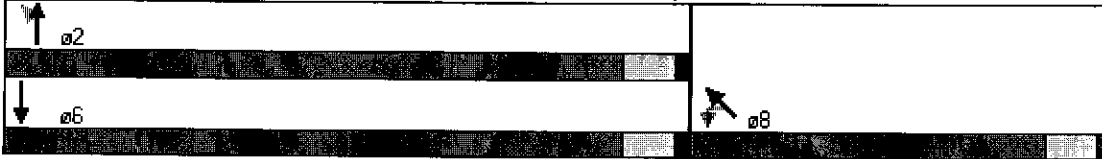
10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A						C	
Queue Length 50th (ft)	9	0			34					69	0	
Queue Length 95th (ft)	m22	m4			66					117	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1019	2567			2564					572	821	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.42	0.15			0.24					0.28	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 5.6
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps















22: AVE 14/Olive & SR 145/Madera
2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.994				0.850
Flt Protected		0.965					0.950				0.991	
Satd. Flow (prot)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Flt Permitted		0.965					0.950				0.991	
Satd. Flow (perm)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			358					5				212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	203	78	329	0	0	0	93	546	21	50	229	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	221	85	358	0	0	0	101	593	23	54	249	212
Lane Group Flow (vph)	0	306	358	0	0	0	101	616	0	0	303	212
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		16.6	16.6				24.8	24.8			21.6	21.6
Actuated g/C Ratio		0.22	0.22				0.33	0.33			0.29	0.29
v/c Ratio		0.79	0.58				0.09	0.56			0.31	0.35
Control Delay		35.9	8.0				19.4	23.9			24.3	8.3
Queue Delay		6.1	0.6				0.0	0.0			0.0	0.0
TOTAL Delay		42.0	8.6				19.4	23.9			24.3	8.3
LOS		D	A				B	C			C	A
Approach Delay		24.0						23.3			17.7	

22: AVE 14/Olive & SR 145/Madera
 2010 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			B	
Queue Length 50th (ft)		126	12				16	120			63	1
Queue Length 95th (ft)		m0	m35				36	191			98	63
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		501	696				1064	1093			991	598
Starvation Cap Reductn		142	111				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		0.85	0.61				0.09	0.56			0.31	0.35

Intersection Summary







Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 22.0
 Intersection LOS: C
 Intersection Capacity Utilization 48.9%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



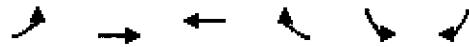
23: Ave 14/Olive & SR 99 SB off-ramp
 2010 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	331	287	0	279	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	360	312	0	303	187
Lane Group Flow (vph)	0	360	312	0	303	187
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.0	49.0		18.0	18.0
Actuated g/C Ratio		0.65	0.65		0.24	0.24
v/c Ratio		0.16	0.14		0.76	0.37
Control Delay		6.1	4.2		38.1	5.6
Queue Delay		0.0	0.3		0.1	0.0
Total Delay		6.1	4.5		38.1	5.6
LOS		A	A		D	A
Approach Delay		6.1	4.5		25.7	

23: AVE 14/Olive & SR 99 SB off-ramp
 2010 Project AM Alternative B

10/22/2008



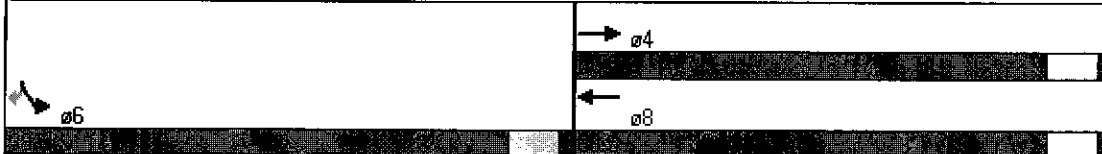
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		28	12		132	0
Queue Length 95th (ft)		61	38		187	40
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2290	2290		769	789
Starvation Cap Reductn		0	1399		0	0
Spillback Cap Reductn		0	0		44	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.16	0.35		0.42	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 31.3%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A












Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2010 Project AM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	16	68	6	14	67	54	8	75	8	49	82	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	7	15	73	59	9	82	9	53	89	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	147	99	172								
Volume Left (vph)	17	15	9	53								
Volume Right (vph)	7	59	9	29								
Hadj (s)	0.13	0.02	0.30	0.25								
Departure Headway (s)	4.9	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.14	0.23								
Capacity (veh/h)	678	708	669	693								
Control Delay (s)	8.7	8.9	8.9	9.4								
Approach Delay (s)	8.7	8.9	8.9	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
HCM Level of Service			A									
Intersection Capacity Utilization			30.9%		ICU Level of Service				A			
Analysis Period (min)			15									

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	387	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	421	82	125	239	155	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	510	125			364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	125			364	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	6	91			87	
cM capacity (veh/h)	449	915			1189	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	421	82	125	239	229	
Volume Left	421	0	0	0	155	
Volume Right	0	82	0	239	0	
cSH	449	915	1700	1700	1189	
Volume to Capacity	0.94	0.09	0.07	0.14	0.13	
Queue Length 95th (ft)	273	7	0	0	11	
Control Delay (s)	58.7	9.3	0.0	0.0	6.1	
Lane LOS	F	A			A	
Approach Delay (s)	50.7		0.0		6.1	
Approach LOS	F					
Intersection Summary						
Average Delay			24.5			
Intersection Capacity Utilization			46.3%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.952			0.871				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1518	0	1687	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1518	0	1687	1776	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			17		21			18				62
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	180	234	16	14	320	152	16	3	17	387	11	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	196	254	17	15	348	165	17	3	18	421	12	62
Lane Group Flow (vph)	196	254	17	15	513	0	17	21	0	421	12	62
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	54.7	54.7	9.7	44.4	0.0	9.7	20.6	0.0	35.0	45.9	45.9
Total Split (%)	16.7%	45.6%	45.6%	8.1%	37.0%	0.0%	8.1%	17.2%	0.0%	29.2%	38.3%	38.3%
Maximum Green (s)	15.4	50.1	50.1	5.1	39.8		5.2	16.1		30.5	41.4	41.4
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	16.0	56.5	56.5	5.7	40.4		5.7	16.6		31.0	47.7	47.7
Actuated g/C Ratio	0.13	0.47	0.47	0.05	0.34		0.05	0.14		0.26	0.40	0.40
v/c Ratio	0.91	0.32	0.02	0.19	0.92		0.22	0.09		0.97	0.02	0.10
Control Delay	93.9	22.2	8.7	64.1	42.6		61.7	21.9		79.9	24.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	93.9	22.2	8.7	64.1	42.6		61.7	21.9		79.9	24.7	6.9
LOS	F	C	A	E	D		E	C		E	C	A
Approach Delay		51.8			43.3			39.7			69.4	

26: Ave 12 & GS Blvd
 2010 Project AM Alternative B

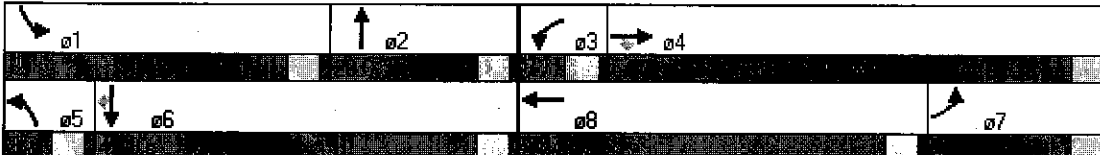
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			D			E	
Queue Length 50th (ft)	152	111	0	12	238		13	2		323	5	0
Queue Length 95th (ft)	#294	200	14	m17	#561		38	26		#527	20	30
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	215	799	688	77	558		79	226		436	706	637
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.91	0.32	0.02	0.19	0.92		0.22	0.09		0.97	0.02	0.10

Intersection Summary


















Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 54.3
 Intersection LOS: D
 Intersection Capacity Utilization 74.2%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.923				0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1656	1743	0	0	1654	0	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	1743	0	0	1654	0	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					96				129			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	81	557	0	0	292	387	194	0	119	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	88	605	0	0	317	421	211	0	129	0	0	0
Lane Group Flow (vph)	88	605	0	0	738	0	0	211	129	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	17.0	91.0	0.0	0.0	74.0	0.0	29.0	29.0	29.0	0.0	0.0	0.0
Total Split (%)	14.2%	75.8%	0.0%	0.0%	61.7%	0.0%	24.2%	24.2%	24.2%	0.0%	0.0%	0.0%
Maximum Green (s)	12.4	86.4			69.4		24.4	24.4	24.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	11.4	91.5			78.5		20.5	20.5				
Actuated g/C Ratio	0.10	0.76			0.65		0.17	0.17				
v/c Ratio	0.56	0.45			0.66		0.78	0.37				
Control Delay	57.1	2.3			16.4		66.2	9.9				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	57.1	2.3			16.4		66.2	9.9				
LOS	E	A			B		E	A				
Approach Delay		9.3			16.4		44.9					

27: Ave 12 & SR 99 NB Ramps
 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	70	117			309			157	0			
Queue Length 95th (ft)	m80	m2			511			236	52			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	180	1330			1115			333	400			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.49	0.45			0.66			0.63	0.32			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 19.1 Intersection LOS: B
 Intersection Capacity Utilization 64.3% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	154	66	0	0	106	7	239	0	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	167	72	0	0	115	8	260	0	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			72			526	529	72	581	526	119
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			72			526	529	72	581	526	119
tC, single (s)	4.3			4.2			7.3	6.7	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.7	4.2	3.5	3.5	4.0	3.3
p0 queue free %	88			100			34	100	94	100	100	100
cM capacity (veh/h)	1344			1456			394	377	943	364	403	938
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	167	72	123	260	55							
Volume Left	167	0	0	260	0							
Volume Right	0	0	8	0	55							
cSH	1344	1700	1700	394	943							
Volume to Capacity	0.12	0.04	0.07	0.66	0.06							
Queue Length 95th (ft)	11	0	0	114	5							
Control Delay (s)	8.1	0.0	0.0	30.1	9.1							
Lane LOS	A			D	A							
Approach Delay (s)	5.6		0.0	26.4								
Approach LOS				D								
Intersection Summary												
Average Delay			14.3									
Intersection Capacity Utilization			35.1%		ICU Level of Service				A			
Analysis Period (min)			15									











3: Ave 18.5 & Road 23
2010 Project PM Alternative B












10/22/2008













Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	435	103	32	252	0	79	0	65	23	75	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	473	112	35	274	0	86	0	71	25	82	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	274			585			1032	872	529	943	928	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			585			1032	872	529	943	928	274
tC, single (s)	4.3			4.3			7.3	6.7	6.4	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.9	4.4	3.7
p0 queue free %	100			96			23	100	86	86	63	83
cM capacity (veh/h)	1192			911			111	257	511	174	223	682
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	585	309	86	71	225							
Volume Left	0	35	86	0	25							
Volume Right	112	0	0	71	118							
cSH	1700	911	111	511	330							
Volume to Capacity	0.34	0.04	0.77	0.14	0.68							
Queue Length 95th (ft)	0	3	108	12	118							
Control Delay (s)	0.0	1.4	104.2	13.2	36.5							
Lane LOS		A	F	B	E							
Approach Delay (s)	0.0	1.4	63.1		36.5							
Approach LOS			F		E							
Intersection Summary												
Average Delay			14.5									
Intersection Capacity Utilization			66.4%		ICU Level of Service				C			
Analysis Period (min)			15									

4: Ave 18.5 & Pistacchio
 2010 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	376	212	228	156	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	409	230	248	170	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	478				663	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478				663	230
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				58	99
cM capacity (veh/h)	997				402	778
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	421	230	248	176		
Volume Left	12	0	0	170		
Volume Right	0	0	248	7		
cSH	997	1700	1700	409		
Volume to Capacity	0.01	0.14	0.15	0.43		
Queue Length 95th (ft)	1	0	0	53		
Control Delay (s)	0.4	0.0	0.0	20.3		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		20.3		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			44.3%		ICU Level of Service	A
Analysis Period (min)			15			

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	117	93	138	190	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	127	101	150	207	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	251				230	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251				230	101
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				69	100
cM capacity (veh/h)	1314				661	836
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	128	101	150	210		
Volume Left	1	0	0	207		
Volume Right	0	0	150	3		
cSH	1314	1700	1700	663		
Volume to Capacity	0.00	0.06	0.09	0.32		
Queue Length 95th (ft)	0	0	0	34		
Control Delay (s)	0.1	0.0	0.0	12.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		24.3%		ICU Level of Service	A	
Analysis Period (min)		15				

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	54	4	67	114	37	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	59	4	73	124	40	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	454	168	408	393	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	454	168	408	393	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	94	100			97		
cM capacity (veh/h)	442	472	853	515	520	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	75	201	210								
Volume Left	1	0	4	40								
Volume Right	7	59	124	2								
cSH	532	780	1316	1296								
Volume to Capacity	0.05	0.10	0.00	0.03								
Queue Length 95th (ft)	4	8	0	2								
Control Delay (s)	12.1	10.1	0.2	1.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.1	10.1	0.2	1.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			35.1%		ICU Level of Service				A			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	74	854	0	0	1087	191	416	2	724	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	928	0	0	1182	208	452	2	787	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1389			928			2271	2478	928	3059	2271	1182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1389			928			2271	2478	928	3059	2271	1182
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			100			0	91	0	0	100	100
cM capacity (veh/h)	483			737			25	24	322	0	34	233
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	80	928	1182	208	454	787						
Volume Left	80	0	0	0	452	0						
Volume Right	0	0	0	208	0	787						
cSH	483	1700	1700	1700	25	322						
Volume to Capacity	0.17	0.55	0.70	0.12	18.50	2.44						
Queue Length 95th (ft)	15	0	0	0	Err	1571						
Control Delay (s)	13.9	0.0	0.0	0.0	Err	684.6						
Lane LOS	B				F	F						
Approach Delay (s)	1.1		0.0		4093.9							
Approach LOS					F							
Intersection Summary												
Average Delay			1396.7									
Intersection Capacity Utilization			96.4%		ICU Level of Service				F			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
 2010 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1253	1010	0	209	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1362	1098	0	227	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1098				2460	1098
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1098				2460	1098
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	100				0	61
cM capacity (veh/h)	628				32	253
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	1362	1098	227	99		
Volume Left	0	0	227	0		
Volume Right	0	0	0	99		
cSH	1700	1700	32	253		
Volume to Capacity	0.80	0.65	7.01	0.39		
Queue Length 95th (ft)	0	0	Err	44		
Control Delay (s)	0.0	0.0	Err	28.1		
Lane LOS			F	D		
Approach Delay (s)	0.0	0.0	6974.5			
Approach LOS			F			
Intersection Summary						
Average Delay			816.4			
Intersection Capacity Utilization			84.2%		ICU Level of Service	E
Analysis Period (min)			15			

10: Ave 17 & GS Blvd
 2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	42	673	85	162	637	302	128	84	241	339	49	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	732	92	176	692	328	139	91	262	368	53	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1021			824			1929	2196	732	2339	2124	857
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1021			824			1929	2196	732	2339	2124	857
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	93			78			0	0	38	0	0	90
cM capacity (veh/h)	672			793			0	32	420	0	34	341
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	46	732	92	176	1021	139	91	262	457			
Volume Left	46	0	0	176	0	139	0	0	368			
Volume Right	0	0	92	0	328	0	0	262	35			
cSH	672	1700	1700	793	1700	0	32	420	0			
Volume to Capacity	0.07	0.43	0.05	0.22	0.60	Err	2.81	0.62	Err			
Queue Length 95th (ft)	5	0	0	21	0	Err	265	103	Err			
Control Delay (s)	10.7	0.0	0.0	10.8	0.0	Err	1077.8	26.8	Err			
Lane LOS	B			B		F	F	D	F			
Approach Delay (s)	0.6			1.6		Err			Err			
Approach LOS						F			F			
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			95.2%		ICU Level of Service				F			
Analysis Period (min)			15									

11: Ave 17 & Road 23
 2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	187	53	70	190	8	45	114	86	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	203	58	76	207	9	49	124	93	12	147	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	556	491	152	603	449	171	157			217		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	556	491	152	603	449	171	157			217		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	56	94	68	57	99	96			99		
cM capacity (veh/h)	280	457	895	238	475	860	1359			1284		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	261	291	266	168								
Volume Left	0	76	49	12								
Volume Right	58	9	93	10								
cSH	512	381	1359	1284								
Volume to Capacity	0.51	0.76	0.04	0.01								
Queue Length 95th (ft)	71	156	3	1								
Control Delay (s)	19.1	39.2	1.7	0.6								
Lane LOS	C	E	A	A								
Approach Delay (s)	19.1	39.2	1.7	0.6								
Approach LOS	C	E										
Intersection Summary												
Average Delay			17.2									
Intersection Capacity Utilization			62.8%		ICU Level of Service					B		
Analysis Period (min)			15									

12: Ellis & Road 26
 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.988			0.979	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3497	0	1770	3465	0
Flt Permitted		0.708			0.731		0.950			0.950		
Satd. Flow (perm)	0	1319	1583	0	1362	1583	1770	3497	0	1770	3465	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			15			226		13			27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	95	1	14	57	4	208	11	788	67	195	752	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1	15	62	4	226	12	857	73	212	817	132
Lane Group Flow (vph)	0	104	15	0	66	226	12	930	0	212	949	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.5	10.5		10.5	10.5	7.0	26.7		10.7	36.4	
Actuated g/C Ratio		0.19	0.19		0.19	0.19	0.11	0.50		0.19	0.68	
v/c Ratio		0.42	0.05		0.26	0.47	0.06	0.53		0.62	0.40	
Control Delay		25.1	10.1		21.7	6.9	26.5	15.0		29.6	7.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.1	10.1		21.7	6.9	26.5	15.0		29.6	7.2	
LOS		C	B		C	A	C	B		C	A	
Approach Delay		23.2			10.2			15.1			11.3	
Approach LOS		C			B			B			B	

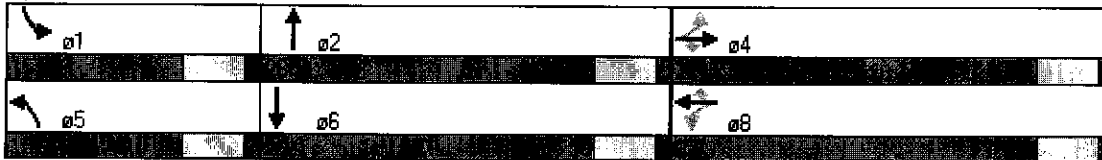
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		31	0		19	0	4	130		65	57	
Queue Length 95th (ft)		69	12		47	46	17	214		#148	192	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		459	561		474	698	318	1789		372	2374	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.23	0.03		0.14	0.32	0.04	0.52		0.57	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.4
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 56.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.










Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 12: Ellis & Road 26












13: Kennedy & Gateway
2010 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	215	3	0	174	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	234	3	0	189	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	274		465	232		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274		465	232		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1283		556	808		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	234	3	274			
Volume Left	0	3	0			
Volume Right	0	0	85			
cSH	1700	556	1700			
Volume to Capacity	0.14	0.01	0.16			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.5	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.5	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			24.4%	ICU Level of Service		A
Analysis Period (min)			15			










14: Gateway & Ave 16 Connector
 2010 Project PM Alternative B

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	78	3	108	303	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	3	117	329	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121				147	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				147	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				61	100
cM capacity (veh/h)	1461				846	1003
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	85	121	329			
Volume Left	0	0	329			
Volume Right	0	117	0			
cSH	1700	1700	846			
Volume to Capacity	0.05	0.07	0.39			
Queue Length 95th (ft)	0	0	47			
Control Delay (s)	0.0	0.0	11.9			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			7.4			
Intersection Capacity Utilization			30.3%	ICU Level of Service		A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 2010 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	303	215	173	0	0	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	329	234	188	0	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked					0.96	
vC, conflicting volume	188				1080	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				1084	188
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	76				100	86
cM capacity (veh/h)	1386				174	849
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	563	188	117			
Volume Left	329	0	0			
Volume Right	0	0	117			
cSH	1386	1700	849			
Volume to Capacity	0.24	0.11	0.14			
Queue Length 95th (ft)	23	0	12			
Control Delay (s)	5.9	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	5.9	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization		43.9%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
 2010 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				3		410
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	394	279	3	78	377
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	428	303	3	85	410
Lane Group Flow (vph)	98	428	303	3	85	410
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	13.9	36.5	22.6	22.6	23.5	23.5
Total Split (%)	23.2%	60.8%	37.7%	37.7%	39.2%	39.2%
Maximum Green (s)	9.0	31.6	17.7	17.7	19.0	19.0
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.4	19.9	13.4	13.4	9.4	9.4
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.24	0.24
v/c Ratio	0.28	0.44	0.47	0.01	0.20	0.59
Control Delay	19.6	7.1	15.0	9.3	15.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	7.1	15.0	9.3	15.7	6.1
LOS	B	A	B	A	B	A
Approach Delay		9.5	14.9		7.8	
Approach LOS		A	B		A	



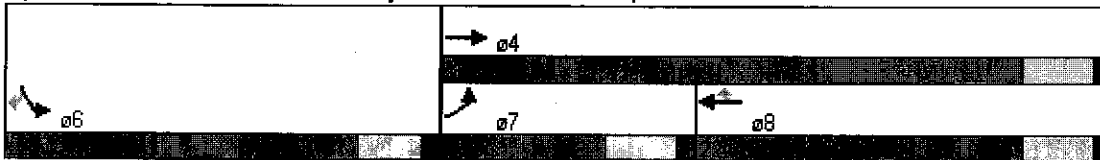
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	38	56	0	17	0
Queue Length 95th (ft)	66	121	144	5	50	54
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	406	1221	829	706	744	903
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.35	0.37	0.00	0.11	0.45

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 38.5
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 44.7%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.944			0.963				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3341	0	1770	3408	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3341	0	1770	3408	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			34				7		139	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	72	43	319	97	31	39	90	6	86	141	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	78	47	347	105	34	42	98	7	93	153	330
Lane Group Flow (vph)	3	125	0	347	139	0	42	98	7	93	483	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	22.0	34.0	0.0	8.9	23.3	23.3	13.8	28.2	0.0
Total Split (%)	11.1%	26.1%	0.0%	27.5%	42.5%	0.0%	11.1%	29.1%	29.1%	17.3%	35.3%	0.0%
Maximum Green (s)	4.0	16.0		17.1	29.1		4.0	18.4	18.4	8.9	23.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	5.0	8.1		16.6	24.4		4.9	22.6	22.6	8.8	27.7	
Actuated g/C Ratio	0.07	0.12		0.25	0.36		0.07	0.34	0.34	0.13	0.41	
v/c Ratio	0.03	0.29		0.79	0.11		0.34	0.16	0.01	0.41	0.66	
Control Delay	34.0	20.9		39.5	11.6		40.3	21.5	12.3	34.6	19.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	20.9		39.5	11.6		40.3	21.5	12.3	34.6	19.6	
LOS	C	C		D	B		D	C	B	C	B	
Approach Delay		21.2			31.5			26.4		22.0		
Approach LOS		C			C			C		C		

17: Ave 16 & Aviation Drive
 2010 Project PM Alternative B

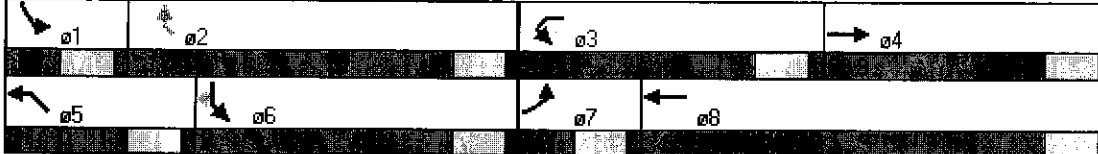
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	16		141	13		18	33	0	38	132	
Queue Length 95th (ft)	9	40		#278	36		48	71	9	82	#295	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	119	765		472	1450		124	597	539	249	737	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.16		0.74	0.10		0.34	0.16	0.01	0.37	0.66	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 66.9
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 25.9
 Intersection LOS: C
 Intersection Capacity Utilization 44.6%
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						212			60			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	206	1136	0	0	1182	195	714	2	350	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	224	1235	0	0	1285	212	776	2	380	0	0	0
Lane Group Flow (vph)	224	1235	0	0	1285	212	388	390	380	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	15.0	48.5			29.5	29.5	28.5	28.5	28.5			
Actuated g/C Ratio	0.18	0.57			0.35	0.35	0.34	0.34	0.34			
v/c Ratio	0.72	0.62			1.05	0.31	0.69	0.69	0.67			
Control Delay	54.9	12.4			67.9	4.5	31.9	32.0	26.9			
Queue Delay	0.0	0.2			0.0	0.0	0.1	0.1	0.0			
Total Delay	54.9	12.6			67.9	4.5	32.0	32.1	26.9			
LOS	D	B			E	A	C	C	C			
Approach Delay		19.1			58.9			30.4				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			E			C				
Queue Length 50th (ft)	132	120			~417	0	186	187	144			
Queue Length 95th (ft)	m177	218			#545	46	292	293	244			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	342	2000			1229	688	564	565	571			
Starvation Cap Reductn	0	182			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	7	7	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.65	0.68			1.05	0.31	0.70	0.70	0.67			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 36.8
 Intersection LOS: D
 Intersection Capacity Utilization 110.3%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Fl _t Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			636									34
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1138	713	257	1635	0	0	0	0	200	2	179
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1237	775	279	1777	0	0	0	0	217	2	195
Lane Group Flow (vph)	0	1237	775	279	1777	0	0	0	0	0	219	195
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	37.6	37.6	25.1	62.7	0.0	0.0	0.0	0.0	22.3	22.3	22.3
Total Split (%)	0.0%	44.2%	44.2%	29.5%	73.8%	0.0%	0.0%	0.0%	0.0%	26.2%	26.2%	26.2%
Maximum Green (s)		33.0	33.0	20.5	58.1					17.8	17.8	17.8
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		39.4	39.4	18.2	61.6						15.4	15.4
Actuated g/C Ratio		0.46	0.46	0.21	0.72						0.18	0.18
v/c Ratio		0.75	0.72	0.74	0.69						0.71	0.65
Control Delay		24.3	8.6	38.8	9.0						45.6	36.3
Queue Delay		0.0	0.0	0.0	1.6						0.0	0.0
Total Delay		24.3	8.6	38.8	10.6						45.6	36.3
LOS		C	A	D	B						D	D
Approach Delay		18.2			14.4						41.2	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project PM Alternative B

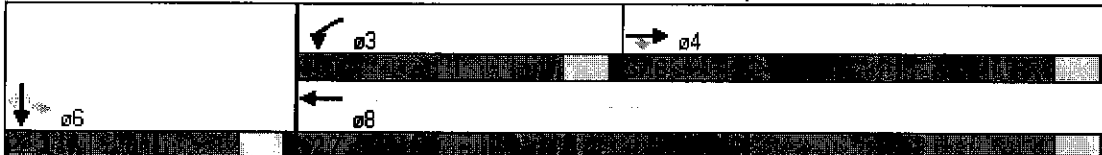
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						D	
Queue Length 50th (ft)		290	44	163	231						110	79
Queue Length 95th (ft)		#446	200	m188	m236						179	145
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1641	1075	439	2563						364	352
Starvation Cap Reductn		0	0	0	559						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.75	0.72	0.64	0.89						0.60	0.55

Intersection Summary














Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 18.6
 Intersection LOS: B
 Intersection Capacity Utilization 110.3%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2010 Project PM Alternative B

10/22/2008

Movement													
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Volume (veh/h)	0	1	1	42	1	43	0	169	77	50	191	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	1	1	46	1	47	0	184	84	54	208	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type		None			None								
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	589	584	208	543	542	226	208			267			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	589	584	208	543	542	226	208			267			
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3			
p0 queue free %	100	100	100	89	100	94	100			96			
cM capacity (veh/h)	381	405	833	429	424	806	1317			1220			
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	2	93	267	262									
Volume Left	0	46	0	54									
Volume Right	1	47	84	0									
cSH	545	560	1317	1220									
Volume to Capacity	0.00	0.17	0.00	0.04									
Queue Length 95th (ft)	0	15	0	3									
Control Delay (s)	11.6	12.7	0.0	2.0									
Lane LOS	B	B		A									
Approach Delay (s)	11.6	12.7	0.0	2.0									
Approach LOS	B	B											
Intersection Summary													
Average Delay			2.8										
Intersection Capacity Utilization		48.1%			ICU Level of Service				A				
Analysis Period (min)			15										

21: SR 145/Madera & SR 99 NB ramps
2010 Project PM Alternative B

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.968							0.852
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3426	0	0	0	0	1770	1587	0
Flt Permitted	0.251									0.950		
Satd. Flow (perm)	898	3505	0	0	3426	0	0	0	0	1770	1587	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					59						65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	548	487	0	0	592	159	0	0	0	128	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	596	529	0	0	643	173	0	0	0	139	1	65
Lane Group Flow (vph)	596	529	0	0	816	0	0	0	0	139	66	0
Turn Type	Perm									Perm		
Protected Phases		2			6							8
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	37.5	37.5	0.0	0.0	37.5	0.0	0.0	0.0	0.0	37.5	37.5	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	32.9	32.9			32.9					33.0	33.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	59.2	59.2			59.2					10.7	10.7	
Actuated g/C Ratio	0.79	0.79			0.79					0.14	0.14	
v/c Ratio	0.84	0.19			0.30					0.55	0.23	
Control Delay	22.5	0.1			3.2					37.5	10.0	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	22.5	0.1			3.2					37.5	10.0	
LOS	C	A			A					D	A	
Approach Delay		12.0			3.2						28.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 Project PM Alternative B

10/22/2008

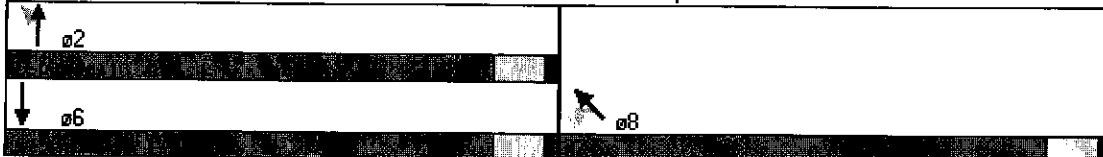
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			A						C	
Queue Length 50th (ft)	64	0			45					61	0	
Queue Length 95th (ft) m#138		m0			82					108	31	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	709	2766			2717					791	745	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.84	0.19			0.30					0.18	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 10.2
 Intersection Capacity Utilization 54.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A



















95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
 2010 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.999				0.850
Flt Protected		0.966					0.950				0.989	
Satd. Flow (prot)	0	1765	1553	0	0	0	3433	3536	0	0	3466	1568
Flt Permitted		0.966					0.950				0.989	
Satd. Flow (perm)	0	1765	1553	0	0	0	3433	3536	0	0	3466	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			620					1				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	251	101	570	0	0	0	133	784	7	83	275	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	273	110	620	0	0	0	145	852	8	90	299	272
Lane Group Flow (vph)	0	383	620	0	0	0	145	860	0	0	389	272
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		19.5	19.5				21.9	21.9			21.6	21.6
Actuated g/C Ratio		0.26	0.26				0.29	0.29			0.29	0.29
v/c Ratio		0.83	0.72				0.14	0.83			0.39	0.42
Control Delay		41.4	10.3				21.2	34.8			27.1	9.0
Queue Delay		88.4	2.1				0.0	0.0			0.0	0.0
Total Delay		129.8	12.4				21.2	34.8			27.1	9.0
LOS		F	B				C	C			C	A
Approach Delay		57.2						32.9			19.7	

22: AVe 14/Olive & SR 145/Madera
 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E						C			B	
Queue Length 50th (ft)		174	65				26	203			84	0
Queue Length 95th (ft)		m230	m115				48	#316			125	74
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		506	887				1002	1032			998	645
Starvation Cap Reductn		182	145				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		1.18	0.84				0.14	0.83			0.39	0.42

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 38.7
 Intersection LOS: D
 Intersection Capacity Utilization 61.1%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						172
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	473	384	0	449	158
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	514	417	0	488	172
Lane Group Flow (vph)	0	514	417	0	488	172
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		40.7	40.7		26.3	26.3
Actuated g/C Ratio		0.54	0.54		0.35	0.35
v/c Ratio		0.27	0.22		0.83	0.27
Control Delay		11.0	6.8		34.4	3.4
Queue Delay		0.0	0.3		2.4	0.0
Total Delay		11.0	7.1		36.8	3.4
LOS		B	A		D	A
Approach Delay		11.0	7.1		28.1	

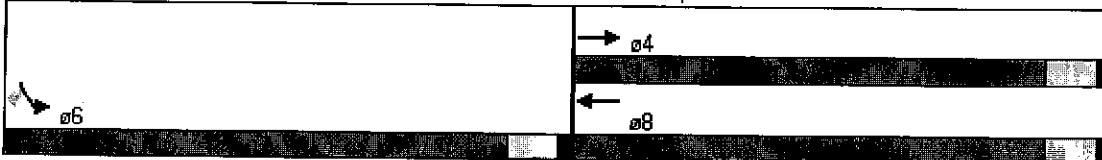
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		63	24		201	0
Queue Length 95th (ft)		115	58		266	30
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1919	1919		769	781
Starvation Cap Reductn		0	907		0	0
Spillback Cap Reductn		132	0		164	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.29	0.41		0.81	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 17.0
 Intersection Capacity Utilization 44.6%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A












Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2010 Project PM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	49	89	12	16	38	53	5	119	25	67	110	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	97	13	17	41	58	5	129	27	73	120	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	116	162	220								
Volume Left (vph)	53	17	5	73								
Volume Right (vph)	13	58	27	27								
Hadj (s)	0.07	-0.10	0.09	0.26								
Departure Headway (s)	5.1	5.0	5.0	5.1								
Degree Utilization, x	0.23	0.16	0.23	0.31								
Capacity (veh/h)	644	647	665	660								
Control Delay (s)	9.7	9.0	9.5	10.4								
Approach Delay (s)	9.7	9.0	9.5	10.4								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.8									
HCM Level of Service			A									
Intersection Capacity Utilization		43.9%			ICU Level of Service				A			
Analysis Period (min)			15									

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	438	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	476	91	125	286	91	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	450	125			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450	125			411	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	8	90			92	
cM capacity (veh/h)	516	918			1137	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	476	91	125	286	234	
Volume Left	476	0	0	0	91	
Volume Right	0	91	0	286	0	
cSH	516	918	1700	1700	1137	
Volume to Capacity	0.92	0.10	0.07	0.17	0.08	
Queue Length 95th (ft)	277	8	0	0	7	
Control Delay (s)	51.0	9.4	0.0	0.0	3.7	
Lane LOS	F	A			A	
Approach Delay (s)	44.3		0.0		3.7	
Approach LOS	E					
Intersection Summary						
Average Delay			21.5			
Intersection Capacity Utilization			49.1%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.947			0.877				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1618	0	1719	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1618	0	1719	1810	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			32		24			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	238	29	14	289	160	46	18	85	481	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	259	32	15	314	174	50	20	92	523	30	65
Lane Group Flow (vph)	217	259	32	15	488	0	50	112	0	523	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	49.9	49.9	9.5	39.4	0.0	13.0	20.6	0.0	40.0	47.6	47.6
Total Split (%)	16.7%	41.6%	41.6%	7.9%	32.8%	0.0%	10.8%	17.2%	0.0%	33.3%	39.7%	39.7%
Maximum Green (s)	15.4	45.3	45.3	4.9	34.8		8.5	16.1		35.5	43.1	43.1
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	16.0	51.6	51.6	5.5	35.4		8.2	16.6		36.0	46.4	46.4
Actuated g/C Ratio	0.13	0.43	0.43	0.05	0.30		0.07	0.14		0.30	0.39	0.39
v/c Ratio	0.97	0.34	0.05	0.19	0.95		0.42	0.37		1.01	0.04	0.10
Control Delay	106.0	25.5	7.9	63.4	47.1		64.2	17.1		85.2	25.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	106.0	25.5	7.9	63.4	47.1		64.2	17.1		85.2	25.0	6.5
LOS	F	C	A	E	D		E	B		F	C	A
Approach Delay		58.8			47.6			31.7			74.0	

26: Ave 12 & GS Blvd
 2010 Project PM Alternative B

10/22/2008

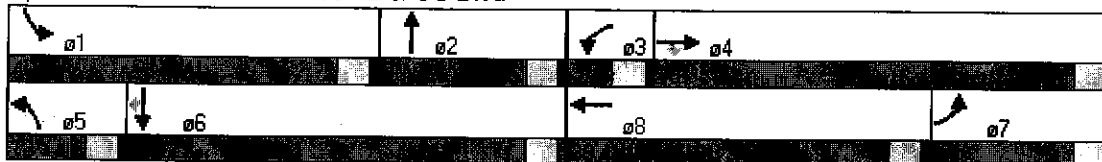
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			C			E	
Queue Length 50th (ft)	170	124	0	12	229		38	14		~416	15	0
Queue Length 95th (ft)	#328	217	21	m14	#548		80	67		#642	36	30
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	223	756	661	77	513		131	303		516	700	635
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.34	0.05	0.19	0.95		0.38	0.37		1.01	0.04	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 83 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 58.4
 Intersection Capacity Utilization 79.4%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.916				0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	1827	0	0	1673	0	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	1827	0	0	1673	0	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					118				153			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	164	640	0	0	284	466	179	1	141	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	178	696	0	0	309	507	195	1	153	0	0	0
Lane Group Flow (vph)	178	696	0	0	816	0	0	196	153	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	22.0	96.0	0.0	0.0	74.0	0.0	24.0	24.0	24.0	0.0	0.0	0.0
Total Split (%)	18.3%	80.0%	0.0%	0.0%	61.7%	0.0%	20.0%	20.0%	20.0%	0.0%	0.0%	0.0%
Maximum Green (s)	17.4	91.4			69.4		19.4	19.4	19.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	16.4	94.1			73.7			17.9	17.9			
Actuated g/C Ratio	0.14	0.78			0.61			0.15	0.15			
v/c Ratio	0.75	0.49			0.76			0.78	0.43			
Control Delay	61.0	2.1			20.8			69.8	10.9			
Queue Delay	0.0	0.2			0.0			0.0	0.0			
Total Delay	61.0	2.3			20.8			69.8	10.9			
LOS	E	A			C			E	B			
Approach Delay		14.2			20.8			44.0				

27: Ave 12 & SR 99 NB Ramps
 2010 Project PM Alternative B

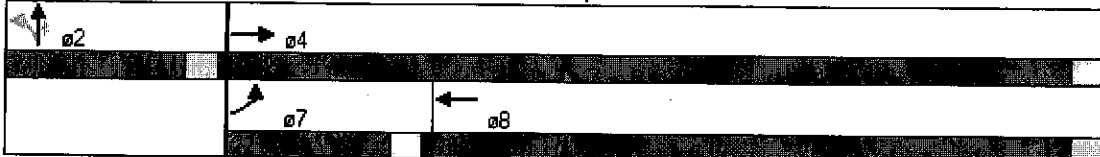
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			D				
Queue Length 50th (ft)	143	126			408			145	0			
Queue Length 95th (ft)	m152	m34			602			#240	59			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	261	1433			1073			282	379			
Starvation Cap Reductn	0	178			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.68	0.55			0.76			0.70	0.40			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 21.9
 Intersection LOS: C
 Intersection Capacity Utilization 72.6%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 13

OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99-NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

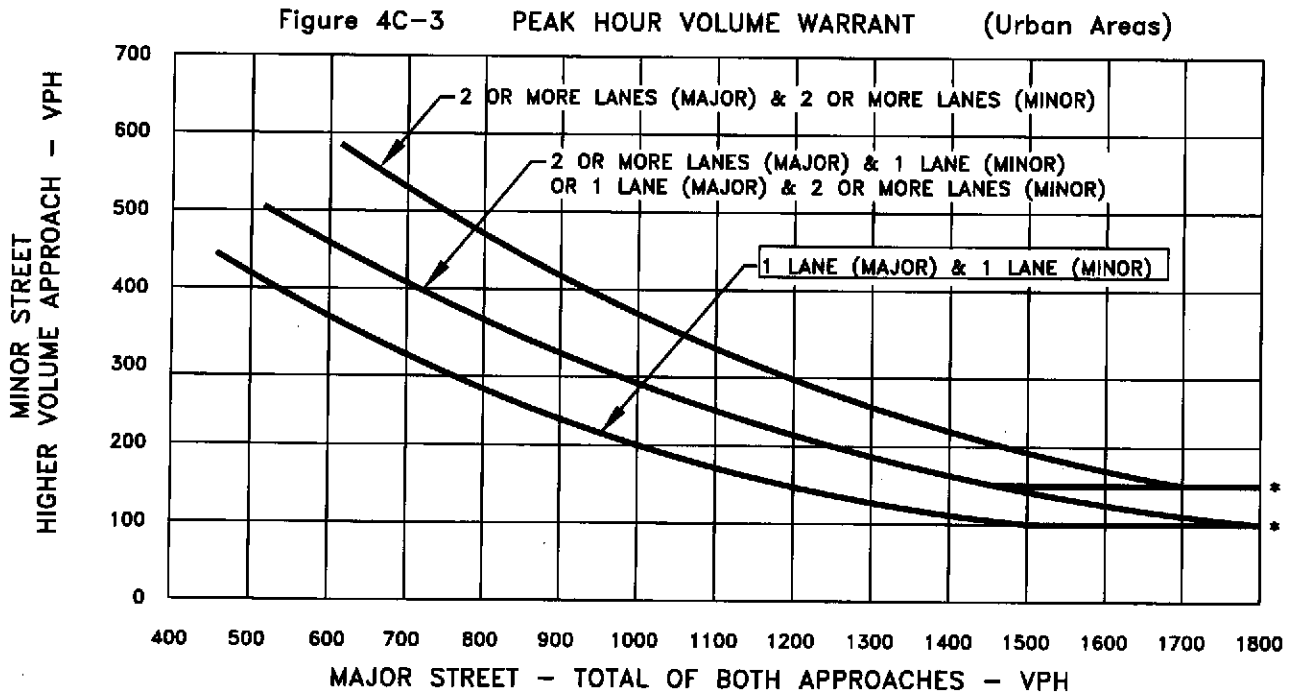
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
Both Approaches - Major Street	✓		327	333			
Highest Approaches - Minor Street	✓		225	290			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB ON RAMP/ ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE B

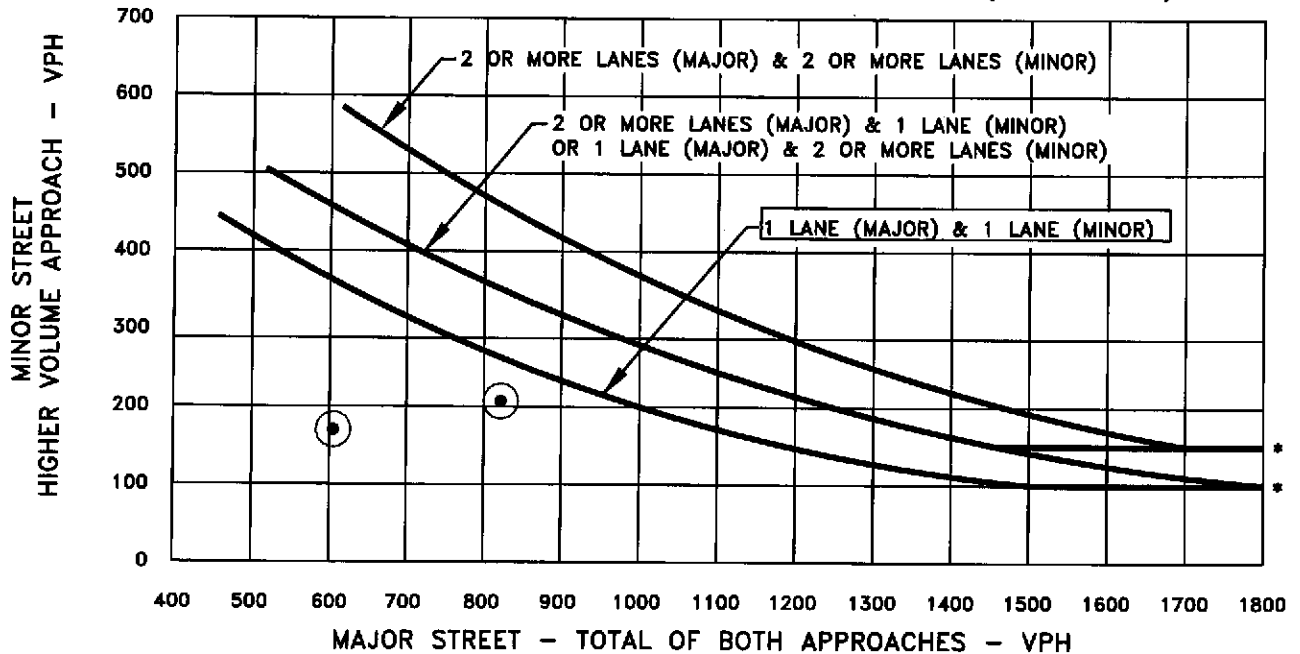
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		605	822	
Highest Approaches - Minor Street	✓		170	207	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08 CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2 Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ----- or RURAL (R)

In built up area of isolated community of < 10,000 pop. ----- URBAN (U)

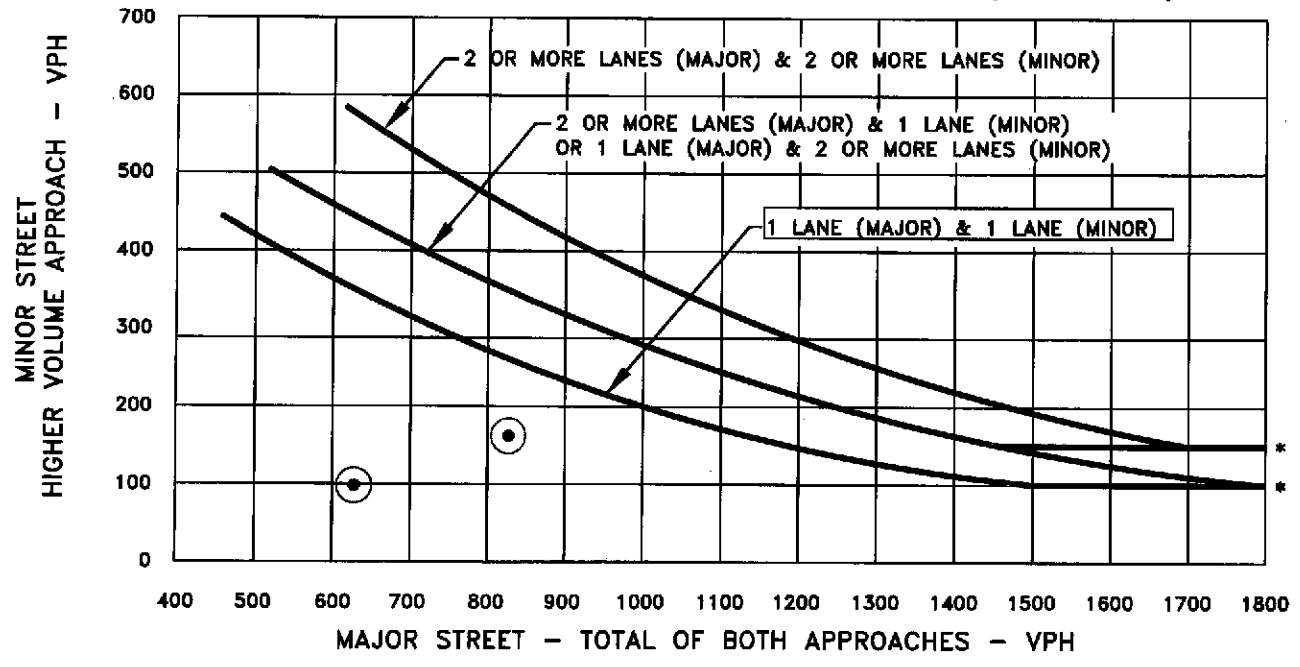
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		628	827	
Highest Approaches - Minor Street	✓		98	162	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

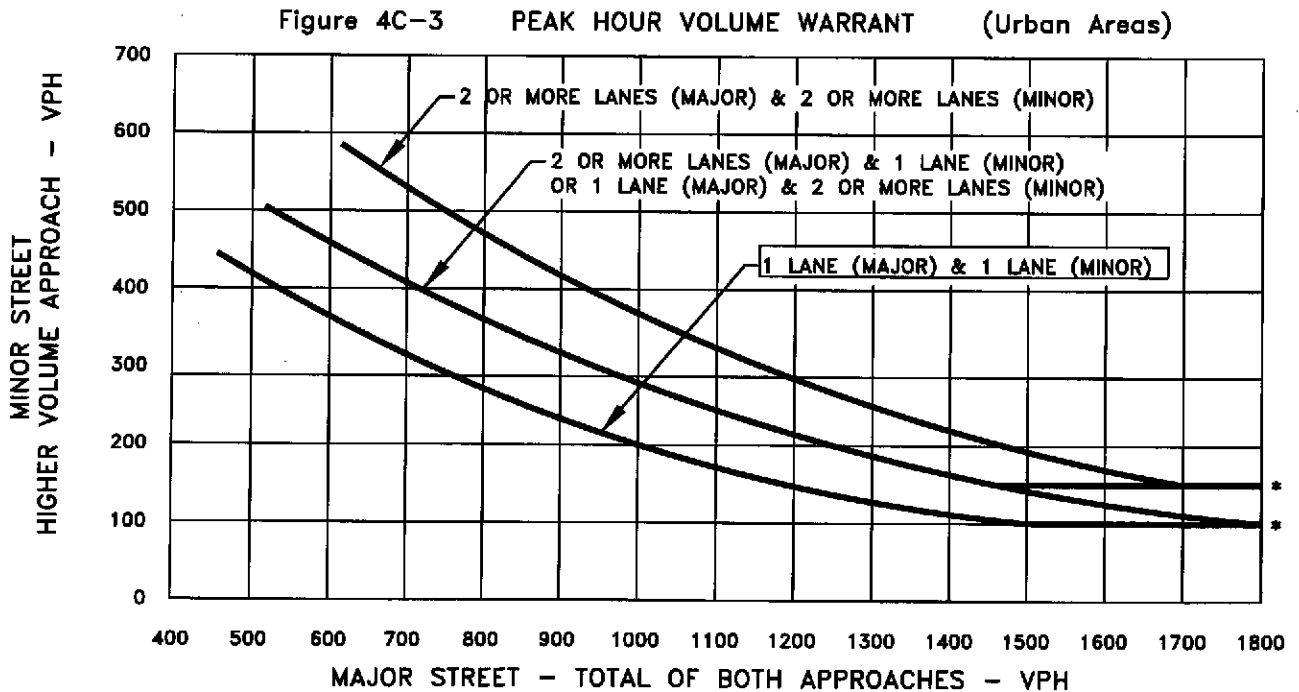
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		292	349	
Highest Approaches - Minor Street	✓		156	193	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

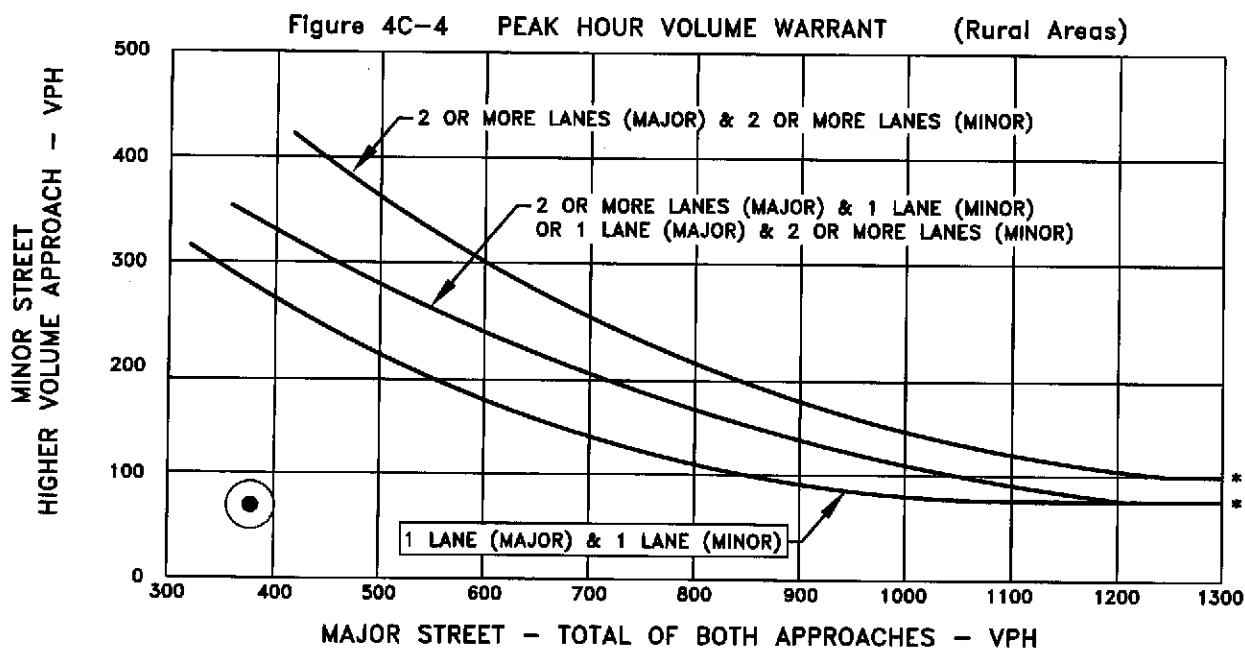
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		261	378		
Highest Approaches - Minor Street	✓		45	69		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

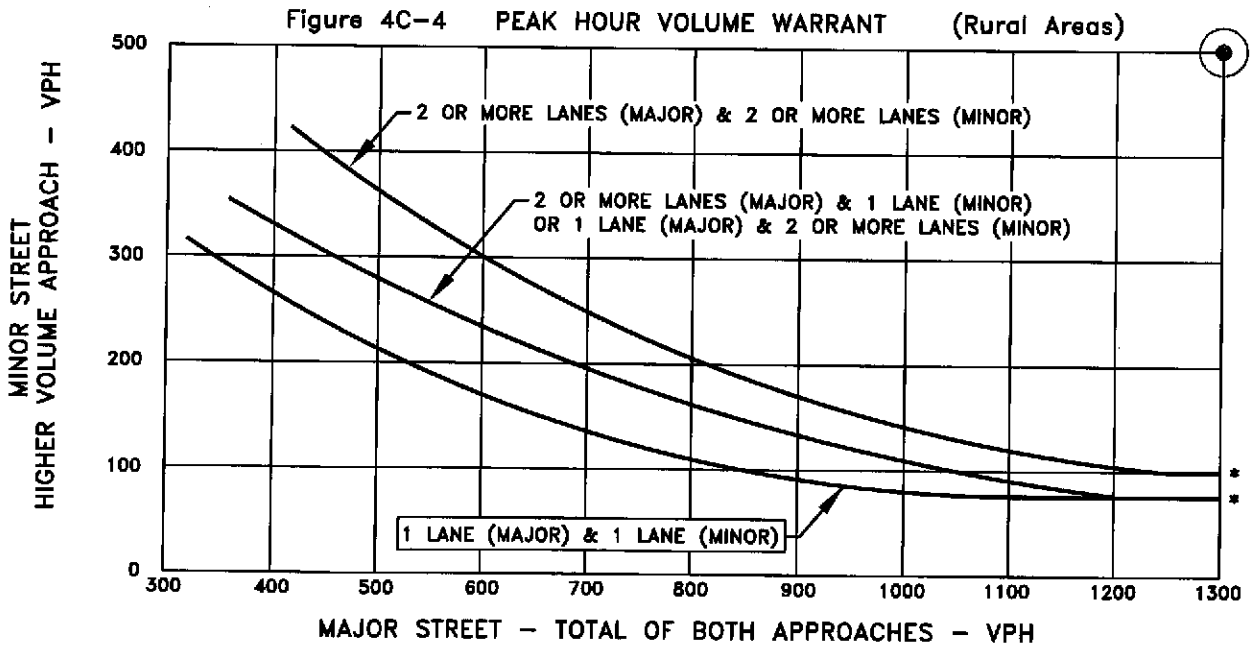
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		1306	2206		
Highest Approaches - Minor Street	✓		582	1142		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 SB OFF RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

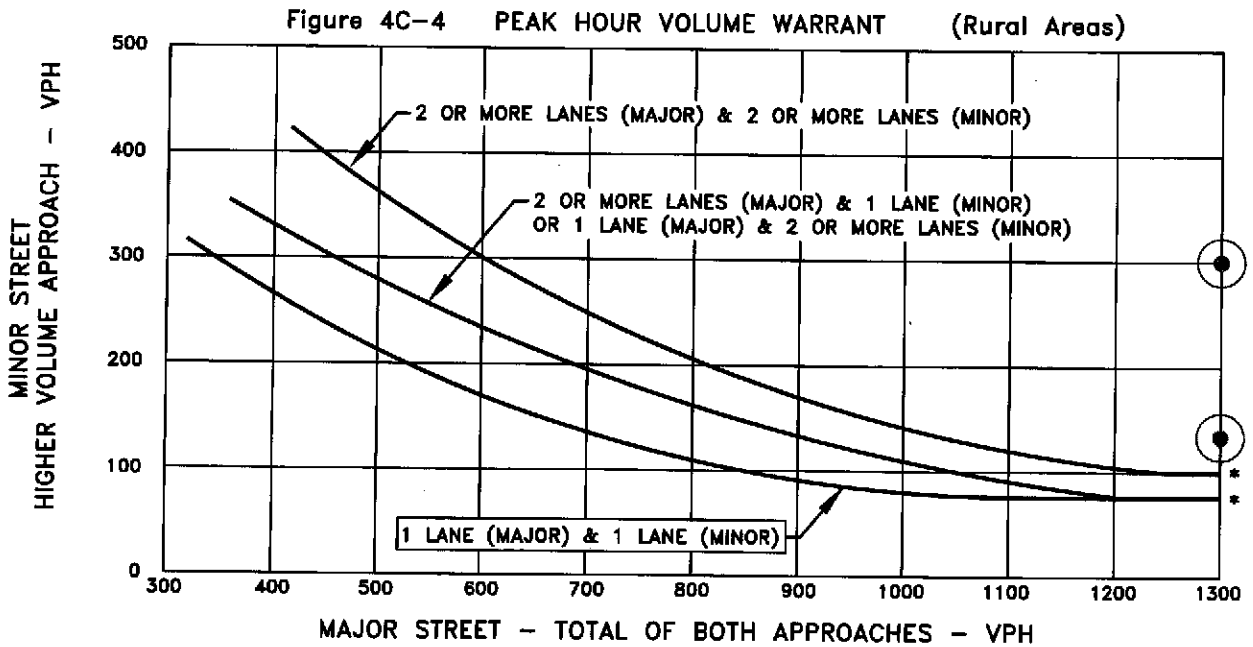
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1410	2263		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	134	300		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: AIRPORT ROAD/ GOLDEN STATE

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

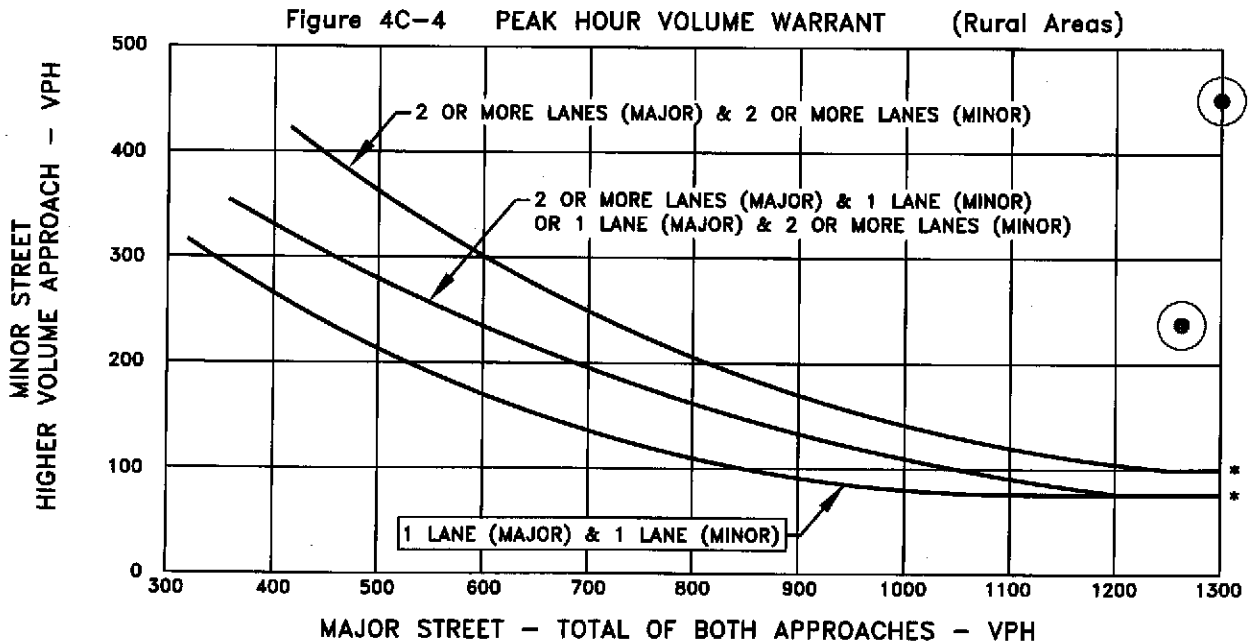
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour				
			AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		1263	1901			
Highest Approaches - Minor Street	✓		238	453			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

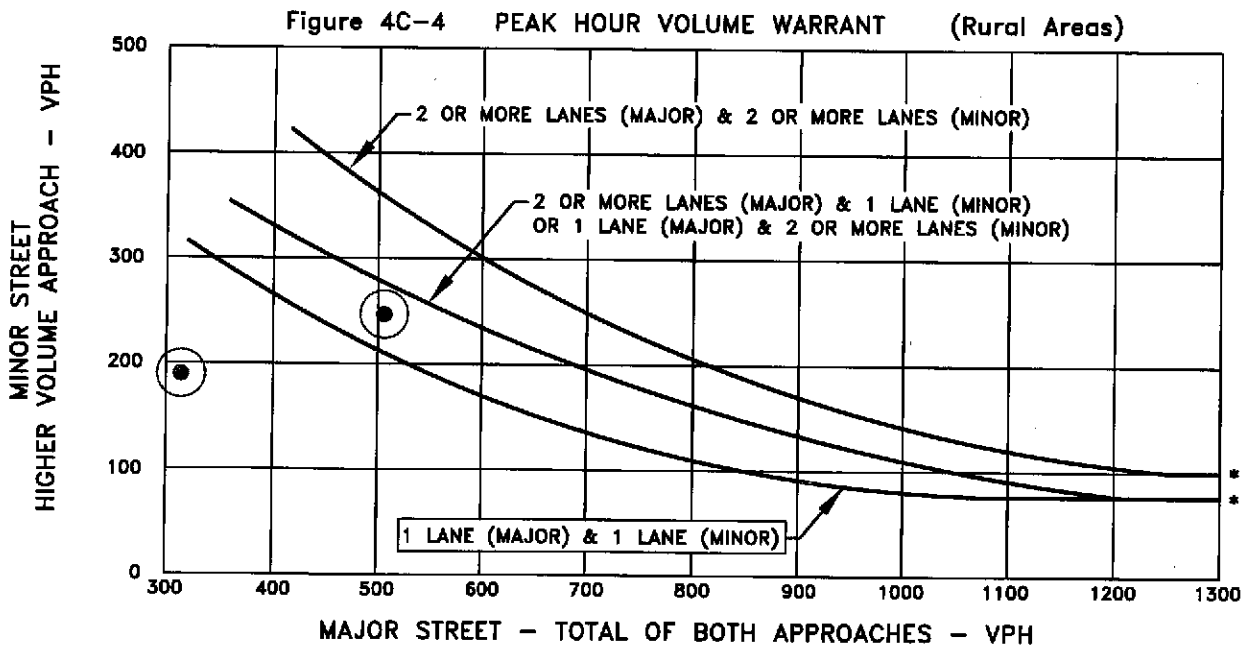
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		314	508				
Highest Approaches - Minor Street	✓		190	245				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB ON RAMP

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16/ GATEWAY

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE B

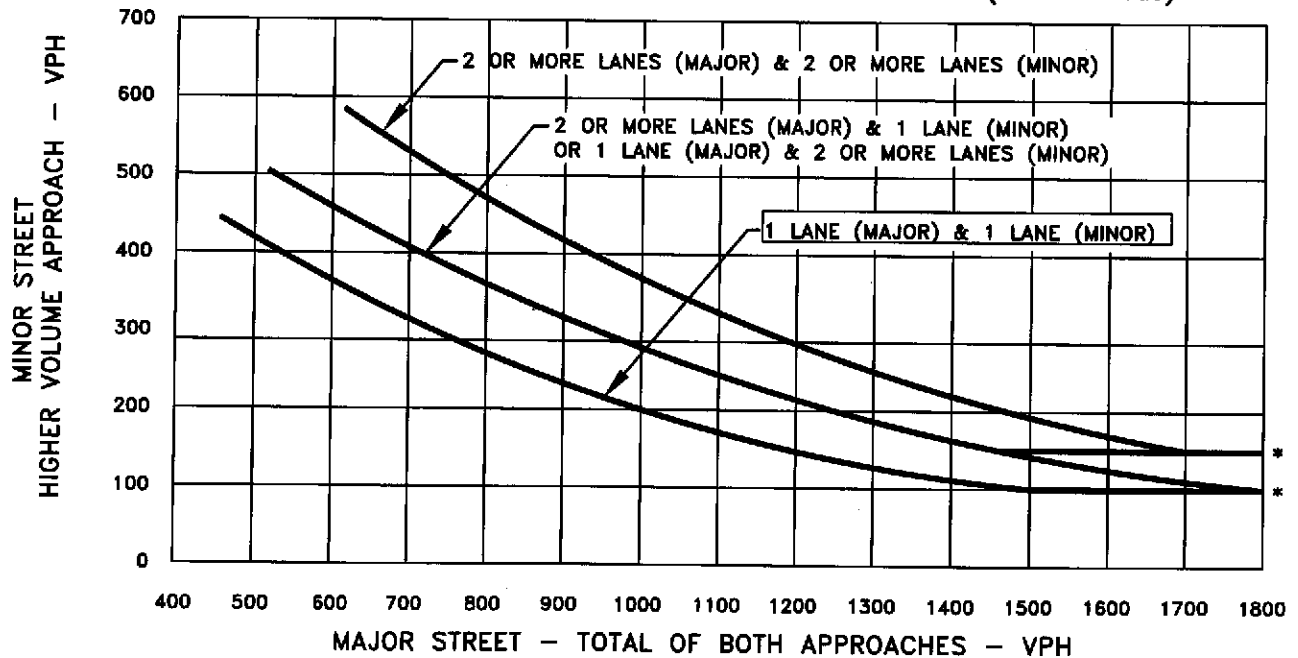
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		162	255	
Highest Approaches - Minor Street	✓		140	215	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 16

Critical Approach Speed 35 mph

MINOR STREET: SR-99 NB ON CONNECTOR

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----
 or RURAL (R)
 In built up area of isolated community of < 10,000 pop. -----
 URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE B

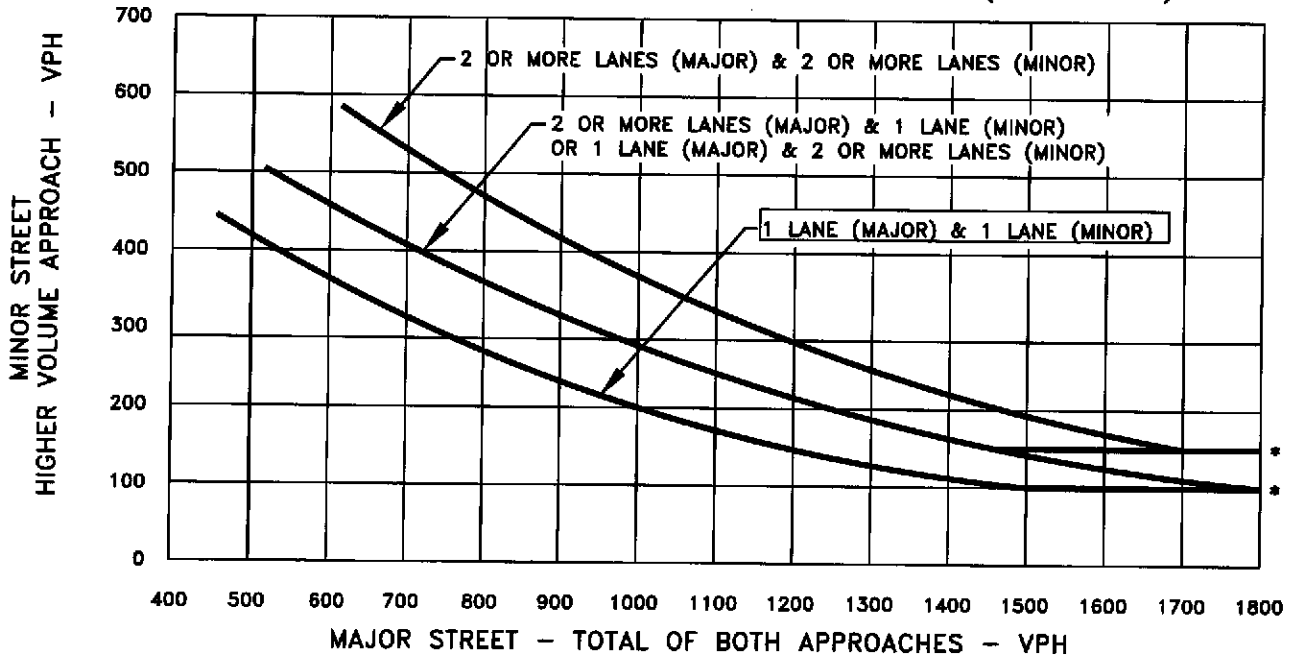
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM	PM PEAK		
Both Approaches - Major Street	✓		204	303		
Highest Approaches - Minor Street	✓		64	111		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16 CONNECTOR

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE B

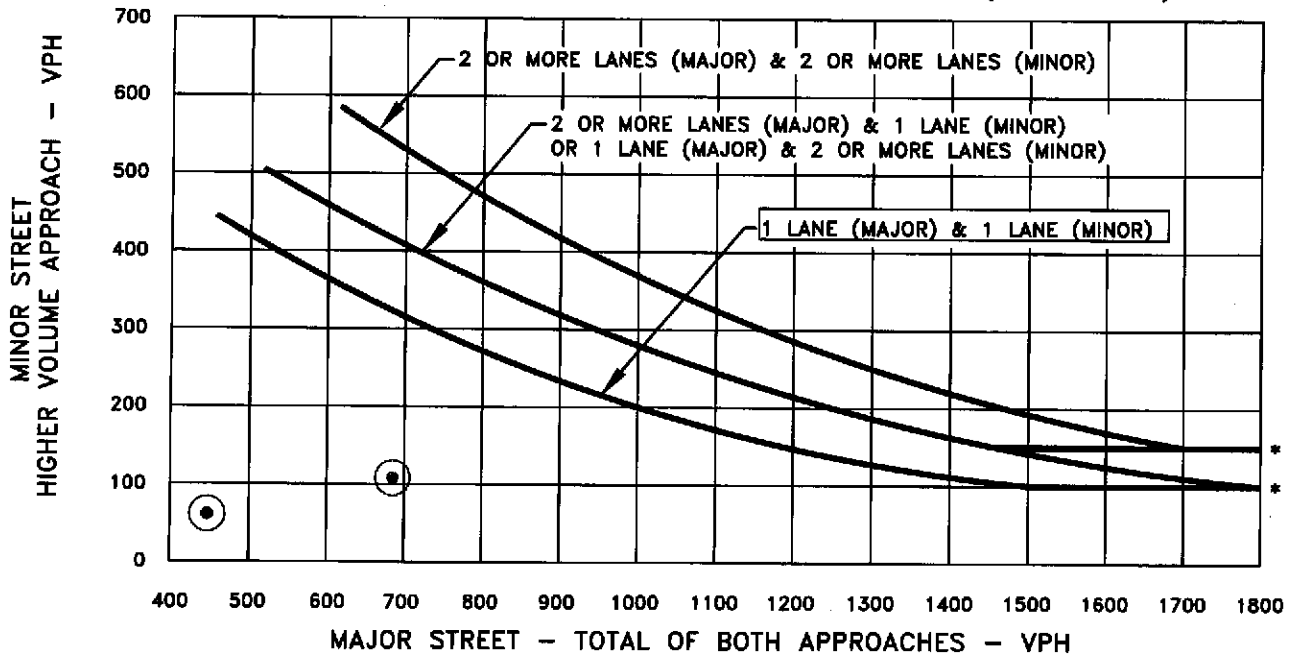
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		447	691	
Highest Approaches - Minor Street	✓		61	108	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

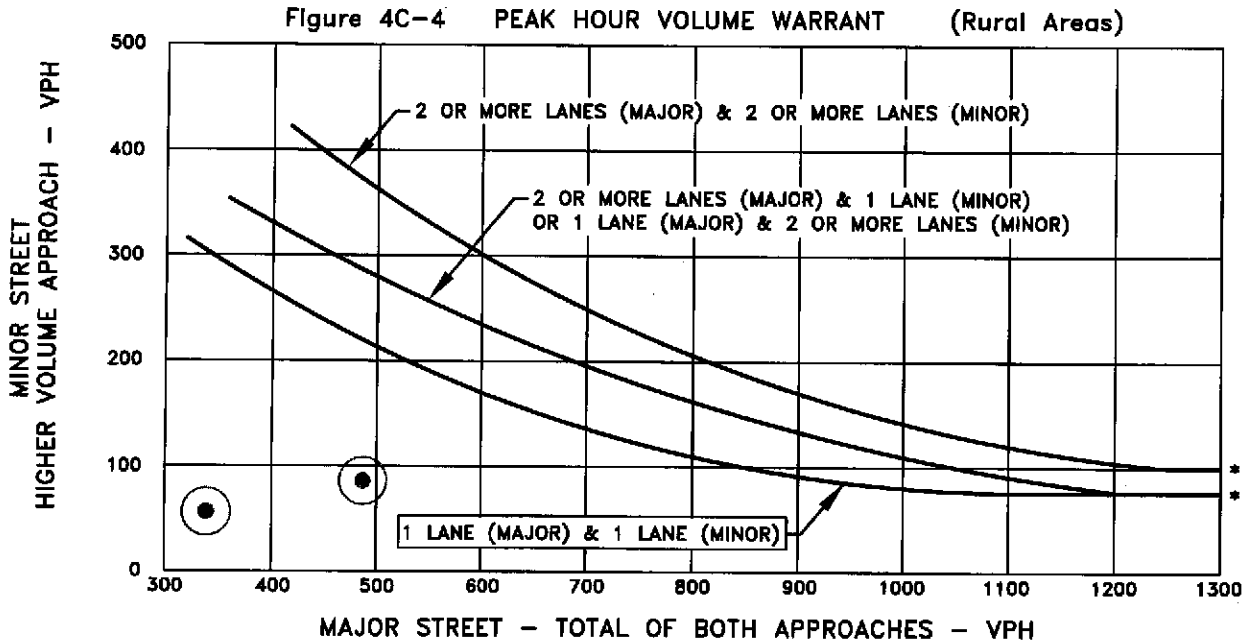
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour					
			AM PEAK	PM PEAK				
Both Approaches - Major Street	✓		339	487				
Highest Approaches - Minor Street	✓		56	86				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

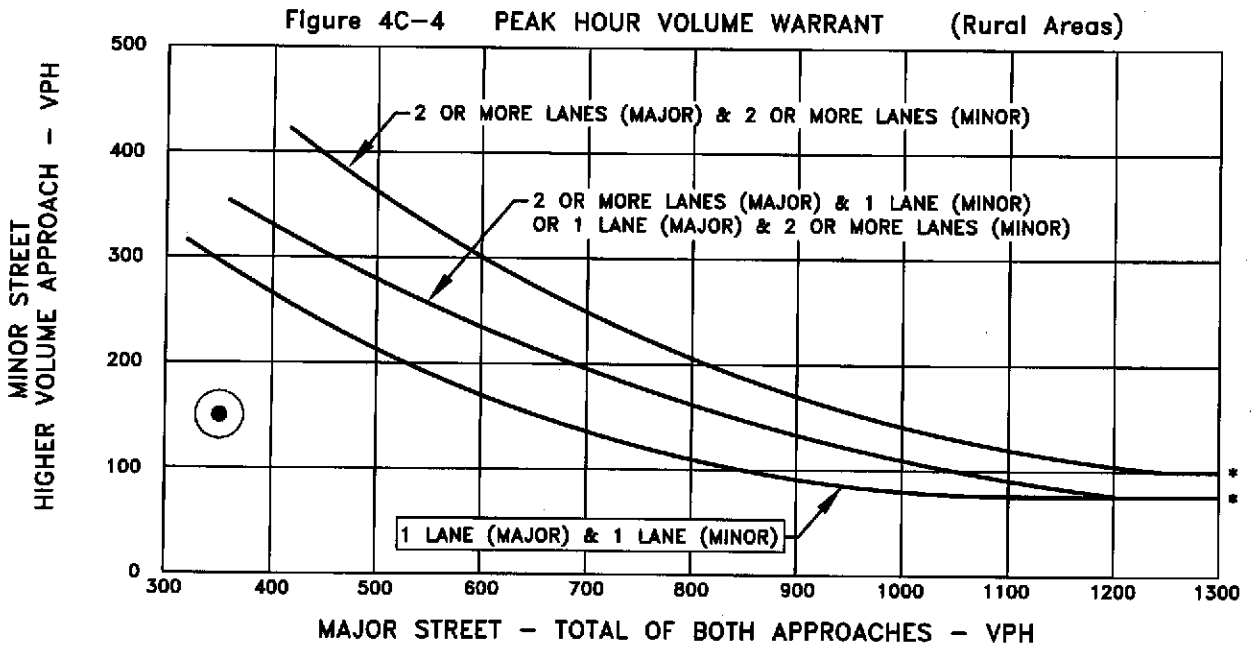
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		249	351				
Highest Approaches - Minor Street	✓		135	150				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB RAMPS/ GOLDEN STATE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

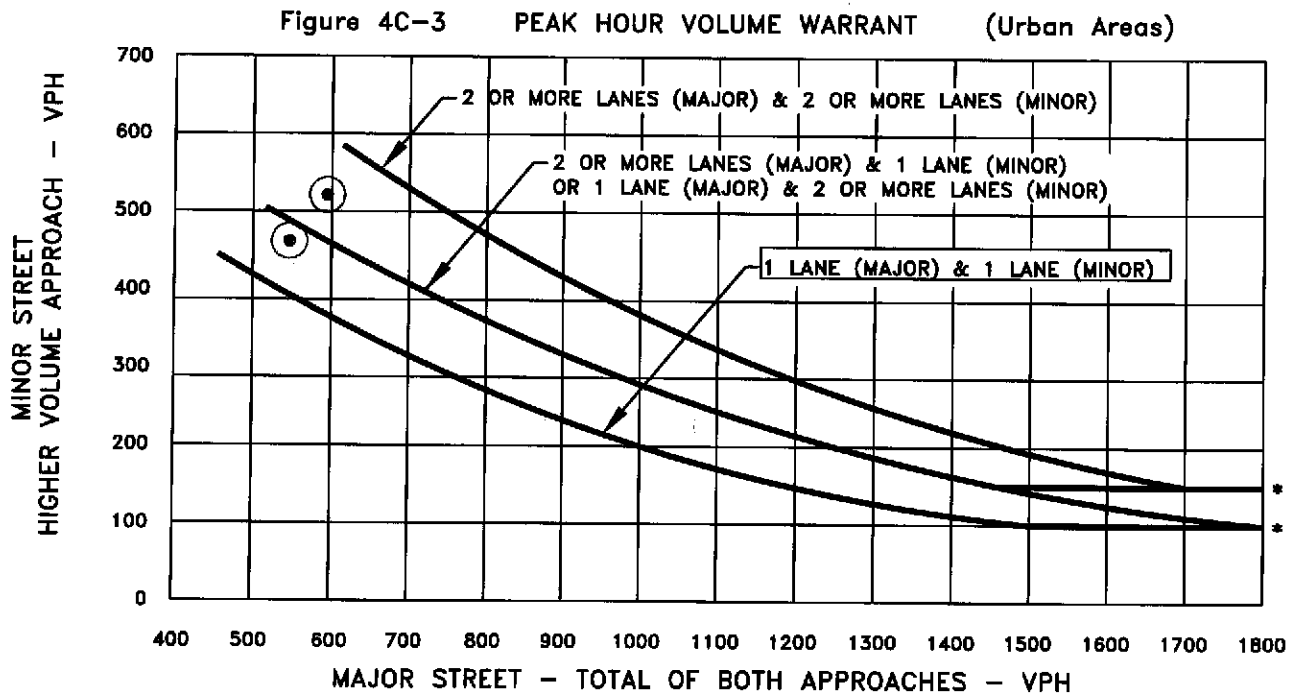
CONDITION: 2010 PROJECT ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		546	593	
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		462	522	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

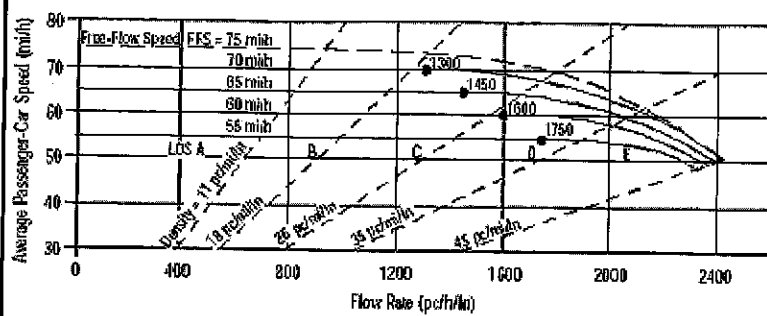
ATTACHMENT VI – C - 14

OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2618	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop. D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

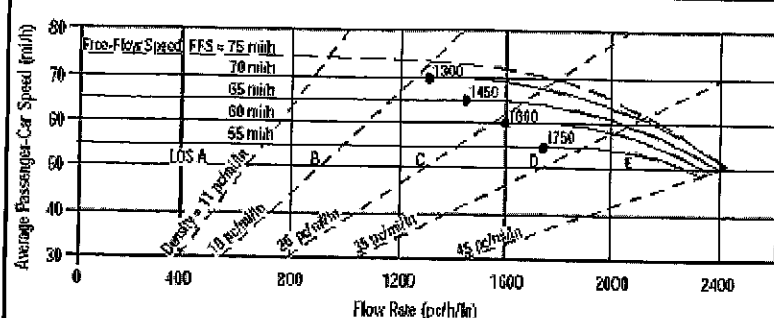
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 I/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1672 pc/h/ln	Design LOS	
S	69.0 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.2 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2699	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

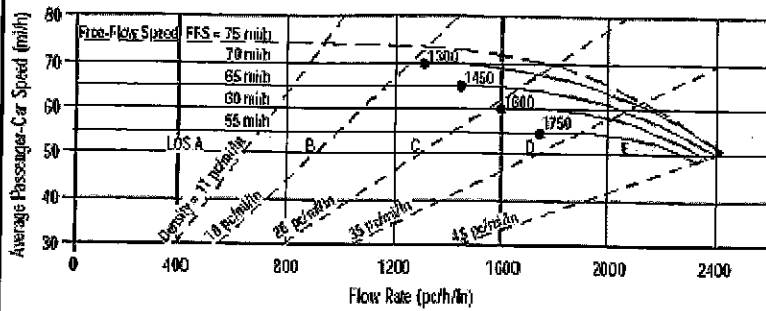
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1724 pc/h/ln	Design LOS	
S	68.6 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.1 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2185	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

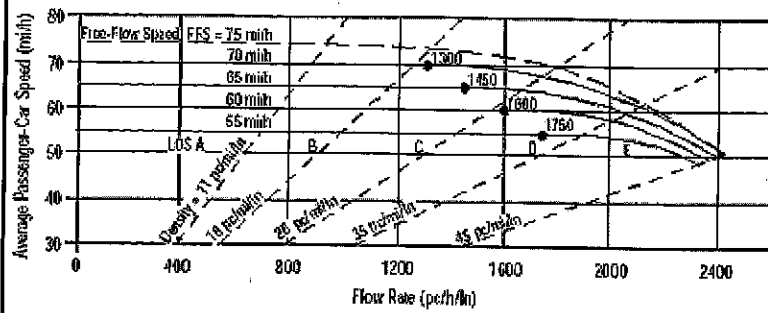
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1395 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.9 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	3231	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P_T	24
Peak-Hr Prop. of AAADT, K			%RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	mi

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h
Interchange Density	0.50	l/mi	f_{ID}	mi/h
Number of Lanes, N	2		f_N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

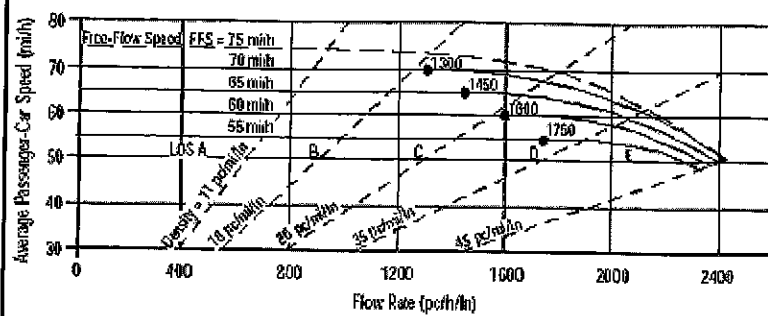
Operational (LOS)			Design (N)	
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	2063	pc/h/ln	Design LOS	
S	63.6	mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	32.5	pc/mi/ln	S	mi/h
LOS	D		$D = v_p / S$	pc/mi/ln
			Required Number of Lanes, N	

Glossary

Factor Location

N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2716	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AAADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}		mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}		mi/h
Interchange Density	0.50	l/mi	f _{ID}		mi/h
Number of Lanes, N	2		f _N		mi/h
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures

Design (N)

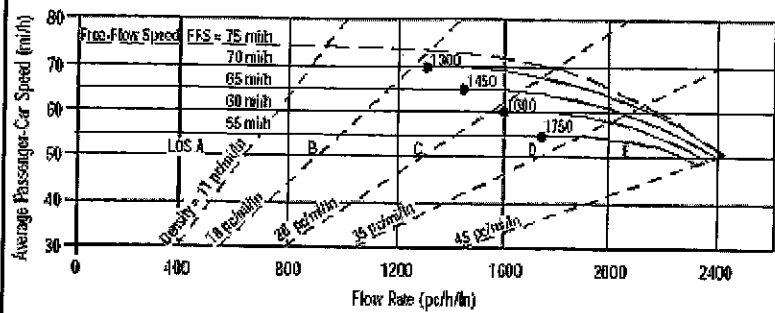
Operational (LOS)			Design (N)		
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1735	pc/h/ln	Design LOS		
S	68.5	mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)		pc/h
D = v _p / S	25.3	pc/mi/ln	S		mi/h
LOS	C		D = v _p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2856	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop. D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

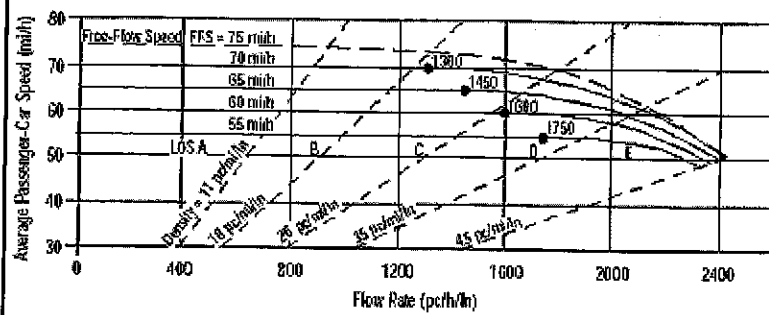
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1824 pc/h/ln	Design LOS	
S	67.6 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	27.0 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst: R Davis
 Agency or Company: TPG Consulting, Inc.
 Date Performed: 9/22/08
 Analysis Time Period: 2010 Project Alt C AM
 Project Description: 04-837.2 Northfork Casino Alt C

Site Information

Highway/Direction of Travel: SR 99 Southbound
 From/To: between Ave 18 1/2 & Ave 17
 Jurisdiction: Caltrans
 Analysis Year: 2010

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2295	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AAADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T + (E _T - 1) * P _R * (E _R - 1))	0.890

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	l/mi
Number of Lanes, N	2	
FFS (measured)	70.0	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	70.0	mi/h

LOS and Performance Measures

Operational (LOS)		
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1466	pc/h/ln
S	69.9	mi/h
D = v _p / S	21.0	pc/mi/ln
LOS	C	

Design (N)

Design (N)	
Design LOS	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	mi/h
D = v _p / S	pc/mi/ln
Required Number of Lanes, N	

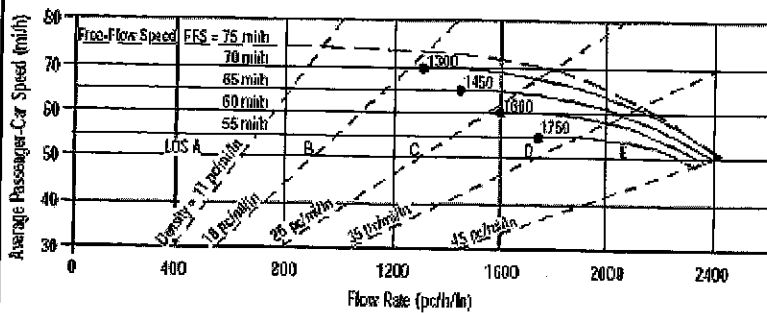
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3423	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

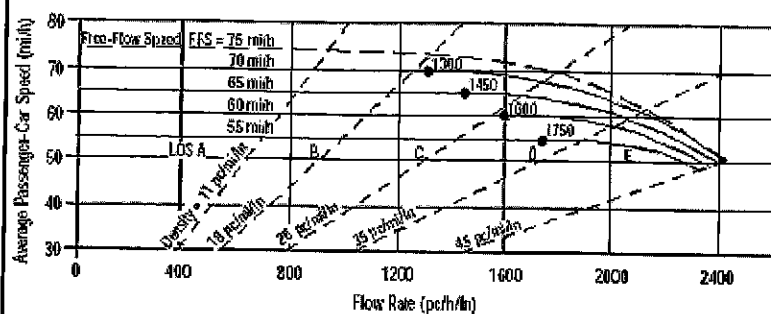
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T (E_T - 1) + P_R (E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	2	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	2186 pc/h/ln	Design LOS	
S	60.5 mi/h	$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	36.1 pc/mi/ln	S	mi/h
LOS	E	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	3177	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AAADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	2		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

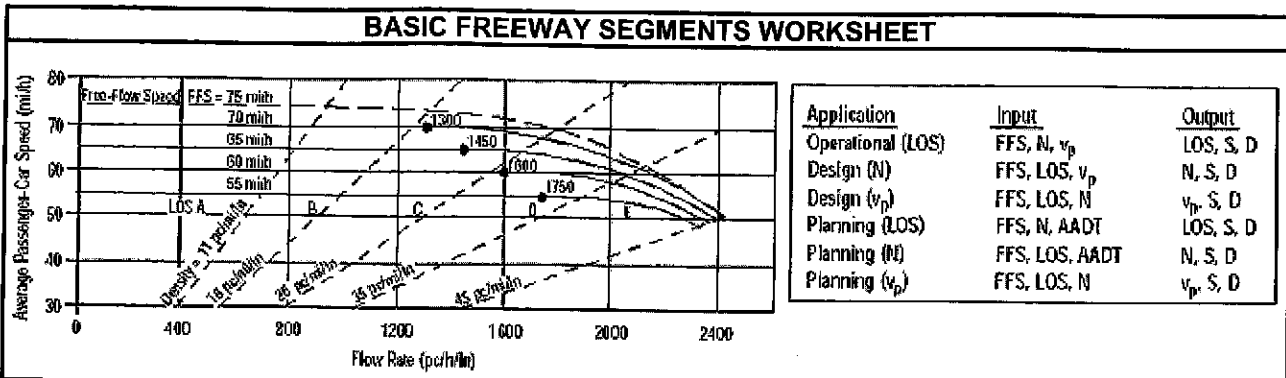
Design (N)

Operational (LOS)			Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	2029	pc/h/ln	Design LOS	
S	64.3	mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	31.6	pc/mi/ln	S	mi/h
LOS	D		D = v _p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs

Volume, V	3541	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P_T	24
Peak-Hr Prop. of AAADT, K			% RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	mi

Calculate Flow Adjustments

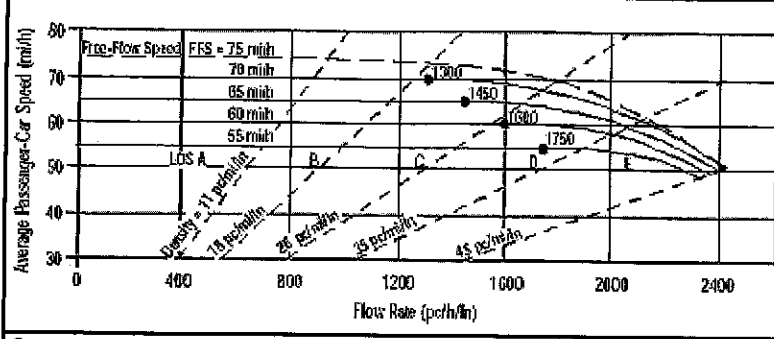
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T + (E_T - 1) * P_R * (E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 1/mi	f_{ID}	mi/h
Number of Lanes, N	2	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or } DDHV) / (PHF * N * f_{HV} * f_p)$	2261 pc/h/ln	Design LOS	
S	58.3 mi/h	$v_p = (V \text{ or } DDHV) / (PHF * N * f_{HV} * f_p)$	pc/h
$D = v_p / S$	38.8 pc/mi/ln	S	mi/h
LOS	E	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2670	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

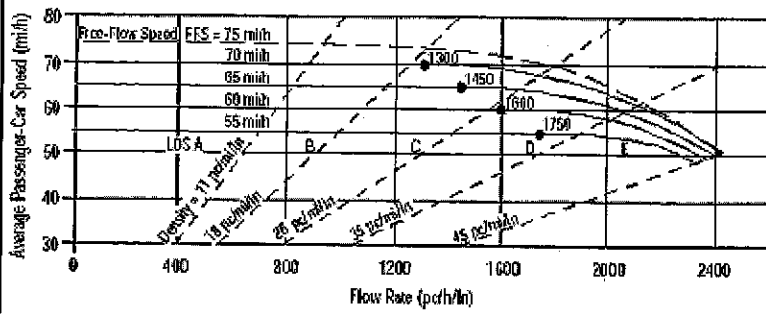
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T + (E _T - 1) * P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	2	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1705 pc/h/ln	Design LOS	
S	68.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.8 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2010 Project Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	4153	veh/h	Peak-Hour Factor, PHF	0.88
AAADT		veh/day	% Trucks and Buses, P_T	24
Peak-Hr Prop. of AAADT, K			% RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AAADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)}$	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h
Interchange Density	0.50	l/mi	f_{ID}	mi/h
Number of Lanes, N	2		f_N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

Operational (LOS)			Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	2652	pc/h/ln	Design LOS	
S		mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$		pc/mi/ln	S	mi/h
LOS	F		$D = v_p / S$	pc/mi/ln
			Required Number of Lanes, N	

Glossary

Factor Location

N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 15


















OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
2010 Project AM Alternative C

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	170	51	0	0	94	12	184	2	39	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	55	0	0	102	13	200	2	42	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115			55			534	540	55	577	534	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115			55			534	540	55	577	534	109
tC, single (s)	4.5			4.3			7.4	6.8	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.6			2.4			3.8	4.3	3.6	3.5	4.0	3.3
p0 queue free %	85			100			46	99	95	100	100	100
cM capacity (veh/h)	1259			1447			369	351	938	363	388	950
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	185	55	115	200	45							
Volume Left	185	0	0	200	0							
Volume Right	0	0	13	0	42							
cSH	1259	1700	1700	369	867							
Volume to Capacity	0.15	0.03	0.07	0.54	0.05							
Queue Length 95th (ft)	13	0	0	77	4							
Control Delay (s)	8.4	0.0	0.0	25.7	9.4							
Lane LOS	A			D	A							
Approach Delay (s)	6.4		0.0	22.7								
Approach LOS				C								
Intersection Summary												
Average Delay			11.8									
Intersection Capacity Utilization		32.9%		ICU Level of Service				A				
Analysis Period (min)			15									











3: Ave 18.5 & Road 23
2010 Project AM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↗		↖		↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	314	64	16	211	0	81	0	89	12	54	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	341	70	17	229	0	88	0	97	13	59	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	229			411			750	640	376	737	675	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229			411			750	640	376	737	675	229
tC, single (s)	4.4			4.3			7.4	6.8	6.5	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.5			2.4			3.7	4.2	3.5	3.8	4.3	3.6
p0 queue free %	100			98			61	100	84	95	82	89
cM capacity (veh/h)	1171			1044			226	356	618	246	330	732
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	411	247	88	97	152							
Volume Left	0	17	88	0	13							
Volume Right	70	0	0	97	80							
cSH	1700	1044	226	618	447							
Volume to Capacity	0.24	0.02	0.39	0.16	0.34							
Queue Length 95th (ft)	0	1	43	14	37							
Control Delay (s)	0.0	0.8	30.7	11.9	17.2							
Lane LOS		A	D	B	C							
Approach Delay (s)	0.0	0.8	20.8		17.2							
Approach LOS			C		C							
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization		46.8%		ICU Level of Service					A			
Analysis Period (min)			15									







4: Ave 18.5 & Pistacchio
 2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	276	211	140	94	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	300	229	152	102	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	382				532	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				532	229
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				78	99
cM capacity (veh/h)	1026				460	741
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	301	229	152	107		
Volume Left	1	0	0	102		
Volume Right	0	0	152	4		
cSH	1026	1700	1700	467		
Volume to Capacity	0.00	0.13	0.09	0.23		
Queue Length 95th (ft)	0	0	0	22		
Control Delay (s)	0.0	0.0	0.0	15.0		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		29.9%		ICU Level of Service	A	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	80	83	126	152	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	87	90	137	165	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	227				184	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227				184	90
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				75	99
cM capacity (veh/h)	1335				673	811
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	90	90	137	170		
Volume Left	3	0	0	165		
Volume Right	0	0	137	4		
cSH	1335	1700	1700	676		
Volume to Capacity	0.00	0.05	0.08	0.25		
Queue Length 95th (ft)	0	0	0	25		
Control Delay (s)	0.3	0.0	0.0	12.1		
Lane LOS	A			B		
Approach Delay (s)	0.3	0.0		12.1		
Approach LOS				B		
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization		22.0%		ICU Level of Service	A	
Analysis Period (min)		15				

6: Ave 18 & Road 23
 2010 Project AM Alternative C







10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	39	1	129	0	26	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	42	1	140	0	28	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357	313	114	322	313	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357	313	114	322	313	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	95	100			98		
cM capacity (veh/h)	546	577	920	589	571	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	49	141	142								
Volume Left	0	4	1	28								
Volume Right	3	42	0	0								
cSH	632	824	1323	1283								
Volume to Capacity	0.02	0.06	0.00	0.02								
Queue Length 95th (ft)	2	5	0	2								
Control Delay (s)	10.8	9.6	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.8	9.6	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization		30.1%			ICU Level of Service					A		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2010 Project AM Alternative C























10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	60	382	0	0	774	90	352	1	233	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	415	0	0	841	98	383	1	253	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	939			415			1387	1485	415	1641	1387	841
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	939			415			1387	1485	415	1641	1387	841
tC, single (s)	4.3			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.1	3.4	3.5	4.0	3.3
pD queue free %	90			100			0	99	60	100	100	100
cM capacity (veh/h)	668			1128			109	110	629	44	130	368
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	65	415	841	98	384	253						
Volume Left	65	0	0	0	383	0						
Volume Right	0	0	0	98	0	253						
cSH	668	1700	1700	1700	109	629						
Volume to Capacity	0.10	0.24	0.49	0.06	3.52	0.40						
Queue Length 95th (ft)	8	0	0	0	Err	49						
Control Delay (s)	11.0	0.0	0.0	0.0	Err	14.5						
Lane LOS	B				F	B						
Approach Delay (s)	1.5		0.0		6029.1							
Approach LOS					F							
Intersection Summary												
Average Delay		1867.7										
Intersection Capacity Utilization		73.6%			ICU Level of Service					D		
Analysis Period (min)		15										

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	745	673	0	56	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	810	732	0	61	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	732				1541	732
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	732				1541	732
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.5
p0 queue free %	100				47	78
cM capacity (veh/h)	812				114	390
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	810	732	61	85		
Volume Left	0	0	61	0		
Volume Right	0	0	0	85		
cSH	1700	1700	114	390		
Volume to Capacity	0.48	0.43	0.53	0.22		
Queue Length 95th (ft)	0	0	62	20		
Control Delay (s)	0.0	0.0	68.1	16.8		
Lane LOS			F	C		
Approach Delay (s)	0.0	0.0	38.2			
Approach LOS			E			
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization		49.2%		ICU Level of Service		A
Analysis Period (min)			15			













10: Ave 17 & GS Blvd
2010 Project AM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	470	14	137	460	154	108	41	89	186	25	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	511	15	149	500	167	117	45	97	202	27	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	667			526			1414	1546	511	1581	1477	584
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	667			526			1414	1546	511	1581	1477	584
tC, single (s)	4.2			4.2			7.4	6.8	6.5	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.5	3.6	4.1	3.4
p0 queue free %	96			85			0	46	81	0	72	96
cM capacity (veh/h)	886			997			67	83	518	34	98	495
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	35	511	15	149	667	117	45	97	251			
Volume Left	35	0	0	149	0	117	0	0	202			
Volume Right	0	0	15	0	167	0	0	97	22			
cSH	886	1700	1700	997	1700	67	83	518	40			
Volume to Capacity	0.04	0.30	0.01	0.15	0.39	1.76	0.54	0.19	6.22			
Queue Length 95th (ft)	3	0	0	13	0	263	59	17	Err			
Control Delay (s)	9.2	0.0	0.0	9.2	0.0	500.5	90.7	13.5	Err			
Lane LOS	A			A		F	F	B	F			
Approach Delay (s)	0.6			1.7		247.8			Err			
Approach LOS						F			F			
Intersection Summary												
Average Delay			1365.4									
Intersection Capacity Utilization			66.4%		ICU Level of Service				C			
Analysis Period (min)			15									

11: Ave 17 & Road 23
2010 Project AM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	125	28	44	112	3	16	134	38	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	136	30	48	122	3	17	146	41	10	104	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	389	346	104	423	325	166	104			187		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389	346	104	423	325	166	104			187		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.3			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.4			2.4		
p0 queue free %	100	76	97	88	79	100	99			99		
cM capacity (veh/h)	466	564	948	411	570	860	1382			1260		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	166	173	204	114								
Volume Left	0	48	17	10								
Volume Right	30	3	41	0								
cSH	609	518	1382	1260								
Volume to Capacity	0.27	0.33	0.01	0.01								
Queue Length 95th (ft)	28	36	1	1								
Control Delay (s)	13.1	15.4	0.7	0.7								
Lane LOS	B	C	A	A								
Approach Delay (s)	13.1	15.4	0.7	0.7								
Approach LOS	B	C										
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			40.2%		ICU Level of Service					A		
Analysis Period (min)			15									

12: Ellis & Road 26

2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.985			0.991	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3387	0	1752	3473	0
Flt Permitted		0.728			0.730		0.950			0.950		
Satd. Flow (perm)	0	1356	1583	0	1360	1583	1719	3387	0	1752	3473	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			7			103		17			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	38	0	6	41	0	95	6	362	40	55	491	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	41	0	7	45	0	103	7	393	43	60	534	34
Lane Group Flow (vph)	0	41	7	0	45	103	7	436	0	60	568	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.4	10.4		10.4	10.4	8.1	32.7		9.7	36.6	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.61		0.16	0.68	
v/c Ratio		0.17	0.02		0.18	0.28	0.03	0.21		0.21	0.24	
Control Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		14.1			8.9			8.0			6.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		4	0		4	0	1	15		6	22	
Queue Length 95th (ft)		29	8		31	29	10	76		38	91	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		521	613		523	672	360	2331		391	2518	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.01		0.09	0.15	0.02	0.19		0.15	0.23	










Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 36.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A







Splits and Phases: 12: Ellis & Road 26



						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)			15			

14: Gateway & Ave 16 Connector
 2010 Project AM Alternative C

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↓		↑	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			21.9%	ICU Level of Service		A
Analysis Period (min)			15			

15: Kennedy & AVE 16 Connector
 2010 Project AM Alternative C

10/22/2008

	↖	→	←	↗	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑			↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
2010 Project AM Alternative C

10/22/2008

	↗	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↗	↑	↑	↖	↘	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frnt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				1		239
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	285	165	1	49	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	310	179	1	53	239
Lane Group Flow (vph)	130	310	179	1	53	239
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.5	10.7	10.7	13.7	13.7
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.38	0.38
v/c Ratio	0.34	0.35	0.36	0.00	0.08	0.33
Control Delay	17.0	5.7	14.3	10.0	14.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	5.7	14.3	10.0	14.5	4.5
LOS	B	A	B	A	B	A
Approach Delay		9.0	14.3		6.3	

16: Kennedy & SR 99 SB off-ramp
 2010 Project AM Alternative C

10/22/2008

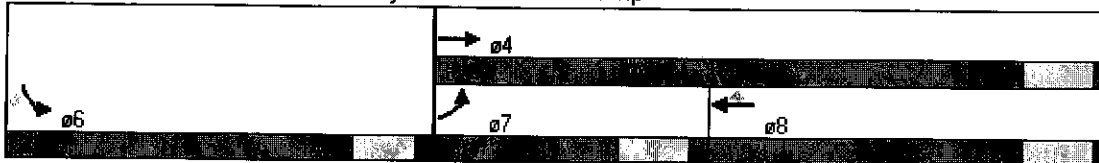
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	30	0	9	0
Queue Length 95th (ft)	71	68	82	3	34	43
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	456	1177	710	604	887	909
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.25	0.00	0.06	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.2
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 29.0%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.939			0.949				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3323	0	1770	3359	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3323	0	1770	3359	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			22				3		207	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	50	34	147	40	20	20	41	3	47	79	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	54	37	160	43	22	22	45	3	51	86	228
Lane Group Flow (vph)	4	91	0	160	65	0	22	45	3	51	314	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.5	7.1		8.7	15.9		4.5	17.1	17.1	16.6	34.6	
Actuated g/C Ratio	0.06	0.11		0.14	0.25		0.07	0.27	0.27	0.26	0.55	
v/c Ratio	0.04	0.23		0.66	0.08		0.19	0.09	0.01	0.11	0.33	
Control Delay	31.5	19.2		42.4	14.2		34.2	19.6	13.7	20.2	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	19.2		42.4	14.2		34.2	19.6	13.7	20.2	5.3	
LOS	C	B		D	B		C	B	B	C	A	
Approach Delay		19.7			34.2			23.9		7.3		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
 2010 Project AM Alternative C

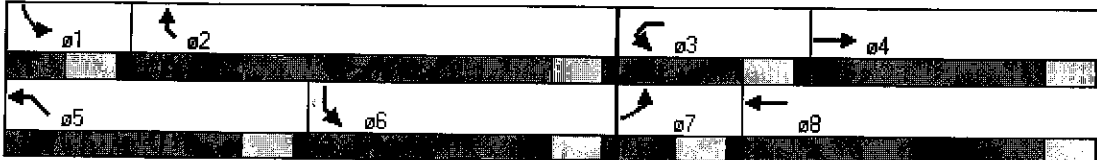
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	10		62	6		9	14	0	16	18	
Queue Length 95th (ft)	10	30		#143	22		29	37	6	41	73	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	114	763		252	1052		117	479	431	465	958	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.12		0.63	0.06		0.19	0.09	0.01	0.11	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 63.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 18.5
 Intersection Capacity Utilization 34.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						137			174			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	82	533	0	0	673	126	350	0	160	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	89	579	0	0	732	137	380	0	174	0	0	0
Lane Group Flow (vph)	89	579	0	0	732	137	190	190	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.8	48.5			36.8	36.8	28.5	28.5	28.5			
Actuated g/C Ratio	0.12	0.57			0.43	0.43	0.34	0.34	0.34			
v/c Ratio	0.45	0.29			0.49	0.18	0.35	0.35	0.28			
Control Delay	31.4	6.0			19.8	4.0	23.6	23.6	4.7			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	31.4	6.0			19.8	4.0	23.6	23.6	4.7			
LOS	C	A			B	A	C	C	A			
Approach Delay		9.4			17.3			17.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project AM Alternative C

10/22/2008

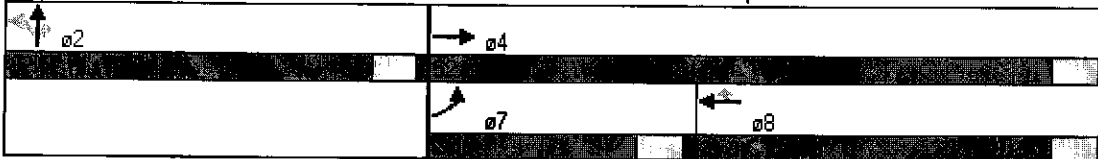
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	46	102			150	0	80	80	0			
Queue Length 95th (ft)	m37	0			214	34	137	137	42			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	339	1981			1505	751	543	543	627			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.26	0.29			0.49	0.18	0.35	0.35	0.28			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 14.9
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			393									111
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	503	362	278	745	0	0	0	0	112	0	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	547	393	302	810	0	0	0	0	122	0	111
Lane Group Flow (vph)	0	547	393	302	810	0	0	0	0	0	122	111
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	28.2	28.2	32.3	60.5	0.0	0.0	0.0	0.0	24.5	24.5	24.5
Total Split (%)	0.0%	33.2%	33.2%	38.0%	71.2%	0.0%	0.0%	0.0%	0.0%	28.8%	28.8%	28.8%
Maximum Green (s)		23.6	23.6	27.7	55.9					20.0	20.0	20.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		41.2	41.2	19.9	65.0						12.0	12.0
Actuated g/C Ratio		0.48	0.48	0.23	0.76						0.14	0.14
v/c Ratio		0.33	0.42	0.75	0.31						0.54	0.37
Control Delay		16.2	3.7	36.3	9.0						42.2	10.2
Queue Delay		0.0	0.0	0.0	0.4						0.0	0.0
Total Delay		16.2	3.7	36.3	9.3						42.2	10.2
LOS		B	A	D	A						D	B
Approach Delay		11.0			16.7						27.0	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						C	
Queue Length 50th (ft)		92	0	160	145						62	0
Queue Length 95th (ft)		163	58	196	203						108	42
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1634	933	572	2630						385	429
Starvation Cap Reductn		0	0	0	1153						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.33	0.42	0.53	0.55						0.32	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 60.4 (71%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.4
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2010 Project AM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	1	22	0	167	29	18	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	1	24	0	182	32	20	136	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	388	136	372	372	197	136			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	388	136	372	372	197	136			213		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	540	538	913	578	549	844	1350			1262		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	61	213	155								
Volume Left	0	36	0	20								
Volume Right	0	24	32	0								
cSH	1700	659	1350	1262								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	8	0	1								
Control Delay (s)	0.0	11.0	0.0	1.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.0	0.0	1.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			31.5%		ICU Level of Service					A		
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2010 Project AM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.976							0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3293	0	0	0	0	1752	1568	0
Flt Permitted	0.389									0.950		
Satd. Flow (perm)	1315	3312	0	0	3293	0	0	0	0	1752	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					48						458	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	394	351	0	0	474	90	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	428	382	0	0	515	98	0	0	0	158	0	78
Lane Group Flow (vph)	428	382	0	0	613	0	0	0	0	158	78	0
Turn Type	Perm					Perm						
Protected Phases		2			6							8
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	46.5	46.5	0.0	0.0	46.5	0.0	0.0	0.0	0.0	28.5	28.5	0.0
Total Split (%)	62.0%	62.0%	0.0%	0.0%	62.0%	0.0%	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%
Maximum Green (s)	41.9	41.9			41.9					24.0	24.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	58.1	58.1			58.1					11.9	11.9	
Actuated g/C Ratio	0.77	0.77			0.77					0.16	0.16	
v/c Ratio	0.42	0.15			0.24					0.57	0.12	
Control Delay	2.7	0.4			3.4					36.7	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	2.7	0.4			3.4					36.7	0.4	
LOS	A	A			A					D	A	
Approach Delay		1.6			3.4						24.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 Project AM Alternative C

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	9	0			34					69	0	
Queue Length 95th (ft)	m22	m4			66					117	0	
Internal Link Dist (ft)		411			1218			1299				1757
Turn Bay Length (ft)												
Base Capacity (vph)	1019	2567			2564					572	821	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.42	0.15			0.24					0.28	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 5.6

Intersection LOS: A

Intersection Capacity Utilization 45.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps















22: AVE 14/Olive & SR 145/Madera
2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.994				0.850
Flt Protected		0.965					0.950				0.991	
Satd. Flow (prot)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Flt Permitted		0.965					0.950				0.991	
Satd. Flow (perm)	0	1746	1538	0	0	0	3213	3292	0	0	3440	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			358					5				212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	203	78	329	0	0	0	93	546	21	50	229	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	221	85	358	0	0	0	101	593	23	54	249	212
Lane Group Flow (vph)	0	306	358	0	0	0	101	616	0	0	303	212
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		16.6	16.6				24.8	24.8			21.6	21.6
Actuated g/C Ratio		0.22	0.22				0.33	0.33			0.29	0.29
v/c Ratio		0.79	0.58				0.09	0.56			0.31	0.35
Control Delay		35.9	8.0				19.4	23.9			24.3	8.3
Queue Delay		6.1	0.6				0.0	0.0			0.0	0.0
Total Delay		42.0	8.6				19.4	23.9			24.3	8.3
LOS		D	A				B	C			C	A
Approach Delay		24.0						23.3			17.7	

22: AVe 14/Olive & SR 145/Madera
 2010 Project AM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			B	
Queue Length 50th (ft)		126	12				16	120			63	1
Queue Length 95th (ft)		m0	m35				36	191			98	63
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		501	696				1064	1093			991	598
Starvation Cap Reductn		142	111				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		0.85	0.61				0.09	0.56			0.31	0.35

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 22.0
 Intersection Capacity Utilization 48.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
2010 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	331	287	0	279	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	360	312	0	303	187
Lane Group Flow (vph)	0	360	312	0	303	187
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.0	49.0		18.0	18.0
Actuated g/C Ratio		0.65	0.65		0.24	0.24
v/c Ratio		0.16	0.14		0.76	0.37
Control Delay		6.1	4.2		38.1	5.6
Queue Delay		0.0	0.3		0.1	0.0
Total Delay		6.1	4.5		38.1	5.6
LOS		A	A		D	A
Approach Delay		6.1	4.5		25.7	

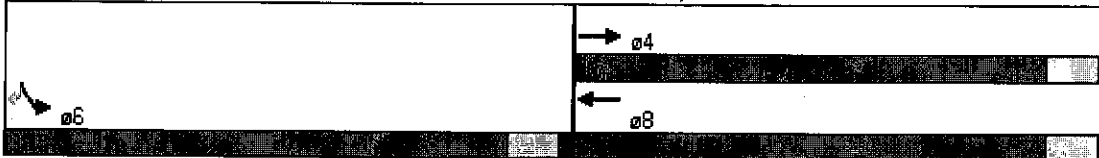
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		28	12		132	0
Queue Length 95th (ft)		61	38		187	40
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2290	2290		769	789
Starvation Cap Reductn		0	1399		0	0
Spillback Cap Reductn		0	0		44	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.16	0.35		0.42	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 31.3%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A












Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2010 Project AM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇄			⇄			⇄			⇄	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	16	68	6	14	67	54	8	75	8	49	82	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	7	15	73	59	9	82	9	53	89	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	147	99	172								
Volume Left (vph)	17	15	9	53								
Volume Right (vph)	7	59	9	29								
Hadj (s)	0.13	0.02	0.30	0.25								
Departure Headway (s)	4.9	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.14	0.23								
Capacity (veh/h)	678	708	669	693								
Control Delay (s)	8.7	8.9	8.9	9.4								
Approach Delay (s)	8.7	8.9	8.9	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
HCM Level of Service			A									
Intersection Capacity Utilization		30.9%			ICU Level of Service				A			
Analysis Period (min)			15									

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	387	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	421	82	125	239	155	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	510	125			364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	125			364	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	6	91			87	
cM capacity (veh/h)	449	915			1189	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	421	82	125	239	229	
Volume Left	421	0	0	0	155	
Volume Right	0	82	0	239	0	
cSH	449	915	1700	1700	1189	
Volume to Capacity	0.94	0.09	0.07	0.14	0.13	
Queue Length 95th (ft)	273	7	0	0	11	
Control Delay (s)	58.7	9.3	0.0	0.0	6.1	
Lane LOS	F	A			A	
Approach Delay (s)	50.7		0.0		6.1	
Approach LOS	F					
Intersection Summary						
Average Delay			24.5			
Intersection Capacity Utilization			46.3%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.952			0.871				0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1518	0	1687	1776	1509
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1518	0	1687	1776	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			17		21			18				62
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	180	234	16	14	320	152	16	3	17	387	11	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	196	254	17	15	348	165	17	3	18	421	12	62
Lane Group Flow (vph)	196	254	17	15	513	0	17	21	0	421	12	62
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	54.7	54.7	9.7	44.4	0.0	9.7	20.6	0.0	35.0	45.9	45.9
Total Split (%)	16.7%	45.6%	45.6%	8.1%	37.0%	0.0%	8.1%	17.2%	0.0%	29.2%	38.3%	38.3%
Maximum Green (s)	15.4	50.1	50.1	5.1	39.8		5.2	16.1		30.5	41.4	41.4
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	16.0	56.5	56.5	5.7	40.4		5.7	16.6		31.0	47.7	47.7
Actuated g/C Ratio	0.13	0.47	0.47	0.05	0.34		0.05	0.14		0.26	0.40	0.40
v/c Ratio	0.91	0.32	0.02	0.19	0.92		0.22	0.09		0.97	0.02	0.10
Control Delay	93.9	22.2	8.7	64.1	42.6		61.7	21.9		79.9	24.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	93.9	22.2	8.7	64.1	42.6		61.7	21.9		79.9	24.7	6.9
LOS	F	C	A	E	D		E	C		E	C	A
Approach Delay		51.8			43.3			39.7			69.4	

26: Ave 12 & GS Blvd
 2010 Project AM Alternative C

10/22/2008

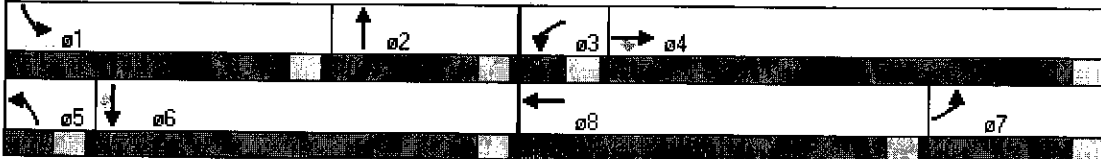
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			D			E	
Queue Length 50th (ft)	152	111	0	12	238		13	2		323	5	0
Queue Length 95th (ft)	#294	200	14	m17	#561		38	26		#527	20	30
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	215	799	688	77	558		79	226		436	706	637
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.91	0.32	0.02	0.19	0.92		0.22	0.09		0.97	0.02	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 82 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 54.3
 Intersection Capacity Utilization 74.2%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.923				0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1656	1743	0	0	1654	0	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	1743	0	0	1654	0	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					96				129			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	81	557	0	0	292	387	194	0	119	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	88	605	0	0	317	421	211	0	129	0	0	0
Lane Group Flow (vph)	88	605	0	0	738	0	0	211	129	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	17.0	91.0	0.0	0.0	74.0	0.0	29.0	29.0	29.0	0.0	0.0	0.0
Total Split (%)	14.2%	75.8%	0.0%	0.0%	61.7%	0.0%	24.2%	24.2%	24.2%	0.0%	0.0%	0.0%
Maximum Green (s)	12.4	86.4			69.4		24.4	24.4	24.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	11.4	91.5			78.5			20.5	20.5			
Actuated g/C Ratio	0.10	0.76			0.65			0.17	0.17			
v/c Ratio	0.56	0.45			0.66			0.78	0.37			
Control Delay	57.1	2.3			16.4			66.2	9.9			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	57.1	2.3			16.4			66.2	9.9			
LOS	E	A			B			E	A			
Approach Delay		9.3			16.4			44.9				

27: Ave 12 & SR 99 NB Ramps
 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	70	117			309			157	0			
Queue Length 95th (ft)	m80	m2			511			236	52			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	180	1330			1115			333	400			
Starvation Cap Reductn	0	0			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.49	0.45			0.66			0.63	0.32			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 19.1
 Intersection Capacity Utilization 64.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.


















Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2010 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	154	66	0	0	106	7	239	0	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	167	72	0	0	115	8	260	0	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			72			526	529	72	581	526	119
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			72			526	529	72	581	526	119
tC, single (s)	4.3			4.2			7.3	6.7	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.7	4.2	3.5	3.5	4.0	3.3
p0 queue free %	88			100			34	100	94	100	100	100
cM capacity (veh/h)	1344			1456			394	377	943	364	403	938
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	167	72	123	260	55							
Volume Left	167	0	0	260	0							
Volume Right	0	0	8	0	55							
cSH	1344	1700	1700	394	943							
Volume to Capacity	0.12	0.04	0.07	0.66	0.06							
Queue Length 95th (ft)	11	0	0	114	5							
Control Delay (s)	8.1	0.0	0.0	30.1	9.1							
Lane LOS	A			D	A							
Approach Delay (s)	5.6		0.0	26.4								
Approach LOS				D								
Intersection Summary												
Average Delay			14.3									
Intersection Capacity Utilization		35.1%		ICU Level of Service					A			
Analysis Period (min)			15									











3: Ave 18.5 & Road 23
2010 Project PM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	435	101	32	252	0	77	0	65	23	75	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	473	110	35	274	0	84	0	71	25	82	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	274			583			1030	871	528	942	926	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			583			1030	871	528	942	926	274
tC, single (s)	4.3			4.3			7.3	6.7	6.4	7.5	6.9	6.6
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.9	4.4	3.7
p0 queue free %	100			96			25	100	86	86	64	83
cM capacity (veh/h)	1192			913			111	257	512	174	224	682
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	583	309	84	71	225							
Volume Left	0	35	84	0	25							
Volume Right	110	0	0	71	118							
cSH	1700	913	111	512	330							
Volume to Capacity	0.34	0.04	0.75	0.14	0.68							
Queue Length 95th (ft)	0	3	103	12	118							
Control Delay (s)	0.0	1.4	99.9	13.2	36.3							
Lane LOS		A	F	B	E							
Approach Delay (s)	0.0	1.4	60.2		36.3							
Approach LOS			F		E							
Intersection Summary												
Average Delay			14.1									
Intersection Capacity Utilization			66.3%		ICU Level of Service				C			
Analysis Period (min)			15									

4: Ave 18.5 & Pistacchio
 2010 Project PM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	376	210	228	156	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	409	228	248	170	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	476				661	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476				661	228
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				58	99
cM capacity (veh/h)	998				403	780
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	421	228	248	176		
Volume Left	12	0	0	170		
Volume Right	0	0	248	7		
cSH	998	1700	1700	410		
Volume to Capacity	0.01	0.13	0.15	0.43		
Queue Length 95th (ft)	1	0	0	53		
Control Delay (s)	0.4	0.0	0.0	20.2		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		20.2		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			44.3%		ICU Level of Service	A
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
 2010 Project PM Alternative C

10/22/2008

	↖	→	←	↗	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	117	91	138	190	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	127	99	150	207	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	249				228	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	249				228	99
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				69	100
cM capacity (veh/h)	1317				663	838
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	128	99	150	210		
Volume Left	1	0	0	207		
Volume Right	0	0	150	3		
cSH	1317	1700	1700	665		
Volume to Capacity	0.00	0.06	0.09	0.32		
Queue Length 95th (ft)	0	0	0	34		
Control Delay (s)	0.1	0.0	0.0	12.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		24.3%		ICU Level of Service	A	
Analysis Period (min)			15			



















6: Ave 18 & Road 23
 2010 Project PM Alternative C







10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	54	4	67	114	33	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	59	4	73	124	36	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	451	446	168	399	385	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451	446	168	399	385	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	94	100			97		
cM capacity (veh/h)	449	479	853	524	527	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	75	201	205								
Volume Left	1	0	4	36								
Volume Right	7	59	124	2								
cSH	539	784	1316	1296								
Volume to Capacity	0.05	0.10	0.00	0.03								
Queue Length 95th (ft)	4	8	0	2								
Control Delay (s)	12.0	10.1	0.2	1.6								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.0	10.1	0.2	1.6								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			34.9%		ICU Level of Service				A			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2010 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	72	852	0	0	1087	191	428	2	720	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	926	0	0	1182	208	465	2	783	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1389			926			2264	2472	926	3048	2264	1182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1389			926			2264	2472	926	3048	2264	1182
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	84			100			0	91	0	0	100	100
cM capacity (veh/h)	483			738			25	25	323	0	35	233
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	78	926	1182	208	467	783						
Volume Left	78	0	0	0	465	0						
Volume Right	0	0	0	208	0	783						
cSH	483	1700	1700	1700	25	323						
Volume to Capacity	0.16	0.54	0.70	0.12	18.75	2.42						
Queue Length 95th (ft)	14	0	0	0	Err	1555						
Control Delay (s)	13.9	0.0	0.0	0.0	Err	675.3						
Lane LOS	B				F	F						
Approach Delay (s)	1.1		0.0		4161.6							
Approach LOS					F							
Intersection Summary												
Average Delay			1428.0									
Intersection Capacity Utilization			96.1%		ICU Level of Service				F			
Analysis Period (min)			15									

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1257	1020	0	211	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1366	1109	0	229	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1109				2475	1109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1109				2475	1109
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	100				0	60
cM capacity (veh/h)	622				32	249
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	1366	1109	229	99		
Volume Left	0	0	229	0		
Volume Right	0	0	0	99		
cSH	1700	1700	32	249		
Volume to Capacity	0.80	0.65	7.24	0.40		
Queue Length 95th (ft)	0	0	Err	45		
Control Delay (s)	0.0	0.0	Err	28.6		
Lane LOS			F	D		
Approach Delay (s)	0.0	0.0	6994.7			
Approach LOS			F			
Intersection Summary						
Average Delay			819.1			
Intersection Capacity Utilization			84.5%		ICU Level of Service	E
Analysis Period (min)			15			

10: Ave 17 & GS Blvd
2010 Project PM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	42	675	83	162	639	308	128	84	237	345	49	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	734	90	176	695	335	139	91	258	375	53	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1029			824			1931	2207	734	2342	2129	862
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1029			824			1931	2207	734	2342	2129	862
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	93			78			0	0	38	0	0	90
cM capacity (veh/h)	667			793			0	32	419	0	34	339
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	46	734	90	176	1029	139	91	258	461			
Volume Left	46	0	0	176	0	139	0	0	375			
Volume Right	0	0	90	0	335	0	0	258	33			
cSH	667	1700	1700	793	1700	0	32	419	0			
Volume to Capacity	0.07	0.43	0.05	0.22	0.61	Err	2.86	0.62	Err			
Queue Length 95th (ft)	5	0	0	21	0	Err	266	100	Err			
Control Delay (s)	10.8	0.0	0.0	10.8	0.0	Err	1102.1	26.4	Err			
Lane LOS	B			B		F	F	D	F			
Approach Delay (s)	0.6			1.6		Err			Err			
Approach LOS						F			F			
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			95.9%		ICU Level of Service				F			
Analysis Period (min)			15									

11: Ave 17 & Road 23
 2010 Project PM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	187	47	62	180	8	53	114	82	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	203	51	67	196	9	58	124	89	12	147	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	566	504	152	612	464	168	157			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	566	504	152	612	464	168	157			213		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	54	94	71	58	99	96			99		
cM capacity (veh/h)	278	446	895	233	463	863	1359			1289		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	254	272	271	168								
Volume Left	0	67	58	12								
Volume Right	51	9	89	10								
cSH	496	376	1359	1289								
Volume to Capacity	0.51	0.72	0.04	0.01								
Queue Length 95th (ft)	72	137	3	1								
Control Delay (s)	19.6	35.8	1.9	0.6								
Lane LOS	C	E	A	A								
Approach Delay (s)	19.6	35.8	1.9	0.6								
Approach LOS	C	E										
Intersection Summary												
Average Delay			15.9									
Intersection Capacity Utilization			61.6%		ICU Level of Service					B		
Analysis Period (min)			15									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.988			0.981	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3497	0	1770	3472	0
Flt Permitted		0.702			0.727		0.950			0.950		
Satd. Flow (perm)	0	1308	1583	0	1354	1583	1770	3497	0	1770	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			15			246		14			24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	103	1	14	57	4	226	11	770	67	193	766	113
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	1	15	62	4	246	12	837	73	210	833	123
Lane Group Flow (vph)	0	113	15	0	66	246	12	910	0	210	956	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effect Green (s)		10.8	10.8		10.8	10.8	7.0	26.1		10.7	35.7	
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.11	0.50		0.20	0.68	
v/c Ratio		0.44	0.05		0.25	0.48	0.06	0.52		0.61	0.40	
Control Delay		25.3	9.9		21.2	6.7	26.7	15.1		29.4	7.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.3	9.9		21.2	6.7	26.7	15.1		29.4	7.5	
LOS		C	A		C	A	C	B		C	A	
Approach Delay		23.5			9.8			15.3			11.4	
Approach LOS		C			A			B			B	

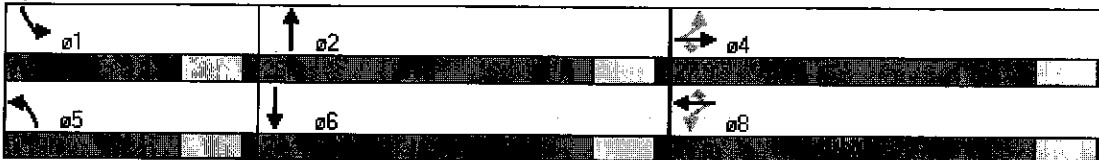
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		34	0		19	0	4	127		65	61	
Queue Length 95th (ft)		74	12		47	47	17	213		#148	199	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		464	571		480	720	324	1781		379	2361	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.24	0.03		0.14	0.34	0.04	0.51		0.55	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 52.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 56.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.










Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
2010 Project PM Alternative C

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	227	3	0	174	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	247	3	0	189	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	274		478	232		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274		478	232		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1283		546	808		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	247	3	274			
Volume Left	0	3	0			
Volume Right	0	0	85			
cSH	1700	546	1700			
Volume to Capacity	0.15	0.01	0.16			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.6	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.6	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		24.4%		ICU Level of Service		A
Analysis Period (min)			15			










14: Gateway & AVE 16 Connector
 2010 Project PM Alternative C

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↔		↑	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	78	3	108	299	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	3	117	325	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121				147	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				147	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				62	100
cM capacity (veh/h)	1461				846	1003
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	85	121	325			
Volume Left	0	0	325			
Volume Right	0	117	0			
cSH	1700	1700	846			
Volume to Capacity	0.05	0.07	0.38			
Queue Length 95th (ft)	0	0	46			
Control Delay (s)	0.0	0.0	11.9			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			7.3			
Intersection Capacity Utilization		30.1%		ICU Level of Service		A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 2010 Project PM Alternative C







10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	299	227	173	0	0	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	325	247	188	0	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked					0.96	
vC, conflicting volume	188				1085	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				1088	188
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	77				100	86
cM capacity (veh/h)	1386				173	849
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	572	188	117			
Volume Left	325	0	0			
Volume Right	0	0	117			
cSH	1386	1700	849			
Volume to Capacity	0.23	0.11	0.14			
Queue Length 95th (ft)	23	0	12			
Control Delay (s)	5.8	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	5.8	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization		44.3%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
2010 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				3		416
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	394	279	3	90	383
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	428	303	3	98	416
Lane Group Flow (vph)	98	428	303	3	98	416
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	13.9	36.5	22.6	22.6	23.5	23.5
Total Split (%)	23.2%	60.8%	37.7%	37.7%	39.2%	39.2%
Maximum Green (s)	9.0	31.6	17.7	17.7	19.0	19.0
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.4	19.9	13.4	13.4	9.6	9.6
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.25	0.25
v/c Ratio	0.28	0.45	0.47	0.01	0.22	0.59
Control Delay	19.7	7.2	15.1	9.3	15.9	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	7.2	15.1	9.3	15.9	6.1
LOS	B	A	B	A	B	A
Approach Delay		9.5	15.0		8.0	
Approach LOS		A	B		A	

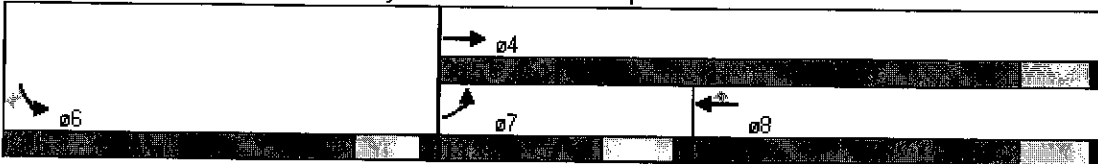
						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	39	57	0	20	0
Queue Length 95th (ft)	66	122	145	5	56	55
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	404	1217	826	703	744	906
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.35	0.37	0.00	0.13	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 38.6
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 10.2
 Intersection Capacity Utilization 45.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.940			0.961				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3327	0	1770	3401	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3327	0	1770	3401	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			34				7		140	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	74	49	319	89	31	39	90	6	86	143	310
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	80	53	347	97	34	42	98	7	93	155	337
Lane Group Flow (vph)	3	133	0	347	131	0	42	98	7	93	492	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	22.0	34.0	0.0	8.9	23.3	23.3	13.8	28.2	0.0
Total Split (%)	11.1%	26.1%	0.0%	27.5%	42.5%	0.0%	11.1%	29.1%	29.1%	17.3%	35.3%	0.0%
Maximum Green (s)	4.0	16.0		17.1	29.1		4.0	18.4	18.4	8.9	23.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	5.0	8.1		16.6	24.4		4.9	22.6	22.6	8.8	27.8	
Actuated g/C Ratio	0.07	0.12		0.25	0.36		0.07	0.34	0.34	0.13	0.41	
v/c Ratio	0.03	0.30		0.79	0.10		0.34	0.16	0.01	0.41	0.67	
Control Delay	34.0	20.3		39.6	11.4		40.4	21.5	12.3	34.7	20.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	20.3		39.6	11.4		40.4	21.5	12.3	34.7	20.0	
LOS	C	C		D	B		D	C	B	C	C	
Approach Delay		20.6			31.9			26.5		22.4		
Approach LOS		C			C			C		C		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	16		141	12		18	33	0	38	137	
Queue Length 95th (ft)	9	41		#279	34		48	72	9	82	#306	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	118	766		471	1446		124	598	539	248	739	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.17		0.74	0.09		0.34	0.16	0.01	0.38	0.67	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 67
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 26.0
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)						212		60				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	206	1140	0	0	1198	195	698	2	352	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	224	1239	0	0	1302	212	759	2	383	0	0	0
Lane Group Flow (vph)	224	1239	0	0	1302	212	380	381	383	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	15.0	48.5			29.5	29.5	28.5	28.5	28.5			
Actuated g/C Ratio	0.18	0.57			0.35	0.35	0.34	0.34	0.34			
v/c Ratio	0.72	0.62			1.06	0.31	0.67	0.67	0.67			
Control Delay	54.7	12.5			72.4	4.5	31.4	31.4	27.1			
Queue Delay	0.0	0.2			0.0	0.0	0.1	0.1	0.0			
Total Delay	54.7	12.7			72.4	4.5	31.5	31.5	27.1			
LOS	D	B			E	A	C	C	C			
Approach Delay		19.2			62.9			30.0				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2010 Project PM Alternative C

10/22/2008

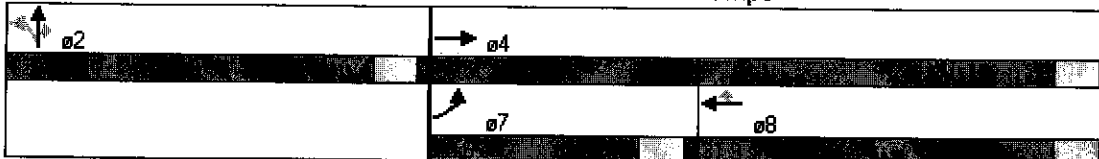
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			E			C				
Queue Length 50th (ft)	132	127			~427	0	181	182	146			
Queue Length 95th (ft)	m176	220			#555	46	286	286	247			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	342	2000			1229	688	564	565	571			
Starvation Cap Reductn	0	191			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	9	9	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.65	0.68			1.06	0.31	0.68	0.69	0.67			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 38.2
 Intersection Capacity Utilization 111.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			633									34
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1138	719	261	1635	0	0	0	0	204	2	179
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1237	782	284	1777	0	0	0	0	222	2	195
Lane Group Flow (vph)	0	1237	782	284	1777	0	0	0	0	0	224	195
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	37.6	37.6	25.1	62.7	0.0	0.0	0.0	0.0	22.3	22.3	22.3
Total Split (%)	0.0%	44.2%	44.2%	29.5%	73.8%	0.0%	0.0%	0.0%	0.0%	26.2%	26.2%	26.2%
Maximum Green (s)		33.0	33.0	20.5	58.1					17.8	17.8	17.8
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		39.2	39.2	18.3	61.4						15.6	15.6
Actuated g/C Ratio		0.46	0.46	0.22	0.72						0.18	0.18
v/c Ratio		0.76	0.73	0.75	0.69						0.72	0.64
Control Delay		24.5	9.0	39.3	9.1						46.1	36.0
Queue Delay		0.0	0.0	0.0	1.5						0.0	0.0
Total Delay		24.5	9.0	39.3	10.7						46.1	36.0
LOS		C	A	D	B						D	D
Approach Delay		18.5			14.6						41.4	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2010 Project PM Alternative C

10/22/2008

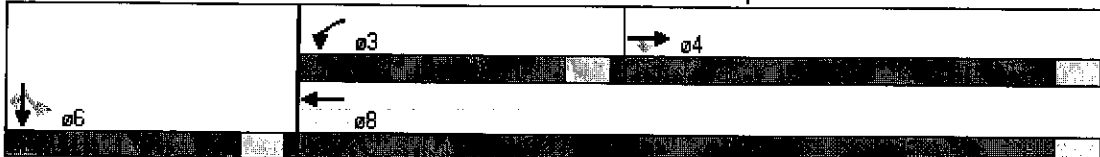
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						D	
Queue Length 50th (ft)		294	48	166	226						112	78
Queue Length 95th (ft)		#446	210	m191	m230						184	145
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1631	1071	439	2558						364	352
Starvation Cap Reductn		0	0	0	550						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.76	0.73	0.65	0.88						0.62	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 18.9
 Intersection Capacity Utilization 111.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service H

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2010 Project PM Alternative C

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	42	1	43	0	165	77	44	185	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	46	1	47	0	179	84	48	201	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565	560	201	520	518	221	201			263		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565	560	201	520	518	221	201			263		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	90	100	94	100			96		
cM capacity (veh/h)	397	420	840	447	440	811	1325			1224		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	93	263	249								
Volume Left	0	46	0	48								
Volume Right	1	47	84	0								
cSH	560	576	1325	1224								
Volume to Capacity	0.00	0.16	0.00	0.04								
Queue Length 95th (ft)	0	14	0	3								
Control Delay (s)	11.5	12.5	0.0	1.8								
Lane LOS	B	B		A								
Approach Delay (s)	11.5	12.5	0.0	1.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization		47.2%		ICU Level of Service					A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2010 Project PM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.970							0.852
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3433	0	0	0	0	1770	1587	0
Flt Permitted	0.256									0.950		
Satd. Flow (perm)	916	3505	0	0	3433	0	0	0	0	1770	1587	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					55						65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	554	485	0	0	592	151	0	0	0	128	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	602	527	0	0	643	164	0	0	0	139	1	65
Lane Group Flow (vph)	602	527	0	0	807	0	0	0	0	139	66	0
Turn Type	Perm									Perm		
Protected Phases		2			6							8
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	37.5	37.5	0.0	0.0	37.5	0.0	0.0	0.0	0.0	37.5	37.5	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	32.9	32.9			32.9					33.0	33.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	59.2	59.2			59.2					10.7	10.7	
Actuated g/C Ratio	0.79	0.79			0.79					0.14	0.14	
v/c Ratio	0.83	0.19			0.30					0.55	0.23	
Control Delay	21.7	0.1			3.2					37.5	10.0	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	21.7	0.1			3.2					37.5	10.0	
LOS	C	A			A					D	A	
Approach Delay		11.6			3.2						28.7	

21: SR 145/Madera & SR 99 NB ramps
 2010 Project PM Alternative C

10/22/2008

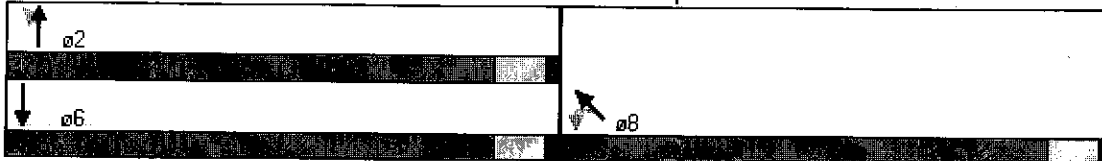
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			A						C	
Queue Length 50th (ft)	64	0			45					61	0	
Queue Length 95th (ft) m#137		m0			82					108	31	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	723	2766			2721					791	745	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.83	0.19			0.30					0.18	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 54.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: Ave 14/Olive & SR 145/Madera
 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15			9	15		9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.999				0.850
Flt Protected		0.966					0.950				0.989	
Satd. Flow (prot)	0	1765	1553	0	0	0	3433	3536	0	0	3466	1568
Flt Permitted		0.966					0.950				0.989	
Satd. Flow (perm)	0	1765	1553	0	0	0	3433	3536	0	0	3466	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			615					1				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	251	101	566	0	0	0	133	788	7	83	275	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	273	110	615	0	0	0	145	857	8	90	299	272
Lane Group Flow (vph)	0	383	615	0	0	0	145	865	0	0	389	272
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.5	25.5	25.5	0.0	0.0	0.0	23.9	23.9	0.0	25.6	25.6	25.6
Total Split (%)	34.0%	34.0%	34.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)	21.0	21.0	21.0				19.3	19.3		21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		19.5	19.5				21.9	21.9			21.6	21.6
Actuated g/C Ratio		0.26	0.26				0.29	0.29			0.29	0.29
v/c Ratio		0.84	0.72				0.14	0.84			0.39	0.42
Control Delay		41.6	10.3				21.2	35.0			27.1	9.1
Queue Delay		89.9	2.1				0.0	0.0			0.0	0.0
Total Delay		131.6	12.4				21.2	35.0			27.1	9.1
LOS		F	B				C	D			C	A
Approach Delay		58.1						33.0			19.7	

22: AVE 14/Olive & SR 145/Madera
 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E						C			B	
Queue Length 50th (ft)		175	8				26	205			84	0
Queue Length 95th (ft)		m231	m115				48	#318			126	74
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		506	884				1003	1034			998	645
Starvation Cap Reductn		183	146				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	0
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		1.19	0.83				0.14	0.84			0.39	0.42

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 39.1
 Intersection Capacity Utilization 61.2%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service B







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

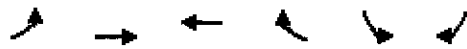
Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 2010 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fit						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1671	1495
Fit Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						170
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	473	384	0	445	156
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	514	417	0	484	170
Lane Group Flow (vph)	0	514	417	0	484	170
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.5	36.5	0.0	38.5	38.5
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		32.0	32.0		34.0	34.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		40.8	40.8		26.2	26.2
Actuated g/C Ratio		0.54	0.54		0.35	0.35
v/c Ratio		0.27	0.22		0.83	0.27
Control Delay		10.9	6.7		34.3	3.4
Queue Delay		0.0	0.3		0.9	0.0
Total Delay		10.9	7.0		35.1	3.4
LOS		B	A		D	A
Approach Delay		10.9	7.0		26.9	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		63	24		200	0
Queue Length 95th (ft)		115	58		263	30
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1925	1925		769	780
Starvation Cap Reductn		0	912		0	0
Spillback Cap Reductn		133	0		97	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.29	0.41		0.72	0.22













Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 16.5
 Intersection Capacity Utilization 44.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	49	89	12	16	38	53	5	117	25	69	100	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	97	13	17	41	58	5	127	27	75	109	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	116	160	211								
Volume Left (vph)	53	17	5	75								
Volume Right (vph)	13	58	27	27								
Hadj (s)	0.07	-0.10	0.09	0.27								
Departure Headway (s)	5.1	5.0	5.0	5.1								
Degree Utilization, x	0.23	0.16	0.22	0.30								
Capacity (veh/h)	649	652	668	660								
Control Delay (s)	9.6	9.0	9.5	10.3								
Approach Delay (s)	9.6	9.0	9.5	10.3								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.7									
HCM Level of Service			A									
Intersection Capacity Utilization		43.3%			ICU Level of Service				A			
Analysis Period (min)			15									

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↓
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	448	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	487	91	125	286	91	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	450	125			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450	125			411	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	6	90			92	
cM capacity (veh/h)	516	918			1137	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	487	91	125	286	234	
Volume Left	487	0	0	0	91	
Volume Right	0	91	0	286	0	
cSH	516	918	1700	1700	1137	
Volume to Capacity	0.94	0.10	0.07	0.17	0.08	
Queue Length 95th (ft)	295	8	0	0	7	
Control Delay (s)	55.1	9.4	0.0	0.0	3.7	
Lane LOS	F	A			A	
Approach Delay (s)	47.9		0.0		3.7	
Approach LOS	E					
Intersection Summary						
Average Delay			23.4			
Intersection Capacity Utilization			49.7%		ICU Level of Service	A
Analysis Period (min)			15			

26: Ave 12 & GS Blvd
2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt			0.850		0.947			0.877				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1618	0	1719	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1618	0	1719	1810	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			32		23			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	228	29	14	289	160	46	18	85	491	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	248	32	15	314	174	50	20	92	534	30	65
Lane Group Flow (vph)	217	248	32	15	488	0	50	112	0	534	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	48.9	48.9	9.5	38.4	0.0	13.0	20.6	0.0	41.0	48.6	48.6
Total Split (%)	16.7%	40.8%	40.8%	7.9%	32.0%	0.0%	10.8%	17.2%	0.0%	34.2%	40.5%	40.5%
Maximum Green (s)	15.4	44.3	44.3	4.9	33.8		8.5	16.1		36.5	44.1	44.1
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	16.0	50.6	50.6	5.5	34.4		8.2	16.6		37.0	47.4	47.4
Actuated g/C Ratio	0.13	0.42	0.42	0.05	0.29		0.07	0.14		0.31	0.40	0.40
v/c Ratio	0.97	0.33	0.05	0.19	0.98		0.42	0.37		1.01	0.04	0.10
Control Delay	106.0	26.1	8.2	63.9	53.8		64.2	17.1		82.8	24.4	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	106.0	26.1	8.2	63.9	53.8		64.2	17.1		82.8	24.4	6.3
LOS	F	C	A	E	D		E	B		F	C	A
Approach Delay		59.8			54.1			31.7			72.1	

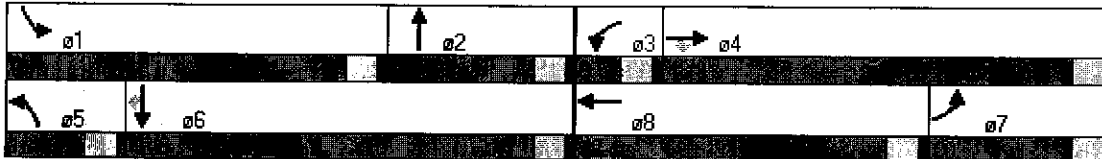
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			C			E	
Queue Length 50th (ft)	170	119	0	12	229		38	14		~419	15	0
Queue Length 95th (ft)	#328	211	21	m14	#560		80	67		#650	36	30
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	223	741	649	77	499		131	303		530	715	647
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.33	0.05	0.19	0.98		0.38	0.37		1.01	0.04	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 85 (71%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 60.0
 Intersection Capacity Utilization 79.9%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.916				0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	1827	0	0	1673	0	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	1827	0	0	1673	0	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					118				153			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	164	640	0	0	284	466	179	1	141	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	178	696	0	0	309	507	195	1	153	0	0	0
Lane Group Flow (vph)	178	696	0	0	816	0	0	196	153	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6		20.6	20.6	20.6			
Total Split (s)	22.0	96.0	0.0	0.0	74.0	0.0	24.0	24.0	24.0	0.0	0.0	0.0
Total Split (%)	18.3%	80.0%	0.0%	0.0%	61.7%	0.0%	20.0%	20.0%	20.0%	0.0%	0.0%	0.0%
Maximum Green (s)	17.4	91.4			69.4		19.4	19.4	19.4			
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	16.4	94.1			73.8			17.9	17.9			
Actuated g/C Ratio	0.14	0.78			0.62			0.15	0.15			
v/c Ratio	0.75	0.49			0.76			0.78	0.43			
Control Delay	60.9	2.0			20.8			69.8	10.9			
Queue Delay	0.0	0.2			0.0			0.0	0.0			
Total Delay	60.9	2.2			20.8			69.8	10.9			
LOS	E	A			C			E	B			
Approach Delay		14.1			20.8			44.0				

27: Ave 12 & SR 99 NB Ramps
 2010 Project PM Alternative C

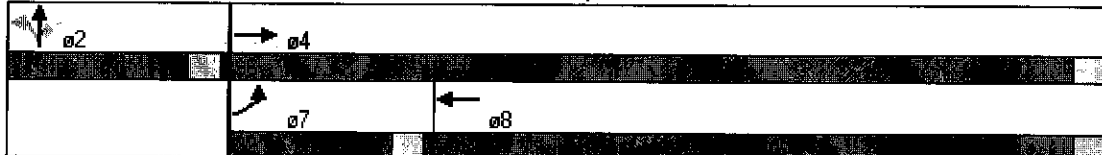
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			D				
Queue Length 50th (ft)	143	124			408			145	0			
Queue Length 95th (ft)	m152	m40			602			#240	59			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	261	1433			1074			282	379			
Starvation Cap Reductn	0	161			0			0	0			
Spillback Cap Reductn	0	0			0			0	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.68	0.55			0.76			0.70	0.40			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 21.9
 Intersection LOS: C
 Intersection Capacity Utilization 72.6%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 16

OPENING DAY (2010) PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99-NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

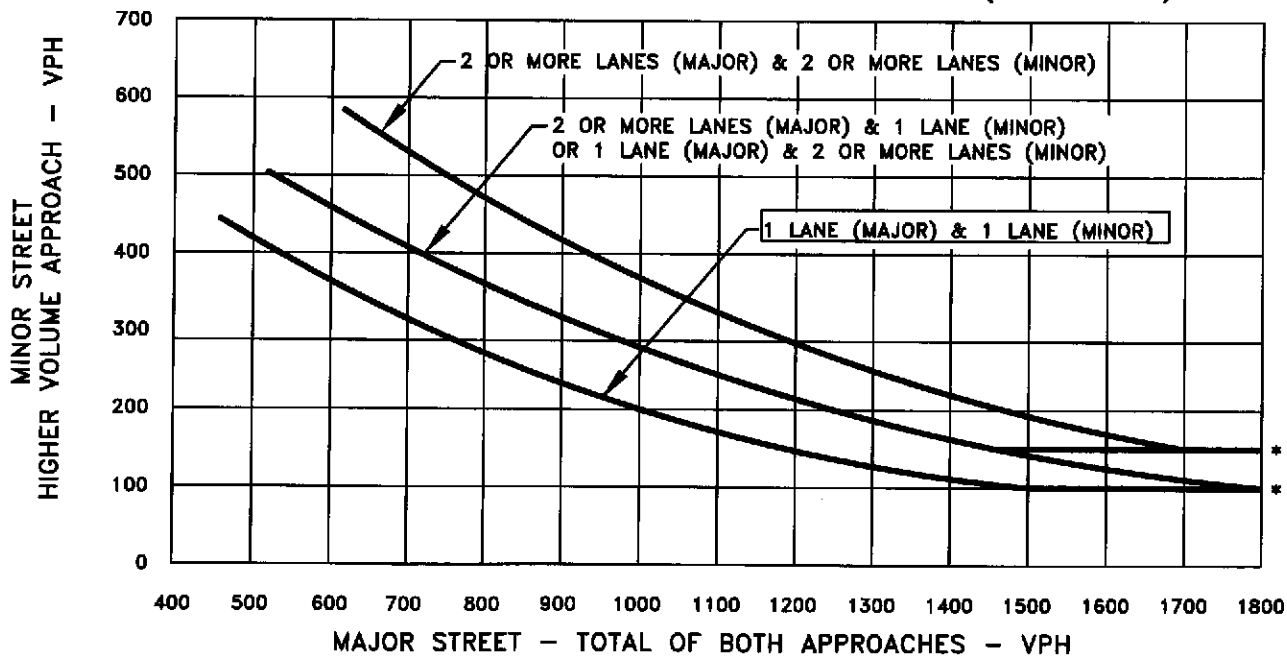
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK / PM PEAK		Hour
			AM PEAK	PM PEAK	
Both Approaches - Major Street	✓		327	333	
Highest Approaches - Minor Street	✓		225	290	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB ON RAMP/ ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

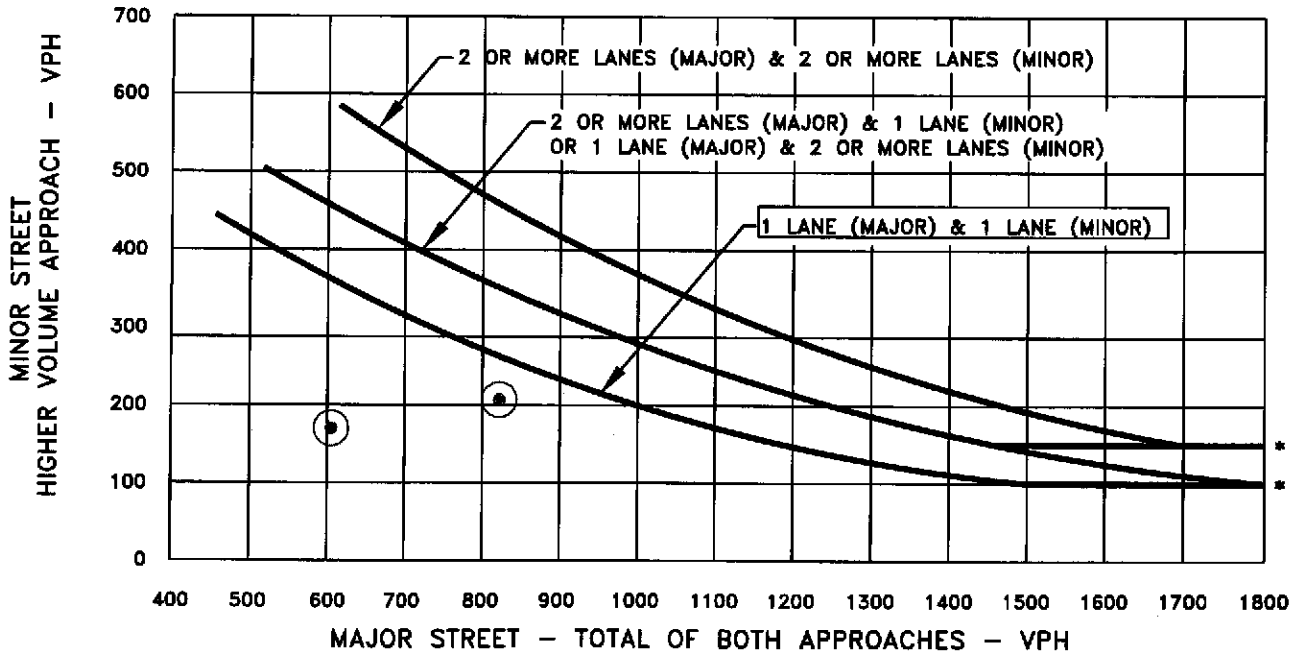
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		605	820	
Highest Approaches - Minor Street	✓		170	207	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

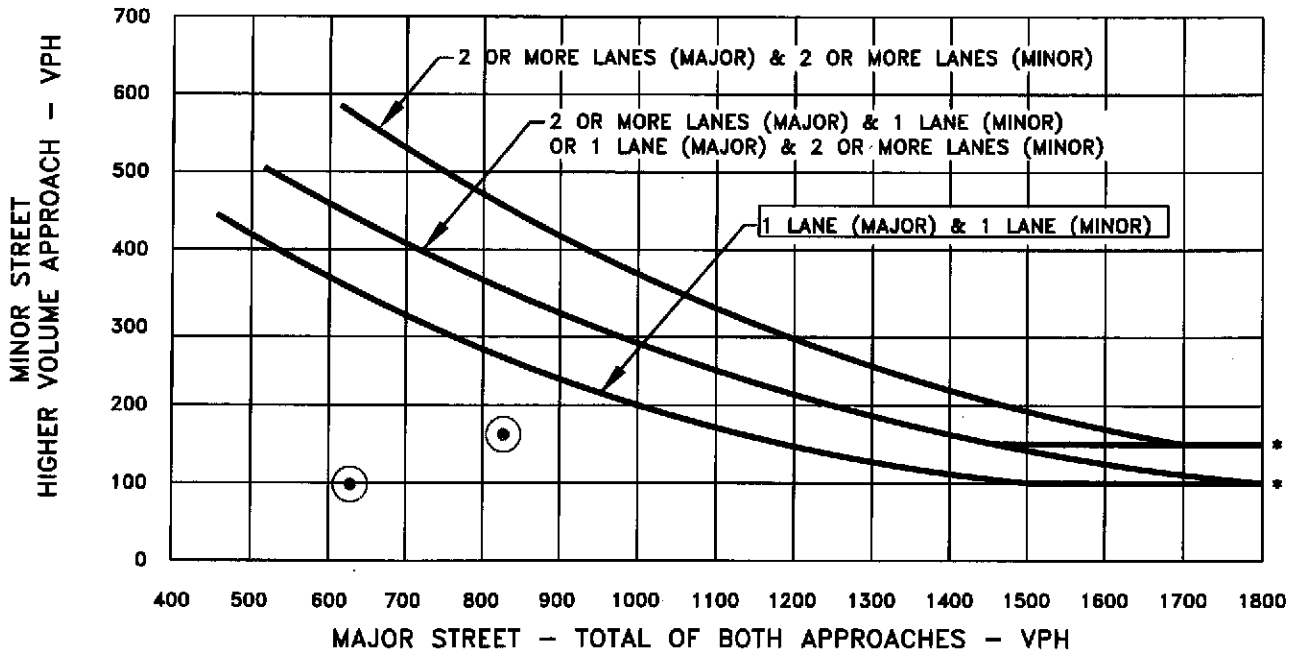
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour	
			AM	PM PEAK
Both Approaches - Major Street	✓		628	825
Highest Approaches - Minor Street	✓		98	162

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

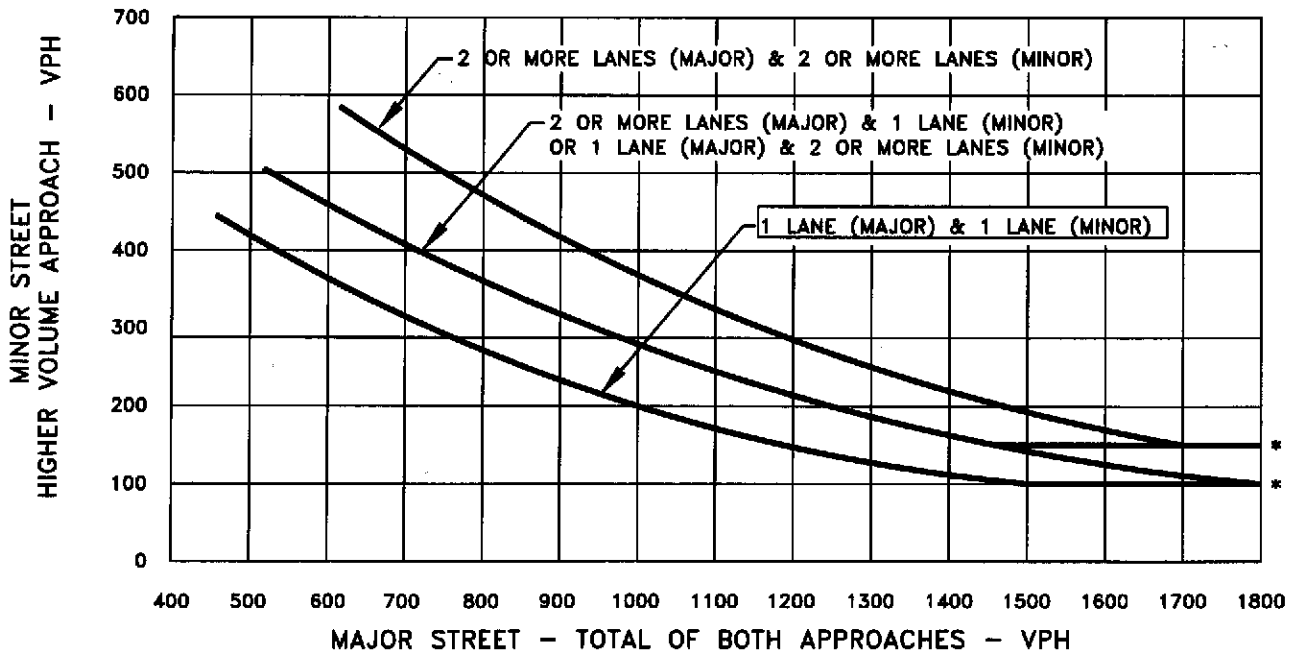
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		292	347	
Highest Approaches - Minor Street	✓		156	193	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

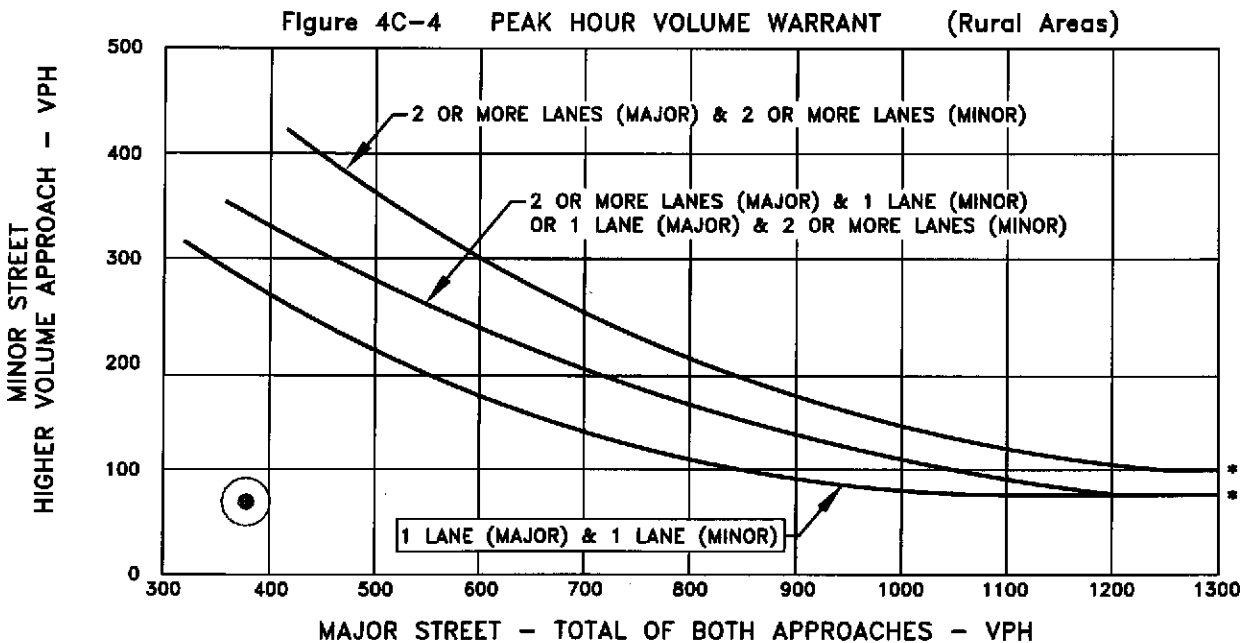
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK		PM PEAK		Hour
	One	2 or more					
Both Approaches - Major Street	✓		261	374			
Highest Approaches - Minor Street	✓		45	69			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 NB RAMPS

Critical Approach Speed NPS mph

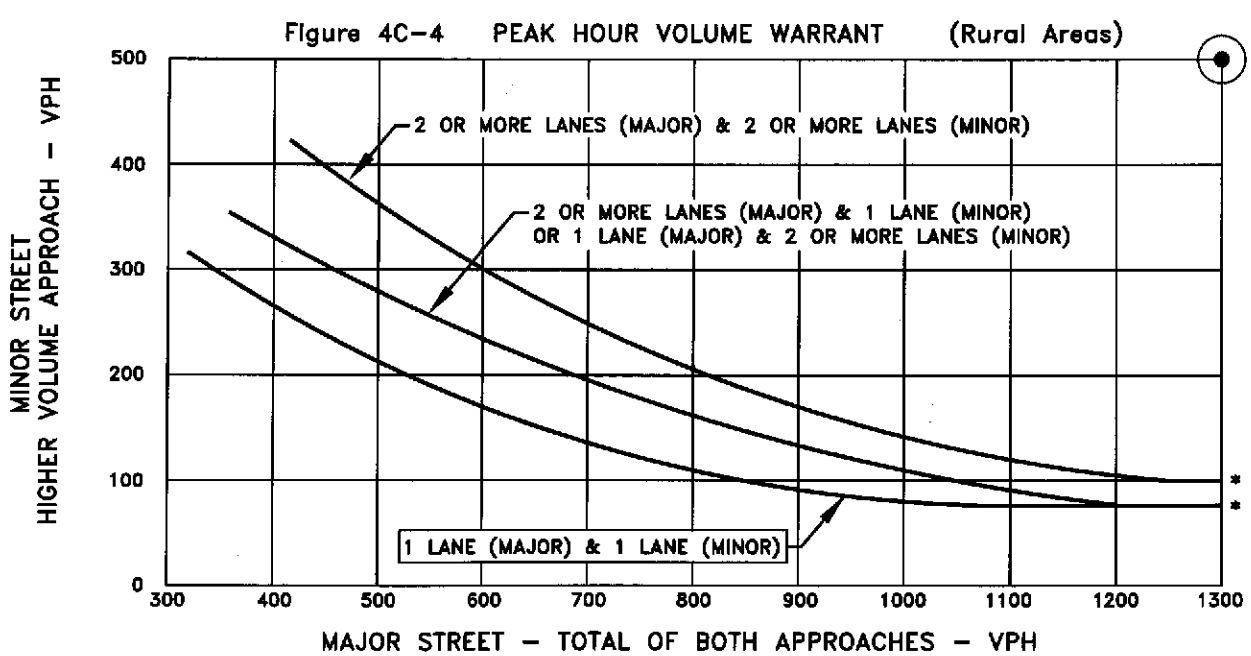
Critical speed of major street traffic > 40 mph ----- or RURAL (R)
 In built up area of isolated community of < 10,000 pop. -----
 URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1306	2202			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	586	1150			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 SB OFF RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

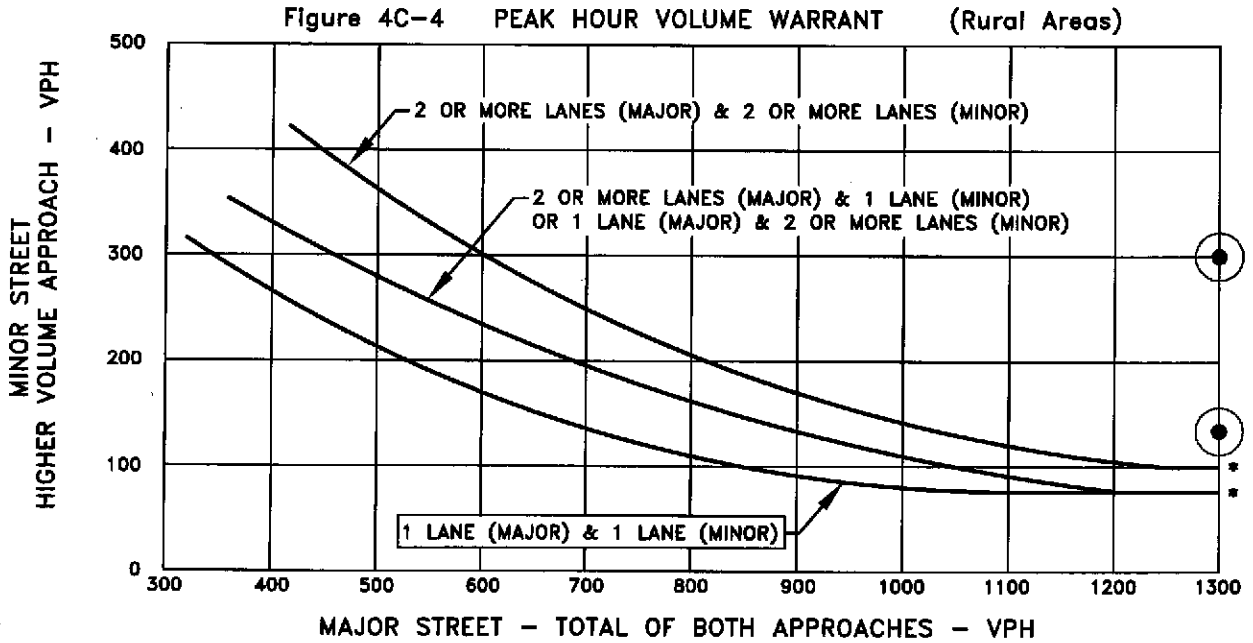
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
Both Approaches - Major Street	✓		1418	2277			
Highest Approaches - Minor Street	✓		134	302			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: AIRPORT ROAD/ GOLDEN STATE

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

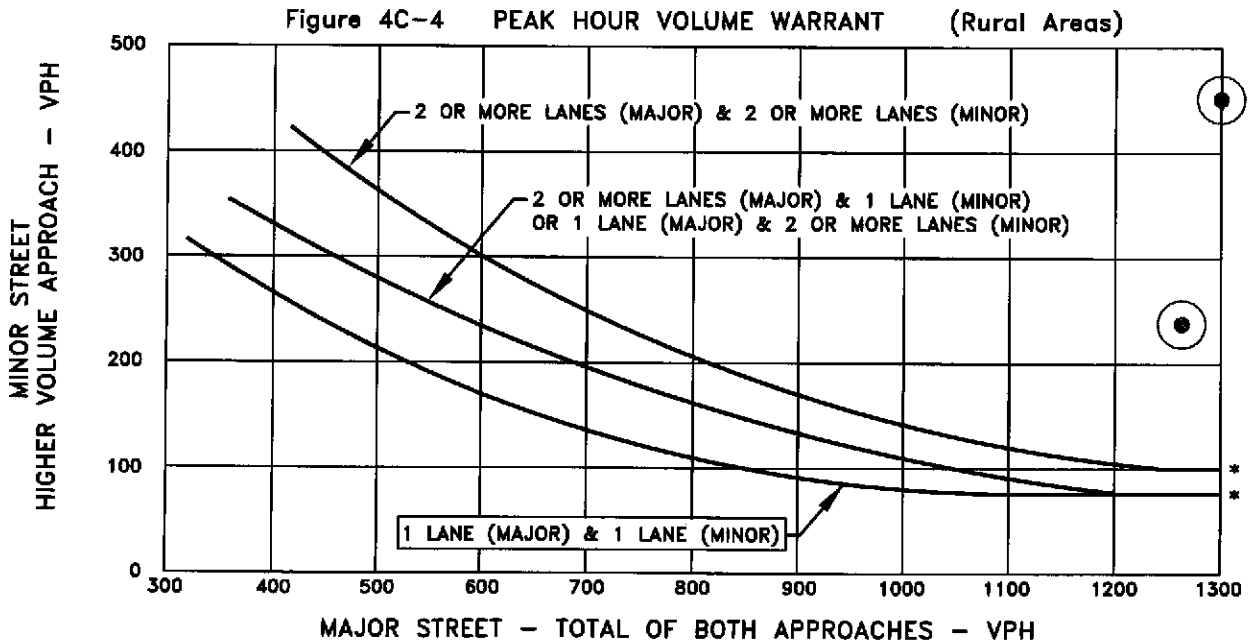
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		1267	1909		
Highest Approaches - Minor Street	✓		238	449		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

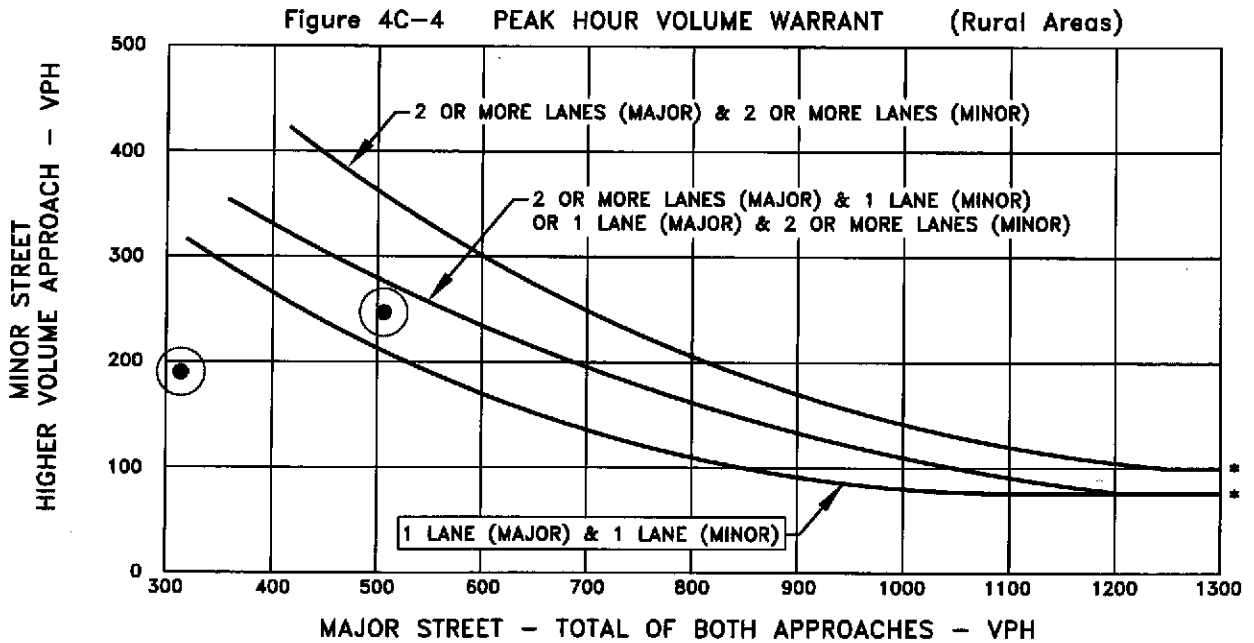
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	✓		312	484			
Highest Approaches - Minor Street	✓		188	249			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB ON RAMP

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16/ GATEWAY

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

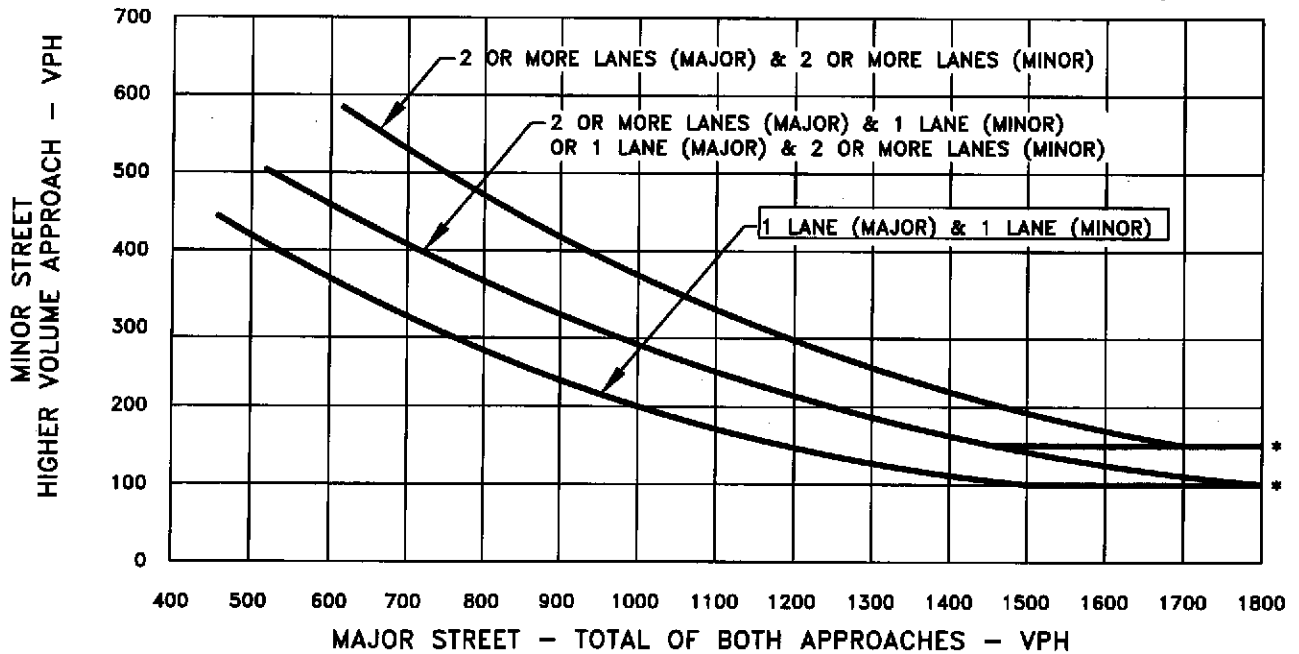
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	162	255	
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	140	227	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 16

Critical Approach Speed 35 mph

MINOR STREET: SR-99 NB ON CONNECTOR

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

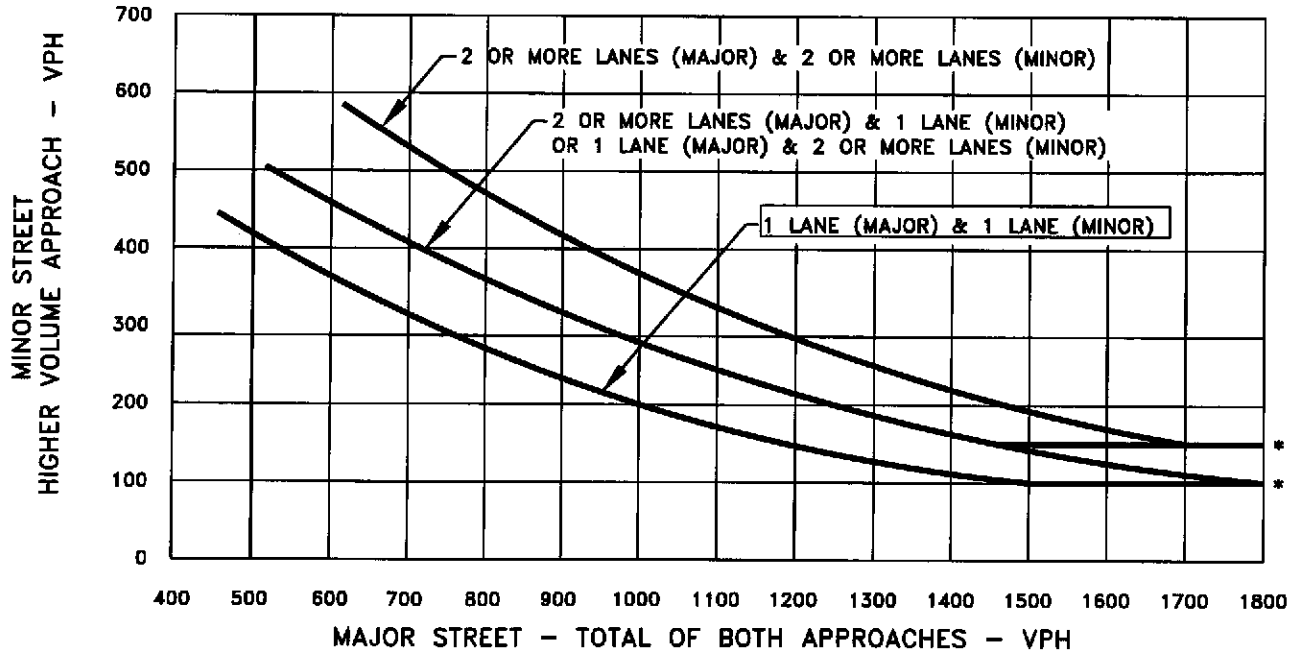
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		204	299	
Highest Approaches - Minor Street	✓		64	111	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: SR-99 NB RAMP

Critical Approach Speed NPS mph

MINOR STREET: AVENUE 16 CONNECTOR

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2010 PROJECT ALTERNATIVE C

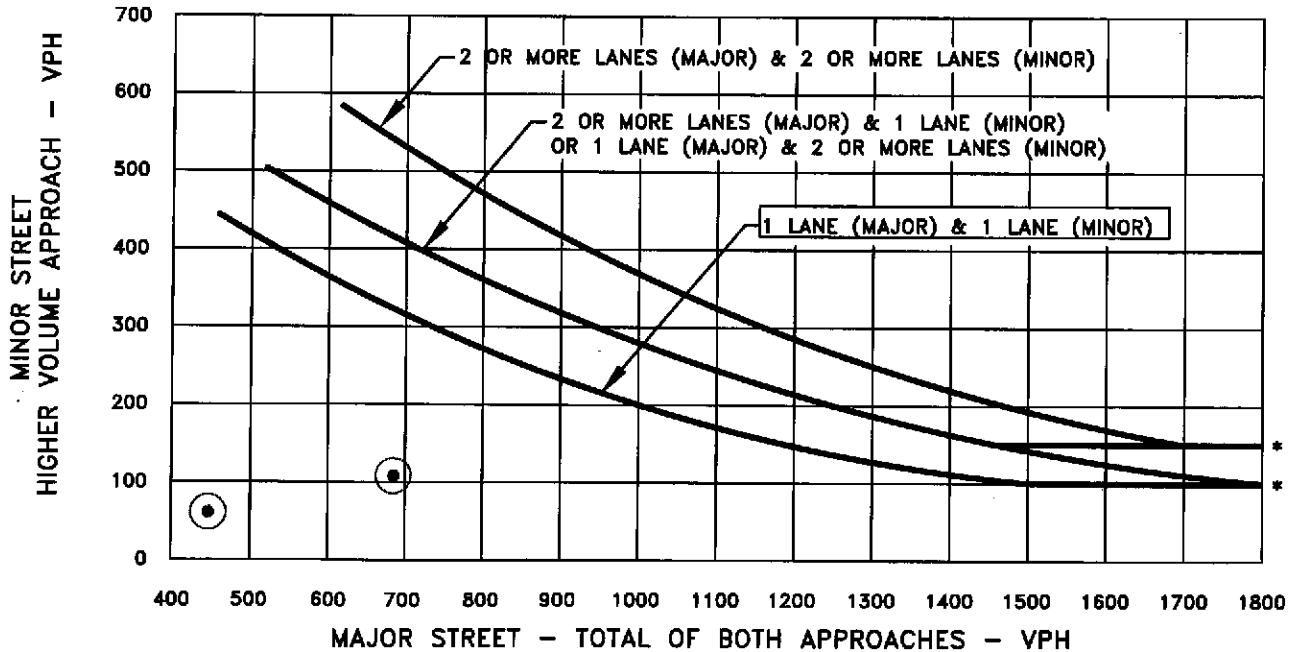
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	447	699	
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	61	108	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

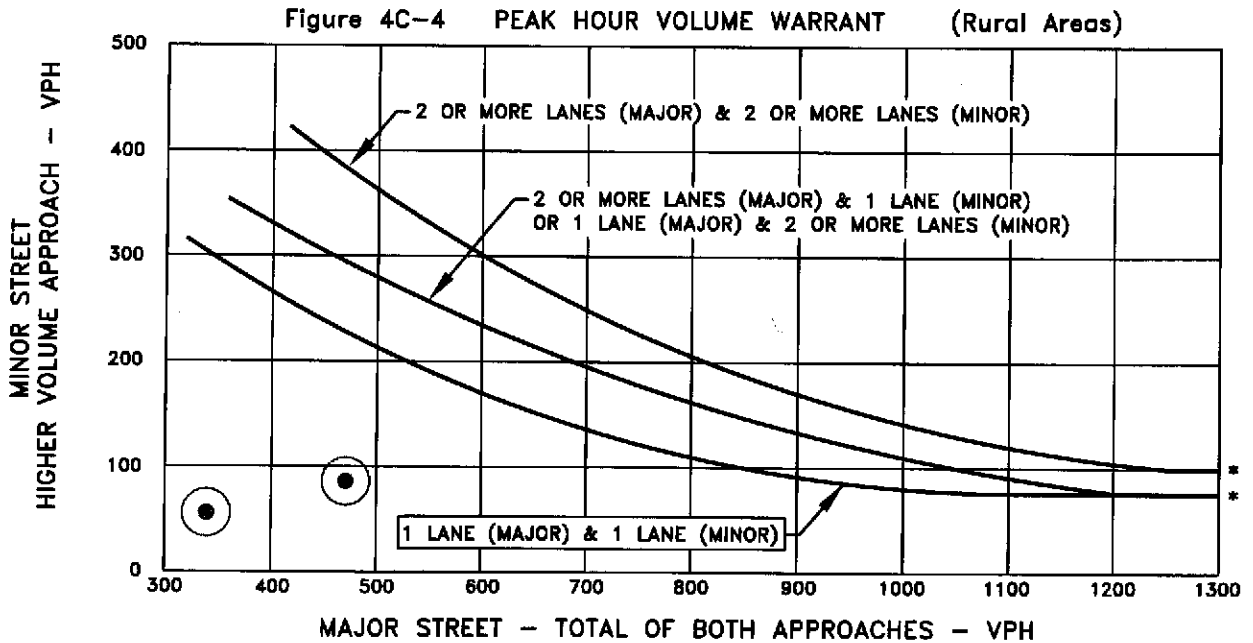
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	✓		339	471			
Highest Approaches - Minor Street	✓		56	86			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

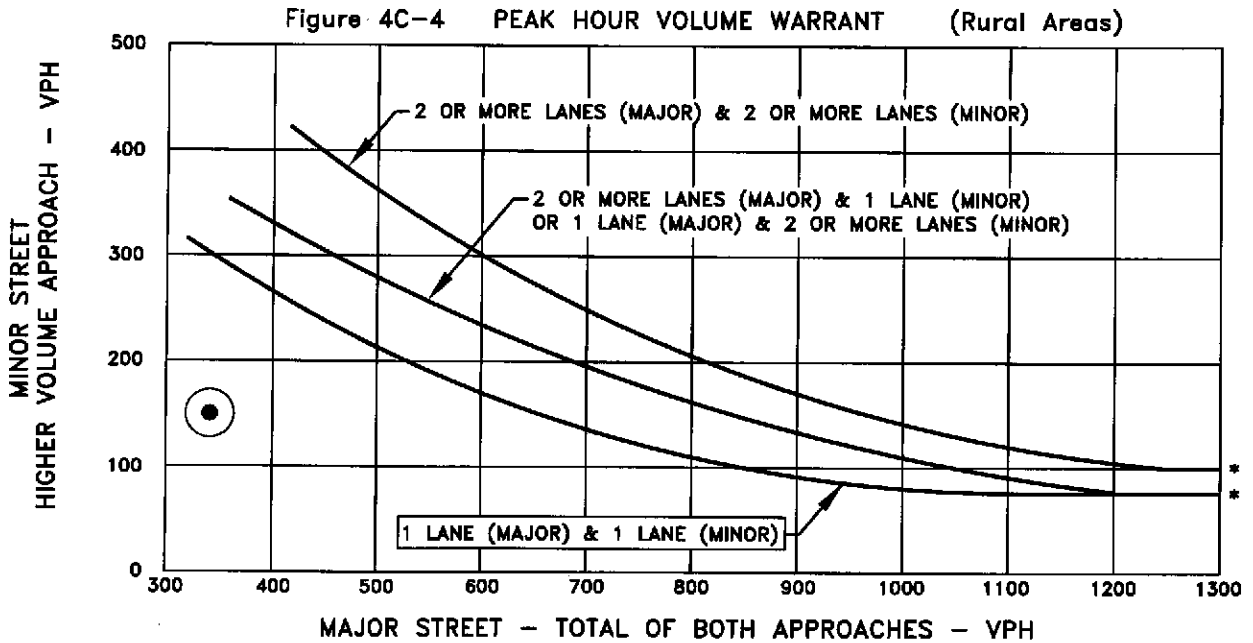
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 – Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches – Major Street	✓		249	341		
Highest Approaches – Minor Street	✓		135	150		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



*** NOTE:**
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB RAMPS/ GOLDEN STATE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

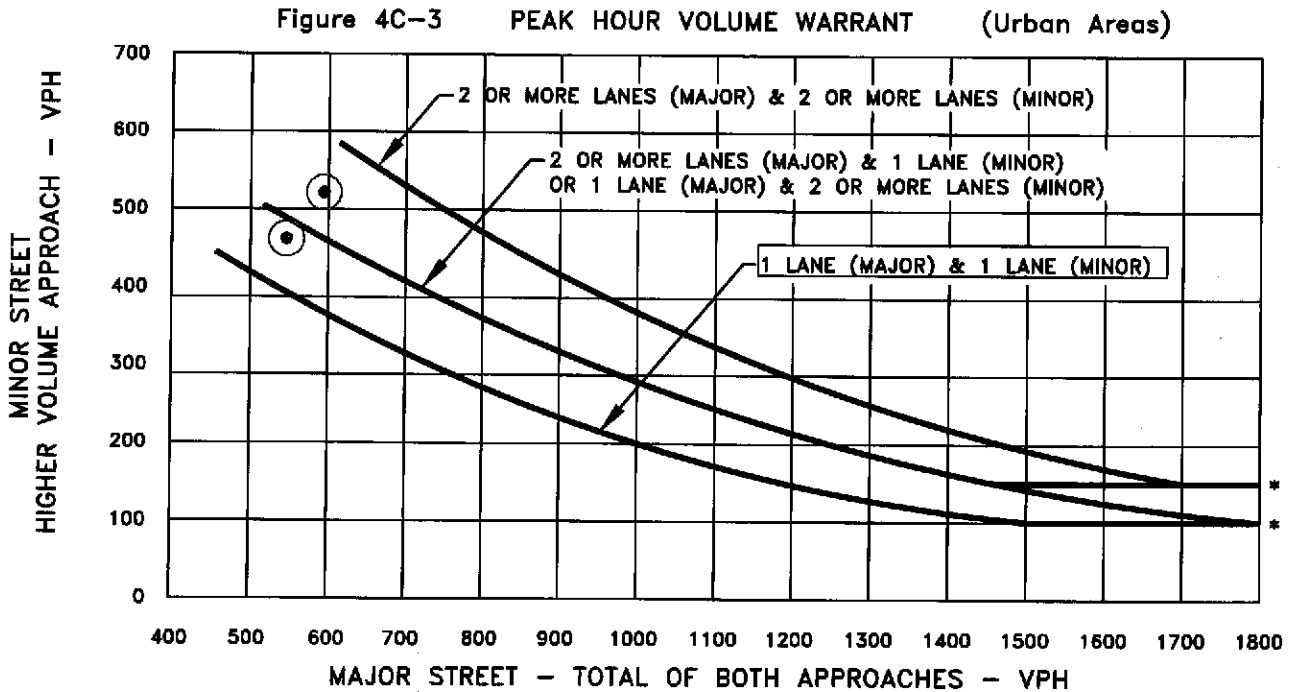
CONDITION: 2010 PROJECT ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		546	593	
Highest Approaches - Minor Street	✓		462	532	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 17

MITIGATED OPENING DAY (2010)

PROJECT CONDITIONS

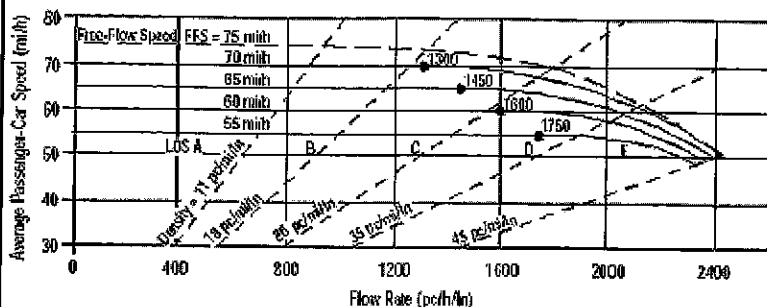
MADERA SITE - ALTERNATIVE A

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET																										
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Application</th> <th style="text-align: left;">Input</th> <th style="text-align: left;">Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>					Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																							
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																							
Date Performed	9/22/08	Jurisdiction	Caltrans																							
Analysis Time Period	Mit 2010 P Alt A AM	Analysis Year	2010																							
Project Description 04-837.2 Northfork Casino Alt A																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	2189	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain: Level																							
DDHV = AADT x K x D		veh/h	Grade %	Length	mi																					
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f _p	1.00		E _R	1.2																						
E _T	1.5		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]																							
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f _{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																						
Interchange Density	0.50	l/mi	f _{ID}	mi/h																						
Number of Lanes, N	3		f _N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)			Design LOS																							
f _p	932	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h																						
S	70.0	mi/h	f _p	mi/h																						
D = v _p / S	13.3	pc/mi/ln	S	mi/h																						
LOS	B		D = v _p / S	pc/mi/ln																						
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																						
v _p - Flow rate	FFS - Free-flow speed		f _p - Page 23-12	f _N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v _p - Exhibits 23-2, 23-3																							
DDHV - Directional design hour volume				f _{ID} - Exhibit 23-7																						

BASIC FREEWAY SEGMENTS WORKSHEET																										
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Application</th> <th style="text-align: left;">Input</th> <th style="text-align: left;">Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>					Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																								
Operational (LOS)	FFS, N, v_p	LOS, S, D																								
Design (N)	FFS, LOS, v_p	N, S, D																								
Design (v_p)	FFS, LOS, N	v_p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v_p)	FFS, LOS, N	v_p , S, D																								
General Information			Site Information																							
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																							
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																							
Date Performed	9/22/08	Jurisdiction	Caltrans																							
Analysis Time Period	Mit 2010 P Alt A PM	Analysis Year	2010																							
Project Description 04-837.2 Northfork Casino Alt A																										
<input checked="" type="checkbox"/> Oper. (LOS)		<input type="checkbox"/> Des. (N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	3233	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT x K x D		veh/h	Grade %	Length																						
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f_p	1.00		E_R	1.2																						
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f_{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h																						
Interchange Density	0.50	1/mi	f_{ID}	mi/h																						
Number of Lanes, N	3		f_N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$			Design LOS																							
v_p	1376	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h																						
S	70.0	mi/h	S	mi/h																						
$D = v_p / S$	19.7	pc/mi/ln	$D = v_p / S$	pc/mi/ln																						
LOS	C		Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																						
v_p - Flow rate	FFS - Free-flow speed		f_p - Page 23-12	f_N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																										

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt A AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2718	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1157 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	16.5 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). Design curves are shown for LOS A, B, C, and D. Free-flow speeds (FFS) of 75, 70, 65, 60, and 55 mi/h are indicated. Density curves for 11, 16, 20, 25, and 35 pc/mi/ln are also shown.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2010 Alt A PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	2858	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00		E_R																			
E_T	1.5		$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)}$																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	1217	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
S	70.0	mi/h	f_p																			
$D = v_p / S$	17.4	pc/mi/ln	S																			
LOS	B		$D = v_p / S$																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
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Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2010 Alt A AM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	2295	veh/h	Peak-Hour Factor, PHF 0.88																			
AADT		veh/day	%Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AADT, K			%RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AADT x K x D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	3		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	977	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$ pc/h																			
S	70.0	mi/h	f_p mi/h																			
$D = v_p / S$	14.0	pc/mi/ln	S mi/h																			
LOS	B		$D = v_p / S$ pc/mi/ln																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>Free-Flow Speed FFS = 75 mi/h 70 mi/h 65 mi/h 60 mi/h 55 mi/h</p> <p>Density 11 pc/mi/ln 19 pc/mi/ln 26 pc/mi/ln 35 pc/mi/ln 45 pc/mi/ln</p> <p>Flow Rate (pc/h/ln): 0, 400, 800, 1200, 1600, 2000, 2400</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information			Site Information																			
Analyst: R Davis		Highway/Direction of Travel: SR 99 Southbound																				
Agency or Company: TPG Consulting, Inc.		From/To: between Ave 18 1/2 & Ave 17																				
Date Performed: 9/22/08		Jurisdiction: Caltrans																				
Analysis Time Period: Mit 2010 P Alt A PM		Analysis Year: 2010																				
Project Description: 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input checked="" type="checkbox"/> Planning Data																		
Flow Inputs																						
Volume, V: 3423 veh/h		Peak-Hour Factor, PHF: 0.88																				
AADT: veh/day		% Trucks and Buses, P_T : 24																				
Peak-Hr Prop. of AADT, K		% RVs, P_R : 2																				
Peak-Hr Direction Prop, D		General Terrain: Level																				
DDHV = AADT x K x D: veh/h		Grade % Length: mi																				
Driver type adjustment: 1.00		Up/Down %																				
Calculate Flow Adjustments																						
f_p : 1.00		E_R : 1.2																				
E_T : 1.5		$f_{HV} = 1 / (P_T(E_T - 1) + P_R(E_R - 1))$: 0.890																				
Speed Inputs			Calc Speed Adj and FFS																			
Lane Width: 12.0 ft		f_{LW} : mi/h																				
Rt-Shoulder Lat. Clearance: 6.0 ft		f_{LC} : mi/h																				
Interchange Density: 0.50 1/mi		f_{ID} : mi/h																				
Number of Lanes, N: 3		f_N : mi/h																				
FFS (measured): 70.0 mi/h		FFS: 70.0 mi/h																				
Base free-flow Speed, BFFS: mi/h																						
LOS and Performance Measures			Design (N)																			
Operational (LOS)			Design (N)																			
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$: 1457 pc/h/ln			Design LOS																			
S: 69.9 mi/h			$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$: pc/h																			
D = v_p / S : 20.8 pc/mi/ln			S: mi/h																			
LOS: C			D = v_p / S : pc/mi/ln																			
			Required Number of Lanes, N																			
Glossary			Factor Location																			
N - Number of lanes		S - Speed		E_R - Exhibits 23-8, 23-10																		
V - Hourly volume		D - Density		f_{LW} - Exhibit 23-4																		
v_p - Flow rate		FFS - Free-flow speed		E_T - Exhibits 23-8, 23-10, 23-11																		
LOS - Level of service		BFFS - Base free-flow speed		f_{LC} - Exhibit 23-5																		
DDHV - Directional design hour volume				f_p - Page 23-12																		
				LOS, S, FFS, v_p - Exhibits 23-2, 23-3																		
				f_N - Exhibit 23-6																		
				f_{ID} - Exhibit 23-7																		

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Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst	R Davis		Highway/Direction of Travel	SR 99 Northbound																						
Agency or Company	TPG Consulting, Inc.		From/To	south of Avenue 17																						
Date Performed	9/22/08		Jurisdiction	Caltrans																						
Analysis Time Period	Mit 2010 Alt A AM		Analysis Year	2010																						
Project Description 04-837.2 Northfork Casino Alt A																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	3175	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT x K x D		veh/h	Grade % Length	mi																						
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f _p	1.00		E _R	1.2																						
E _T	1.5		f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f _{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																						
Interchange Density	0.50	l/mi	f _{ID}	mi/h																						
Number of Lanes, N	3		f _N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)			Design LOS																							
f _p	1352	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h																						
S	70.0	mi/h	f _p	mi/h																						
D = v _p / S	19.3	pc/mi/ln	S	mi/h																						
LOS	C		D = v _p / S	pc/mi/ln																						
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																						
v _p - Flow rate	FFS - Free-flow speed		f _p - Page 23-12	f _N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																										

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Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst <i>R Davis</i>		Highway/Direction of Travel <i>SR 99 Northbound</i>		Agency or Company <i>TPG Consulting, Inc.</i>																						
Date Performed <i>9/22/08</i>		From/To <i>south of Avenue 17</i>		Jurisdiction <i>Caltrans</i>																						
Analysis Time Period <i>Mit 2010 Alt A PM</i>		Analysis Year <i>2010</i>		Project Description <i>04-837.2 Northfork Casino Alt A</i>																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V <i>3535</i> veh/h		Peak-Hour Factor, PHF <i>0.88</i>		AADT <i></i> veh/day																						
Peak-Hr Prop. of AADT, K <i></i>		%Trucks and Buses, P _T <i>24</i>		Peak-Hr Direction Prop, D <i></i>																						
DDHV = AADT x K x D <i></i> veh/h		%RVs, P _R <i>2</i>		Driver type adjustment <i>1.00</i>																						
		General Terrain: <i>Level</i>		Grade % Length <i>mi</i>																						
		Up/Down % <i></i>																								
Calculate Flow Adjustments																										
f _p <i>1.00</i>		E _R <i>1.2</i>		E _T <i>1.5</i>																						
		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)] <i>0.890</i>																								
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width <i>12.0</i> ft		f _{LW} <i></i> mi/h		Rt-Shoulder Lat. Clearance <i>6.0</i> ft																						
Interchange Density <i>0.50</i> l/mi		f _{LC} <i></i> mi/h		Number of Lanes, N <i>3</i>																						
FFS (measured) <i>70.0</i> mi/h		f _{ID} <i></i> mi/h		Base free-flow Speed, BFFS <i></i> mi/h																						
		f _N <i></i> mi/h																								
		FFS <i>70.0</i> mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) <i>1505</i> pc/h/ln			Design LOS																							
S <i>69.8</i> mi/h			v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p) <i></i> pc/h																							
D = v _p / S <i>21.6</i> pc/mi/ln			S <i></i> mi/h																							
LOS <i>C</i>			D = v _p / S <i></i> pc/mi/ln																							
			Required Number of Lanes, N <i></i>																							
Glossary			Factor Location																							
N - Number of lanes		S - Speed		E _R - Exhibits 23-8, 23-10																						
V - Hourly volume		D - Density		f _{LW} - Exhibit 23-4																						
v _p - Flow rate		FFS - Free-flow speed		E _T - Exhibits 23-8, 23-10, 23-11																						
LOS - Level of service		BFFS - Base free-flow speed		f _{LC} - Exhibit 23-5																						
DDHV - Directional design hour volume				f _p - Page 23-12																						
				LOS, S, FFS, v _p - Exhibits 23-2, 23-3																						
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				f _{ID} - Exhibit 23-7																						

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Application	Input	Output																						
Operational (LOS)	FFS, N, v_p	LOS, S, D																						
Design (N)	FFS, LOS, v_p	N, S, D																						
Design (v_p)	FFS, LOS, N	v_p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v_p)	FFS, LOS, N	v_p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																					
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mt 2010 P Alt A AM	Analysis Year	2010																					
Project Description 04-837.2 Northfork Casino Alt A																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	2660	veh/h	Peak-Hour Factor, PHF 0.88																					
AADT		veh/day	%Trucks and Buses, P_T 24																					
Peak-Hr Prop. of AADT, K			%RVs, P_R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV = AADT x K x D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00	E_R	1.2																					
E_T	1.5	$f_{HV} = 1 / (P_T(E_T - 1) + P_R(E_R - 1))$	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW} mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																					
Interchange Density	0.50	l/mi	f_{ID} mi/h																					
Number of Lanes, N	3		f_N mi/h																					
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1133	pc/h/ln	Design LOS																					
S	70.0	mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																					
$D = v_p / S$	16.2	pc/mi/ln	S																					
LOS	B		$D = v_p / S$																					
			Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows design curves for different Levels of Service (LOS) and Free-Flow Speeds (FFS). Key points include: FFS = 75 mi/h, 70 mi/h, 65 mi/h, 60 mi/h, 55 mi/h; LOS A, B, C, D, E; and design flow rates of 1200, 1450, 1600, and 1750 pc/h/ln.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2010 P Alt A PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4137	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
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Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	1761	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
S	68.3	mi/h	f_p																			
$D = v_p / S$	25.8	pc/mi/ln	S																			
LOS	C		$D = v_p / S$																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

ATTACHMENT VI – C - 18

MITIGATED OPENING DAY (2010)

PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.985			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1271	1338	0	0	1573	0	1388	1253	0	0	0	0
Flt Permitted	0.683						0.950					
Satd. Flow (perm)	914	1338	0	0	1573	0	1388	1253	0	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)					13			42				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	170	51	0	0	94	12	184	2	39	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	185	55	0	0	102	13	200	2	42	0	0	0
Lane Group Flow (vph)	185	55	0	0	115	0	200	44	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	33.3	33.3	0.0	0.0	33.3	0.0	26.7	26.7	0.0	0.0	0.0	0.0
Total Split (%)	55.5%	55.5%	0.0%	0.0%	55.5%	0.0%	44.5%	44.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	28.7	28.7			28.7		22.1	22.1				
Flow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	38.3	38.3			38.3		13.7	13.7				
Actuated g/C Ratio	0.64	0.64			0.64		0.23	0.23				
v/c Ratio	0.32	0.06			0.11		0.63	0.14				
Control Delay	5.5	4.2			5.2		29.2	7.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.5	4.2			5.2		29.2	7.2				
LOS	A	A			A		C	A				
Approach Delay		5.2			5.2			25.3				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative A

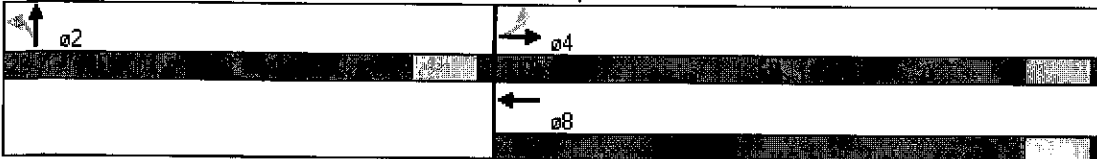
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	15	4			12		65	1				
Queue Length 95th (ft)	40	m15			36		110	19				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	583	854			1009		525	500				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.32	0.06			0.11		0.38	0.09				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 32 (53%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 32.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23













Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50		50		50	50	50	
Trailing Detector (ft)		0		0	0		0		0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.929	
Flt Protected					0.997		0.950				0.996	
Satd. Flow (prot)	0	1385	0	0	1540	0	1421	0	1272	0	1293	0
Flt Permitted					0.966		0.681				0.996	
Satd. Flow (perm)	0	1385	0	0	1492	0	1019	0	1272	0	1293	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		26							97		80	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				45		45	
Link Distance (ft)		295			223				1486		2043	
Travel Time (s)		5.7			4.3				22.5		31.0	
Volume (vph)	0	314	64	16	211	0	81	0	89	12	54	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	34%	23%	23%	23%	27%	27%	27%	36%	36%	36%
Adj. Flow (vph)	0	341	70	17	229	0	88	0	97	13	59	80
Lane Group Flow (vph)	0	411	0	0	246	0	88	0	97	0	152	0
Turn Type				Perm			custom		custom		Perm	
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Detector Phases		4		8	8		2		2	6	6	
Minimum Initial (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Minimum Split (s)		21.3		21.3	21.3		20.6		20.6	20.6	20.6	
Total Split (s)	0.0	35.4	0.0	35.4	35.4	0.0	24.6	0.0	24.6	24.6	24.6	0.0
Total Split (%)	0.0%	59.0%	0.0%	59.0%	59.0%	0.0%	41.0%	0.0%	41.0%	41.0%	41.0%	0.0%
Maximum Green (s)		30.1		30.1	30.1		20.0		20.0	20.0	20.0	
Yellow Time (s)		4.3		4.3	4.3		3.6		3.6	3.6	3.6	
All-Red Time (s)		1.0		1.0	1.0		1.0		1.0	1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		Min		Min	Min	Min	
Walk Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0		0	0	0	
Act Effct Green (s)		41.2		41.2	41.2		10.8		10.8	10.8	10.8	
Actuated g/C Ratio		0.69		0.69	0.69		0.18		0.18	0.18	0.18	
v/c Ratio		0.43		0.24	0.24		0.48		0.31	0.51	0.51	
Control Delay		6.4		1.8	1.8		29.9		7.8	17.1	17.1	
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay		6.4		1.8	1.8		29.9		7.8	17.1	17.1	
LOS		A		A	A		C		A	B	B	
Approach Delay		6.4		1.8	1.8					17.1	17.1	

3: Ave 18.5 & Road 23
 Mitigated 2010 Project AM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A						B	
Queue Length 50th (ft)		47			8		29		0		23	
Queue Length 95th (ft)		125			m18		61		30		63	
Internal Link Dist (ft)		215			143			1406			1963	
Turn Bay Length (ft)												
Base Capacity (vph)		960			1025		350		500		496	
Starvation Cap Reductn		0			0		0		0		0	
Spillback Cap Reductn		0			0		0		0		0	
Storage Cap Reductn		0			0		0		0		0	
Reduced v/c Ratio		0.43			0.24		0.25		0.19		0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 20 (33%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 9.1
 Intersection Capacity Utilization 46.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 3: Ave 18.5 & Road 23









4: Ave 18.5 & Pistacchio
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	276	211	140	94	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	300	229	152	102	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	382				532	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				532	229
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				78	99
cM capacity (veh/h)	1026				460	741
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	301	229	152	107		
Volume Left	1	0	0	102		
Volume Right	0	0	152	4		
cSH	1026	1700	1700	467		
Volume to Capacity	0.00	0.13	0.09	0.23		
Queue Length 95th (ft)	0	0	0	22		
Control Delay (s)	0.0	0.0	0.0	15.0		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		29.9%		ICU Level of Service	A	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	80	83	126	152	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	87	90	137	165	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			978			
pX, platoon unblocked						
vC, conflicting volume	227				184	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227				184	90
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				75	99
cM capacity (veh/h)	1335				673	811
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	90	90	137	170		
Volume Left	3	0	0	165		
Volume Right	0	0	137	4		
cSH	1335	1700	1700	676		
Volume to Capacity	0.00	0.05	0.08	0.25		
Queue Length 95th (ft)	0	0	0	25		
Control Delay (s)	0.3	0.0	0.0	12.1		
Lane LOS	A			B		
Approach Delay (s)	0.3	0.0		12.1		
Approach LOS				B		
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization		22.0%		ICU Level of Service	A	
Analysis Period (min)		15				

6: Ave 18 & Road 23
Mitigated 2010 Project AM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	39	1	129	0	26	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	42	1	140	0	28	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357	313	114	322	313	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357	313	114	322	313	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	95	100			98		
cM capacity (veh/h)	546	577	920	589	571	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	49	141	142								
Volume Left	0	4	1	28								
Volume Right	3	42	0	0								
cSH	632	824	1323	1283								
Volume to Capacity	0.02	0.06	0.00	0.02								
Queue Length 95th (ft)	2	5	0	2								
Control Delay (s)	10.8	9.6	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.8	9.6	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization		30.1%		ICU Level of Service					A			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						98			253			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	60	382	0	0	772	90	350	1	233	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	65	415	0	0	839	98	380	1	253	0	0	0
Lane Group Flow (vph)	65	415	0	0	839	98	190	191	253	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	14.7	46.4	0.0	0.0	31.7	31.7	23.6	23.6	23.6	0.0	0.0	0.0
Total Split (%)	21.0%	66.3%	0.0%	0.0%	45.3%	45.3%	33.7%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	9.4	41.1			26.4	26.4	19.0	19.0	19.0			
Yellow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.4	47.9			39.1	39.1	14.1	14.1	14.1			
Actuated g/C Ratio	0.13	0.68			0.56	0.56	0.20	0.20	0.20			
v/c Ratio	0.32	0.20			0.44	0.11	0.58	0.58	0.34			
Control Delay	23.7	2.3			12.6	3.6	31.8	31.8	4.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	23.7	2.3			12.6	3.6	31.8	31.8	4.5			
LOS	C	A			B	A	C	C	A			
Approach Delay		5.2			11.7			20.9				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	26	14			126	0	77	78	0			
Queue Length 95th (ft)	51	19			204	26	128	129	26			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	234	2092			1918	902	453	454	933			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.28	0.20			0.44	0.11	0.42	0.42	0.27			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 13.0
 Intersection Capacity Utilization 44.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3112	3438	0	1480	1324
Flt Permitted					0.950	
Satd. Flow (perm)	0	3112	3438	0	1480	1324
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						85
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	741	669	0	56	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	805	727	0	61	85
Lane Group Flow (vph)	0	805	727	0	61	85
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	39.4	39.4	0.0	30.6	30.6
Total Split (%)	0.0%	56.3%	56.3%	0.0%	43.7%	43.7%
Maximum Green (s)		34.1	34.1		26.0	26.0
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		53.4	53.4		8.6	8.6
Actuated g/C Ratio		0.76	0.76		0.12	0.12
v/c Ratio		0.34	0.28		0.34	0.36
Control Delay		0.9	1.3		32.6	11.7
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		0.9	1.3		32.6	11.7
LOS		A	A		C	B
Approach Delay		0.9	1.3		20.4	

	↗	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		4	11		25	0
Queue Length 95th (ft)		3	15		56	35
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2376	2625		562	556
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.34	0.28		0.11	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 2.7
 Intersection Capacity Utilization 30.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↑	↗	↖	↗	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.996				0.850			0.850		0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3269	0	1626	3252	1455	1433	1508	1282	3155	1590	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1641	3269	0	1626	3252	1455	1433	1508	1282	3155	1590	0
Right Turn on Red			⚡s			⚡s			⚡s		⚡s	
Satd. Flow (RTOR)		4				163			97		24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	32	470	14	137	460	150	108	41	89	182	25	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	35	511	15	149	500	163	117	45	97	198	27	24
Lane Group Flow (vph)	35	526	0	149	500	163	117	45	97	198	51	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5	8.5	20.5	
Total Split (s)	10.0	22.5	0.0	14.0	26.5	26.5	13.0	22.5	22.5	11.0	20.5	0.0
Total Split (%)	14.3%	32.1%	0.0%	20.0%	37.9%	37.9%	18.6%	32.1%	32.1%	15.7%	29.3%	0.0%
Maximum Green (s)	5.5	18.0		9.5	22.0	22.0	8.5	18.0	18.0	6.5	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	⚡s	⚡s		⚡s	⚡s	⚡s	⚡s	⚡s	⚡s	⚡s	⚡s	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	7.4	28.0		10.0	36.8	36.8	8.6	9.0	9.0	7.0	9.6	
Actuated g/C Ratio	0.11	0.40		0.14	0.53	0.53	0.12	0.13	0.13	0.10	0.14	
v/c Ratio	0.20	0.40		0.64	0.29	0.19	0.67	0.23	0.39	0.63	0.21	
Control Delay	30.6	16.5		35.3	5.8	1.9	49.7	29.5	11.5	40.0	20.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.6	16.5		35.3	5.8	1.9	49.7	29.5	11.5	40.0	20.1	
LOS	C	B		D	A	A	D	C	B	D	C	
Approach Delay		17.4			10.4			31.9			35.9	

10: Ave 17 & GS Blvd
 Mitigated 2010 Project AM Alternative A

10/22/2008

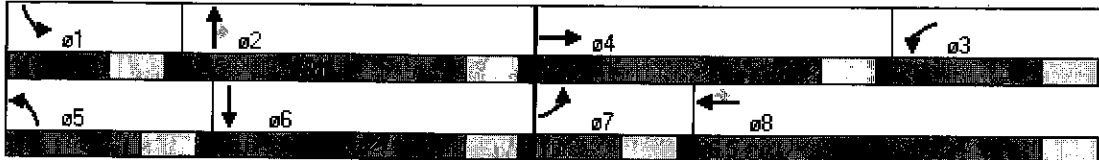
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C				D
Queue Length 50th (ft)	14	81		65	12	0	49	18	0	43	11	
Queue Length 95th (ft)	38	128		#131	74	15	#118	44	37	#80	39	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	174	1312		232	1710	842	184	399	410	316	395	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.40		0.64	0.29	0.19	0.64	0.11	0.24	0.63	0.13	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 20 (29%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 18.8
 Intersection Capacity Utilization 43.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.998			0.972				
Flt Protected					0.986			0.996			0.996	
Satd. Flow (prot)	0	1800	0	0	1715	0	0	1533	0	0	1514	0
Flt Permitted					0.890			0.978			0.974	
Satd. Flow (perm)	0	1800	0	0	1548	0	0	1505	0	0	1480	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		24			2			28				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	0	125	28	46	112	3	16	134	40	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	0	136	30	50	122	3	17	146	43	10	104	0
Lane Group Flow (vph)	0	166	0	0	175	0	0	206	0	0	114	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	30.3	30.3	0.0	30.3	30.3	0.0	29.7	29.7	0.0	29.7	29.7	0.0
Total Split (%)	50.5%	50.5%	0.0%	50.5%	50.5%	0.0%	49.5%	49.5%	0.0%	49.5%	49.5%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		24.4	24.4		24.4	24.4	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.0			14.1			28.5			28.5	
Actuated g/C Ratio		0.28			0.28			0.63			0.63	
v/c Ratio		0.32			0.40			0.22			0.12	
Control Delay		7.8			10.0			5.9			6.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.8			10.0			5.9			6.3	
LOS		A			B			A			A	
Approach Delay		7.8			10.0			5.9			6.3	

11: Ave 17 & Road 23
 Mitigated 2010 Project AM Alternative A

10/22/2008

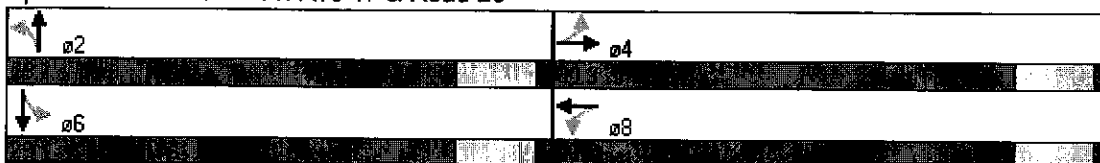
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		13			16			16			10	
Queue Length 95th (ft)		44			52			53			34	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		887			753			1122			1097	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.19			0.23			0.18			0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 45.5
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 40.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Ave 17 & Road 23



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕	↕	↕↕		↕	↕↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.985			0.991	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3387	0	1752	3473	0
Flt Permitted		0.728			0.730		0.950			0.950		
Satd. Flow (perm)	0	1356	1583	0	1360	1583	1719	3387	0	1752	3473	0
Right Turn on Red			↕s			↕s		↕s			↕s	
Satd. Flow (RTOR)			7			103		17			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	38	0	6	41	0	95	6	362	40	55	491	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	41	0	7	45	0	103	7	393	43	60	534	34
Lane Group Flow (vph)	0	41	7	0	45	103	7	436	0	60	568	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							↕s	↕s		↕s	↕s	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.4	10.4		10.4	10.4	8.1	32.7		9.7	36.6	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.61		0.16	0.68	
v/c Ratio		0.17	0.02		0.18	0.28	0.03	0.21		0.21	0.24	
Control Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		14.1			8.9			8.0			6.5	

12: Ellis & Road 26
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A				A
Queue Length 50th (ft)		4	0		4	0	1	15		6	22	
Queue Length 95th (ft)		29	8		31	29	10	76		38	91	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		521	613		523	672	360	2331		391	2518	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.01		0.09	0.15	0.02	0.19		0.15	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 53.8

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 7.6

Intersection Capacity Utilization 36.8%

Analysis Period (min) 15

Intersection LOS: A











ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			19.1%	ICU Level of Service		A
Analysis Period (min)			15			










14: Gateway & Ave 16 Connector
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↓		↑	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)			15			













15: Kennedy & Ave 16 Connector
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)				1		237
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	285	165	1	49	218
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	310	179	1	53	237
Lane Group Flow (vph)	130	310	179	1	53	237
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
ℳflow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	ℳs		ℳs	ℳs		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.5	10.7	10.7	13.7	13.7
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.38	0.38
v/c Ratio	0.34	0.35	0.36	0.00	0.08	0.33
Control Delay	17.0	5.7	14.3	10.0	14.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	5.7	14.3	10.0	14.5	4.5
LOS	B	A	B	A	B	A
Approach Delay		9.0	14.3		6.3	

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative A

10/22/2008

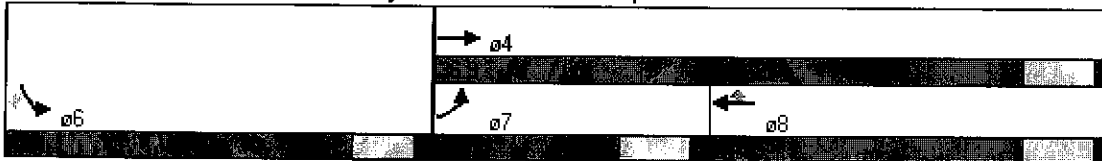
	↖	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	30	0	9	0
Queue Length 95th (ft)	71	68	82	3	34	42
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	456	1177	710	604	887	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.25	0.00	0.06	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.2
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 28.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.939			0.951				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		37			22				3		207	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	50	34	147	42	20	20	41	3	47	79	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	54	37	160	46	22	22	45	3	51	86	228
Lane Group Flow (vph)	4	91	0	160	68	0	22	45	3	51	314	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	vs	vs		vs	vs		vs	vs	vs	vs	vs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.5	7.1		8.7	15.9		4.5	17.1	17.1	16.6	34.6	
Actuated g/C Ratio	0.06	0.11		0.14	0.25		0.07	0.27	0.27	0.26	0.55	
v/c Ratio	0.04	0.23		0.66	0.08		0.19	0.09	0.01	0.11	0.33	
Control Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
LOS	C	B		D	B		C	B	B	C	A	
Approach Delay		19.7			34.0			23.9		7.3		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	10		62	6		9	14	0	16	18	
Queue Length 95th (ft)	10	30		#143	23		29	37	6	41	73	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	114	763		252	1054		117	479	431	465	958	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.12		0.63	0.06		0.19	0.09	0.01	0.11	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 63.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 18.5
 Intersection Capacity Utilization 34.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						135			174			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35				35			30			30
Link Distance (ft)		391				1686			1254			906
Travel Time (s)		7.6				32.8			28.5			20.6
Volume (vph)	82	533	0	0	673	124	350	0	160	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	89	579	0	0	732	135	380	0	174	0	0	0
Lane Group Flow (vph)	89	579	0	0	732	135	190	190	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	12.4	38.5	0.0	0.0	26.1	26.1	21.5	21.5	21.5	0.0	0.0	0.0
Total Split (%)	20.7%	64.2%	0.0%	0.0%	43.5%	43.5%	35.8%	35.8%	35.8%	0.0%	0.0%	0.0%
Maximum Green (s)	7.8	33.9			21.5	21.5	17.0	17.0	17.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	7.8	34.5			24.7	24.7	17.5	17.5	17.5			
Actuated g/C Ratio	0.13	0.58			0.41	0.41	0.29	0.29	0.29			
v/c Ratio	0.39	0.29			0.51	0.19	0.40	0.40	0.31			
Control Delay	36.5	2.7			15.8	3.7	20.2	20.2	4.9			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.5	2.7			15.8	3.7	20.2	20.2	4.9			
LOS	D	A			B	A	C	C	A			
Approach Delay		7.2			13.9			15.4				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	31	13			108	0	57	57	0			
Queue Length 95th (ft)	72	18			156	29	110	110	37			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	243	1996			1430	719	472	472	568			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.37	0.29			0.51	0.19	0.40	0.40	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 23 (38%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			393									111
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	503	362	278	745	0	0	0	0	112	0	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	547	393	302	810	0	0	0	0	122	0	111
Lane Group Flow (vph)	0	547	393	302	810	0	0	0	0	0	122	111
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	21.2	21.2	18.3	39.5	0.0	0.0	0.0	0.0	20.5	20.5	20.5
Total Split (%)	0.0%	35.3%	35.3%	30.5%	65.8%	0.0%	0.0%	0.0%	0.0%	34.2%	34.2%	34.2%
Maximum Green (s)		16.6	16.6	13.7	34.9					16.0	16.0	16.0
Flow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		25.7	25.7	14.3	44.8						10.1	10.1
Actuated g/C Ratio		0.43	0.43	0.24	0.75						0.17	0.17
v/c Ratio		0.38	0.45	0.74	0.32						0.46	0.33
Control Delay		14.3	3.9	27.0	1.7						27.2	7.9
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		14.3	3.9	27.0	1.7						27.2	7.9
LOS		B	A	C	A						C	A
Approach Delay		9.9			8.6						18.0	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A						B	
Queue Length 50th (ft)		72	0	88	11						40	0
Queue Length 95th (ft)		123	51	#199	34						78	33
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1443	870	410	2565						439	473
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.38	0.45	0.74	0.32						0.28	0.23

Intersection Summary













Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 28 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
Mitigated 2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	1	22	0	167	29	18	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	1	24	0	182	32	20	136	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	388	136	372	372	197	136			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	388	136	372	372	197	136			213		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	540	538	913	578	549	844	1350			1262		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	61	213	155								
Volume Left	0	36	0	20								
Volume Right	0	24	32	0								
cSH	1700	659	1350	1262								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	8	0	1								
Control Delay (s)	0.0	11.0	0.0	1.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.0	0.0	1.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frts					0.976						0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3293	0	0	0	0	1752	1568	0
Flt Permitted	0.394									0.950		
Satd. Flow (perm)	1332	3312	0	0	3293	0	0	0	0	1752	1568	0
Right Turn on Red			ts			ts			ts		ts	
Satd. Flow (RTOR)					53						467	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	394	351	0	0	474	90	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	428	382	0	0	515	98	0	0	0	158	0	78
Lane Group Flow (vph)	428	382	0	0	613	0	0	0	0	158	78	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	44.5	44.5	0.0	0.0	44.5	0.0	0.0	0.0	0.0	25.5	25.5	0.0
Total Split (%)	63.6%	63.6%	0.0%	0.0%	63.6%	0.0%	0.0%	0.0%	0.0%	36.4%	36.4%	0.0%
Maximum Green (s)	39.9	39.9			39.9					21.0	21.0	
Flow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	53.4	53.4			53.4					11.5	11.5	
Actuated g/C Ratio	0.76	0.76			0.76					0.16	0.16	
v/c Ratio	0.42	0.15			0.24					0.55	0.12	
Control Delay	5.1	2.8			3.5					33.3	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	5.1	2.8			3.5					33.3	0.4	
LOS	A	A			A					C	A	
Approach Delay		4.0			3.5						22.4	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

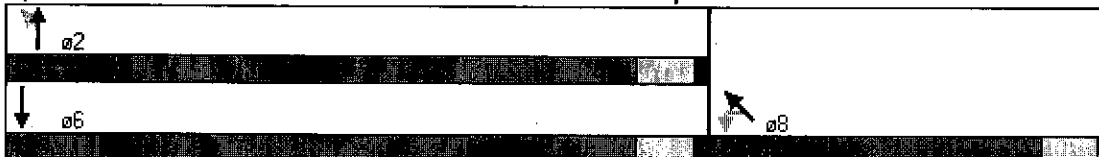
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	29	22			33					63	0	
Queue Length 95th (ft)	43	38			65					109	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1016	2528			2526					538	805	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.42	0.15			0.24					0.29	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 61 (87%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 6.4
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘				↖	↗			↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.994				0.850
Flt Protected	0.950						0.950				0.991	
Satd. Flow (prot)	1719	1810	1538	0	0	0	3213	3292	0	0	3440	1553
Flt Permitted	0.950						0.950				0.783	
Satd. Flow (perm)	1719	1810	1538	0	0	0	3213	3292	0	0	2718	1553
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)			358					10				212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	203	78	329	0	0	0	93	546	21	50	229	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	221	85	358	0	0	0	101	593	23	54	249	212
Lane Group Flow (vph)	221	85	358	0	0	0	101	616	0	0	303	212
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	24.8	24.8	24.8	0.0	0.0	0.0	22.6	45.2	0.0	22.6	22.6	22.6
Total Split (%)	35.4%	35.4%	35.4%	0.0%	0.0%	0.0%	32.3%	64.6%	0.0%	32.3%	32.3%	32.3%
Maximum Green (s)	20.3	20.3	20.3				18.0	40.6		18.0	18.0	18.0
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead
Lead-Lag Optimize?							ℳs			ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	20.8	20.8	20.8				18.6	41.2		18.6	18.6	18.6
Actuated g/C Ratio	0.30	0.30	0.30				0.27	0.59		0.27	0.27	0.27
v/c Ratio	0.43	0.16	0.50				0.12	0.32		0.42	0.37	0.37
Control Delay	14.6	10.9	3.6				20.0	7.7		18.8	3.6	3.6
Queue Delay	3.9	0.0	1.1				0.0	0.0		0.0	0.0	0.0
Total Delay	18.5	10.9	4.7				20.0	7.7		18.8	3.6	3.6
LOS	B	B	A				B	A		B	A	A
Approach Delay		10.1						9.4			12.5	

22: AVE 14/Olive & SR 145/Madera
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						A			B	
Queue Length 50th (ft)	36	14	0				17	62			49	0
Queue Length 95th (ft)	92	m28	0				34	89			73	17
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	511	538	709				854	1942			722	568
Starvation Cap Reductn	209	0	161				0	0			0	0
Spillback Cap Reductn	0	0	0				0	0			0	0
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	0.73	0.16	0.65				0.12	0.32			0.42	0.37

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 32 (46%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 10.5
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frts						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	331	287	0	279	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	360	312	0	303	187
Lane Group Flow (vph)	0	360	312	0	303	187
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	34.5	34.5	0.0	35.5	35.5
Total Split (%)	0.0%	49.3%	49.3%	0.0%	50.7%	50.7%
Maximum Green (s)		30.0	30.0		31.0	31.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		50.3	50.3		11.7	11.7
Actuated g/C Ratio		0.72	0.72		0.17	0.17
v/c Ratio		0.14	0.12		0.56	0.46
Control Delay		3.6	2.6		30.4	8.2
Queue Delay		0.0	0.2		0.0	0.0
Total Delay		3.6	2.8		30.4	8.2
LOS		A	A		C	A
Approach Delay		3.6	2.8		21.9	

23: AVE 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		19	13		62	0
Queue Length 95th (ft)		38	20		92	47
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2518	2518		1459	776
Starvation Cap Reductn		0	1550		0	0
Spillback Cap Reductn		0	0		23	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.14	0.32		0.21	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 60 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 25.3%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 Mitigated 2010 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	16	68	6	14	67	54	8	75	8	49	82	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	7	15	73	59	9	82	9	53	89	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	147	99	172								
Volume Left (vph)	17	15	9	53								
Volume Right (vph)	7	59	9	29								
Hadj (s)	0.13	0.02	0.30	0.25								
Departure Headway (s)	4.9	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.14	0.23								
Capacity (veh/h)	678	708	669	693								
Control Delay (s)	8.7	8.9	8.9	9.4								
Approach Delay (s)	8.7	8.9	8.9	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
HCM Level of Service			A									
Intersection Capacity Utilization			30.9%		ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
 Mitigated 2010 Project AM Alternative A

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.677	
Satd. Flow (perm)	3303	1524	1696	1442	1249	1845
Right Turn on Red		8s		8s		
Satd. Flow (RTOR)		82		239		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	745		408			1104
Travel Time (s)	16.9		9.3			25.1
Volume (vph)	387	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	421	82	125	239	155	74
Lane Group Flow (vph)	421	82	125	239	155	74
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	42.6	42.6	47.4	47.4	47.4	47.4
Total Split (%)	47.3%	47.3%	52.7%	52.7%	52.7%	52.7%
Maximum Green (s)	38.1	38.1	42.9	42.9	42.9	42.9
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	65.9	65.9	16.1	16.1	16.1	16.1
Actuated g/C Ratio	0.73	0.73	0.18	0.18	0.18	0.18
v/c Ratio	0.17	0.07	0.41	0.53	0.69	0.22
Control Delay	4.5	1.4	15.9	6.0	49.8	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	1.4	15.9	6.0	49.8	31.2
LOS	A	A	B	A	D	C
Approach Delay	4.0		9.4			43.8

25: SB Ramps & GS Blvd
 Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	A		A			D
Queue Length 50th (ft)	36	0	35	16	80	35
Queue Length 95th (ft)	60	14	m40	m21	139	68
Internal Link Dist (ft)	665		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2417	1137	818	819	602	890
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.07	0.15	0.29	0.26	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 20 (22%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 32.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50				
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00				
Frt			0.850		0.952			0.871				0.850				
Flt Protected	0.950			0.950			0.950			0.950						
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1518	0	3273	1776	1509				
Flt Permitted	0.950			0.950			0.950			0.950						
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1518	0	3273	1776	1509				
Right Turn on Red			\forall s			\forall s		\forall s		\forall s		\forall s				
Satd. Flow (RTOR)			17		29			18				62				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Link Speed (mph)		35			35			30			30					
Link Distance (ft)		1843			818			837			408					
Travel Time (s)		35.9			15.9			19.0			9.3					
Volume (vph)	180	234	16	14	320	152	16	3	17	387	11	57				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%				
Adj. Flow (vph)	196	254	17	15	348	165	17	3	18	421	12	62				
Lane Group Flow (vph)	196	254	17	15	513	0	17	21	0	421	12	62				
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm				
Protected Phases	7	4		3	8		5	2		1	6					
Permitted Phases			4									6				
Detector Phases	7	4	4	3	8		5	2		1	6	6				
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0				
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6				
Total Split (s)	17.0	43.8	43.8	8.6	35.4	0.0	8.6	20.6	0.0	17.0	29.0	29.0				
Total Split (%)	18.9%	48.7%	48.7%	9.6%	39.3%	0.0%	9.6%	22.9%	0.0%	18.9%	32.2%	32.2%				
Maximum Green (s)	12.4	39.2	39.2	4.0	30.8		4.1	16.1		12.5	24.5	24.5				
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5				
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0				
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s	\forall s				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0				
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max				
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0				
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0				
Pedestrian Calls (#/hr)		0	0		0			0			0	0				
Act Effct Green (s)	12.8	44.8	44.8	4.6	31.4		4.8	16.8		13.0	30.4	30.4				
Actuated g/C Ratio	0.14	0.50	0.50	0.05	0.35		0.05	0.19		0.14	0.34	0.34				
v/c Ratio	0.86	0.30	0.02	0.18	0.88		0.19	0.07		0.89	0.02	0.11				
Control Delay	70.8	15.5	6.7	38.5	32.8		46.2	15.9		56.4	21.4	6.4				
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0				
Total Delay	70.8	15.5	6.7	38.5	32.8		46.2	15.9		56.4	21.4	6.4				
LOS	E	B	A	D	C		D	B		E	C	A				
Approach Delay		38.4			32.9			29.4			49.3					

26: Ave 12 & GS Blvd
 Mitigated 2010 Project AM Alternative A

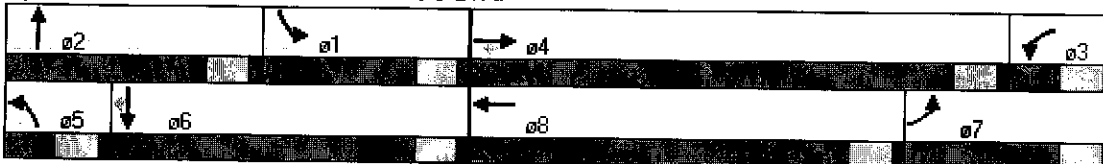
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	110	74	0	9	282		9	1		124	3	0
Queue Length 95th (ft)	#229	149	12	m21	#423		31	21		#176	16	21
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	233	843	726	82	582		89	298		473	599	550
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.84	0.30	0.02	0.18	0.88		0.19	0.07		0.89	0.02	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 39.8
 Intersection LOS: D
 Intersection Capacity Utilization 63.8%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2010 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Fit Protected	0.950							0.950				
Satd. Flow (prot)	1656	1743	0	0	1792	1524	0	1597	1429	0	0	0
Fit Permitted	0.950							0.950				
Satd. Flow (perm)	1656	1743	0	0	1792	1524	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						421			129			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	81	557	0	0	292	387	194	0	119	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	88	605	0	0	317	421	211	0	129	0	0	0
Lane Group Flow (vph)	88	605	0	0	317	421	0	211	129	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.6	20.6	20.6			
Total Split (s)	20.7	59.2	0.0	0.0	38.5	38.5	30.8	30.8	30.8	0.0	0.0	0.0
Total Split (%)	23.0%	65.8%	0.0%	0.0%	42.8%	42.8%	34.2%	34.2%	34.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.1	54.6			33.9	33.9	26.2	26.2	26.2			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	14.7	65.0			48.4	48.4		17.0	17.0			
Actuated g/C Ratio	0.16	0.72			0.54	0.54		0.19	0.19			
v/c Ratio	0.33	0.48			0.33	0.41		0.70	0.34			
Control Delay	32.9	4.9			15.7	3.1		46.0	7.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	32.9	4.9			15.7	3.1		46.0	7.9			
LOS	C	A			B	A		D	A			
Approach Delay		8.4			8.5			31.6				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project AM Alternative A

10/22/2008

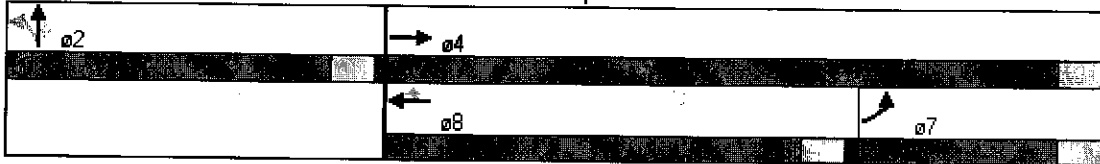
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	51	94			106	0		113	0			
Queue Length 95th (ft)	m73	m116			193	53		173	42			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	307	1259			965	1015		476	516			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.29	0.48			0.33	0.41		0.44	0.25			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 49.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.991			0.850				
Fit Protected	0.950						0.950					
Satd. Flow (prot)	1467	1545	0	0	1652	0	1504	1346	0	0	0	0
Fit Permitted	0.678						0.950					
Satd. Flow (perm)	1047	1545	0	0	1652	0	1504	1346	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					7			884				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	154	66	0	0	106	7	239	0	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	167	72	0	0	115	8	260	0	55	0	0	0
Lane Group Flow (vph)	167	72	0	0	123	0	260	55	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	30.0	30.0	0.0	0.0	30.0	0.0	30.0	30.0	0.0	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	25.4	25.4			25.4		25.4	25.4				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	36.8	36.8			36.8		15.2	15.2				
Actuated g/C Ratio	0.61	0.61			0.61		0.25	0.25				
v/c Ratio	0.26	0.08			0.12		0.68	0.05				
Control Delay	3.7	2.9			6.3		28.7	0.1				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	3.7	2.9			6.3		28.7	0.1				
LOS	A	A			A		C	A				
Approach Delay		3.5			6.3			23.7				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

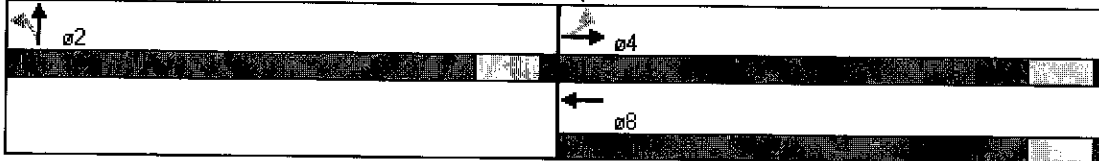
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	8	3			15		85	0				
Queue Length 95th (ft)	m21	m9			44		131	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	642	947			1015		652	1084				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.26	0.08			0.12		0.40	0.05				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 25 (42%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 35.1%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕		↕		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50		50		50	50	50	
Trailing Detector (ft)		0		0	0		0		0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974							0.850		0.929	
Flt Protected					0.994		0.950				0.994	
Satd. Flow (prot)	0	1542	0	0	1587	0	1467	0	1313	0	1253	0
Flt Permitted					0.915		0.551				0.994	
Satd. Flow (perm)	0	1542	0	0	1461	0	851	0	1313	0	1253	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		34							71		93	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			45		45		
Link Distance (ft)		295			223			1486		2043		
Travel Time (s)		5.7			4.3			22.5		31.0		
Volume (vph)	0	435	103	32	252	0	79	0	65	23	75	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	20%	19%	19%	19%	23%	23%	23%	40%	40%	40%
Adj. Flow (vph)	0	473	112	35	274	0	86	0	71	25	82	118
Lane Group Flow (vph)	0	585	0	0	309	0	86	0	71	0	225	0
Turn Type				Perm			custom		custom		Perm	
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Detector Phases		4		8	8		2		2	6	6	
Minimum Initial (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Minimum Split (s)		20.6		20.6	20.6		21.3		21.3	21.3	21.3	
Total Split (s)	0.0	38.7	0.0	38.7	38.7	0.0	21.3	0.0	21.3	21.3	21.3	0.0
Total Split (%)	0.0%	64.5%	0.0%	64.5%	64.5%	0.0%	35.5%	0.0%	35.5%	35.5%	35.5%	0.0%
Maximum Green (s)		34.1		34.1	34.1		16.0		16.0	16.0	16.0	
ℳlow Time (s)		3.6		3.6	3.6		4.3		4.3	4.3	4.3	
All-Red Time (s)		1.0		1.0	1.0		1.0		1.0	1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		Min		Min	Min	Min	
Walk Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0		0	0	0	
Act Effct Green (s)		39.4		39.4	39.4		12.6		12.6	12.6	12.6	
Actuated g/C Ratio		0.66		0.66	0.66		0.21		0.21	0.21	0.21	
v/c Ratio		0.57		0.32	0.32		0.48		0.21	0.67	0.67	
Control Delay		9.1		3.8	3.8		28.6		6.7	22.3	22.3	
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay		9.1		3.8	3.8		28.6		6.7	22.3	22.3	
LOS		A		A	A		C		A	A	C	
Approach Delay		9.1		3.8	3.8						22.3	

3: Ave 18.5 & Road 23
 Mitigated 2010 Project PM Alternative A

10/22/2008

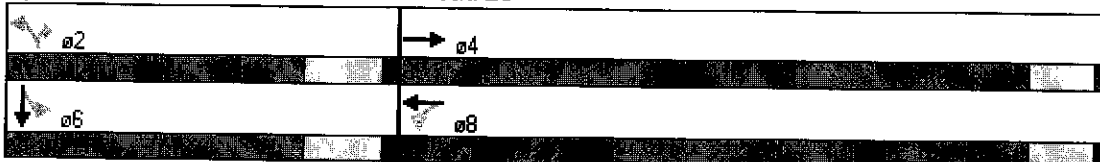
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A							C
Queue Length 50th (ft)		90			11		27		0			42
Queue Length 95th (ft)		213			m48		60		24			97
Internal Link Dist (ft)		215			143			1406				1963
Turn Bay Length (ft)												
Base Capacity (vph)		1024			959		245		429			427
Starvation Cap Reductn		0			0		0		0			0
Spillback Cap Reductn		0			0		0		0			0
Storage Cap Reductn		0			0		0		0			0
Reduced v/c Ratio		0.57			0.32		0.35		0.17			0.53

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 11.3
 Intersection Capacity Utilization 66.4%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.












Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 3: Ave 18.5 & Road 23









4: Ave 18.5 & Pistacchio
 Mitigated 2010 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	376	212	228	156	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	409	230	248	170	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	478				663	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478				663	230
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				58	99
cM capacity (veh/h)	997				402	778
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	421	230	248	176		
Volume Left	12	0	0	170		
Volume Right	0	0	248	7		
cSH	997	1700	1700	409		
Volume to Capacity	0.01	0.14	0.15	0.43		
Queue Length 95th (ft)	1	0	0	53		
Control Delay (s)	0.4	0.0	0.0	20.3		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		20.3		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization		44.3%		ICU Level of Service		A
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
 Mitigated 2010 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	117	93	138	190	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	127	101	150	207	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			978			
pX, platoon unblocked						
vC, conflicting volume	251				230	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251				230	101
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				69	100
cM capacity (veh/h)	1314				661	836
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	128	101	150	210		
Volume Left	1	0	0	207		
Volume Right	0	0	150	3		
cSH	1314	1700	1700	663		
Volume to Capacity	0.00	0.06	0.09	0.32		
Queue Length 95th (ft)	0	0	0	34		
Control Delay (s)	0.1	0.0	0.0	12.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		24.3%		ICU Level of Service		A
Analysis Period (min)			15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	54	4	67	114	37	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	59	4	73	124	40	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	454	168	408	393	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	454	168	408	393	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	94	100			97		
cM capacity (veh/h)	442	472	853	515	520	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	75	201	210								
Volume Left	1	0	4	40								
Volume Right	7	59	124	2								
cSH	532	780	1316	1296								
Volume to Capacity	0.05	0.10	0.00	0.03								
Queue Length 95th (ft)	4	8	0	2								
Control Delay (s)	12.1	10.1	0.2	1.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.1	10.1	0.2	1.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization		35.1%			ICU Level of Service				A			
Analysis Period (min)			15									













7: Ave 17 & SR 99 NB ramps
Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Fit Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Fit Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		
Satd. Flow (RTOR)						208			228			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	74	854	0	0	1081	191	422	2	720	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	80	928	0	0	1175	208	459	2	783	0	0	0
Lane Group Flow (vph)	80	928	0	0	1175	208	230	231	783	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	12.0	50.0	0.0	0.0	38.0	38.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	15.0%	62.5%	0.0%	0.0%	47.5%	47.5%	37.5%	37.5%	37.5%	0.0%	0.0%	0.0%
Maximum Green (s)	7.5	45.5			33.5	33.5	25.5	25.5	25.5			
ℳlow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	7.6	49.0			39.4	39.4	23.0	23.0	23.0			
Actuated g/C Ratio	0.10	0.61			0.49	0.49	0.29	0.29	0.29			
v/c Ratio	0.49	0.44			0.67	0.24	0.48	0.49	0.83			
Control Delay	36.4	6.4			19.7	3.0	26.5	26.5	26.4			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.4	6.4			19.7	3.0	26.5	26.5	26.4			
LOS	D	A			B	A	C	C	C			
Approach Delay		8.8			17.2			26.5				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative A

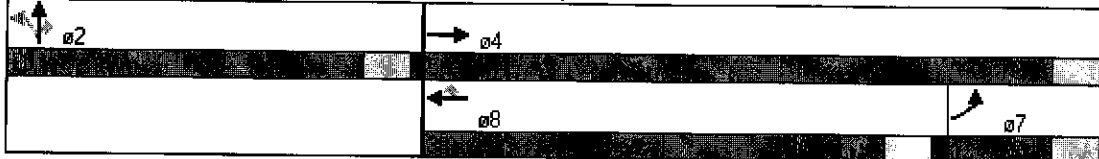
10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	32	62			257	0	93	93	139			
Queue Length 95th (ft)	m64	116			337	37	160	161	214			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	172	2105			1742	885	536	538	1042			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.47	0.44			0.67	0.24	0.43	0.43	0.75			

Intersection Summary







Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 68 (85%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 55.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3471	3471	0	1687	1509
Flt Permitted					0.950	
Satd. Flow (perm)	0	3471	3471	0	1687	1509
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						90
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1253	1010	0	209	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	1362	1098	0	227	99
Lane Group Flow (vph)	0	1362	1098	0	227	99
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	50.7	50.7	0.0	29.3	29.3
Total Split (%)	0.0%	63.4%	63.4%	0.0%	36.6%	36.6%
Maximum Green (s)		45.4	45.4		24.7	24.7
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		56.2	56.2		15.8	15.8
Actuated g/C Ratio		0.70	0.70		0.20	0.20
v/c Ratio		0.56	0.45		0.68	0.27
Control Delay		1.9	2.4		39.6	8.8
Queue Delay		0.2	0.0		0.0	0.0
Total Delay		2.0	2.4		39.6	8.8
LOS		A	A		D	A
Approach Delay		2.0	2.4		30.3	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative A

10/22/2008

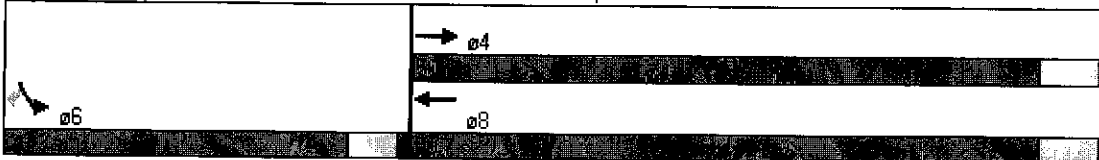
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		19	35		106	4
Queue Length 95th (ft)		52	90		163	38
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2437	2437		534	539
Starvation Cap Reductn		286	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.63	0.45		0.43	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 69 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 5.5
 Intersection Capacity Utilization 52.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.983				0.850			0.850		0.940	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3412	0	1719	3438	1538	1752	1845	1568	3099	1581	0
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3412	0	1719	3438	1538	1752	1845	1568	3099	1581	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		17				328			262		35	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	42	673	85	162	637	302	126	84	241	339	49	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	46	732	92	176	692	328	137	91	262	368	53	35
Lane Group Flow (vph)	46	824	0	176	692	328	137	91	262	368	88	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	21.3		8.5	21.3	21.3	8.5	20.6	20.6	8.5	20.6	
Total Split (s)	10.4	27.2	0.0	15.7	32.5	32.5	13.4	20.6	20.6	16.5	23.7	0.0
Total Split (%)	13.0%	34.0%	0.0%	19.6%	40.6%	40.6%	16.8%	25.8%	25.8%	20.6%	29.6%	0.0%
Maximum Green (s)	5.9	21.9		11.2	27.2	27.2	8.9	16.0	16.0	12.0	19.1	
Yellow Time (s)	3.5	4.3		3.5	4.3	4.3	3.5	3.6	3.6	3.5	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	vs	vs		vs	vs	vs	vs	vs	vs	vs	vs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	6.7	27.6		11.7	36.7	36.7	15.9	9.9	9.9	14.8	8.8	
Actuated g/C Ratio	0.08	0.34		0.15	0.46	0.46	0.20	0.12	0.12	0.18	0.11	
v/c Ratio	0.32	0.69		0.70	0.44	0.37	0.39	0.40	0.62	0.64	0.43	
Control Delay	40.7	27.2		38.7	9.4	3.1	31.0	36.6	11.2	35.6	27.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.7	27.2		38.7	9.4	3.1	31.0	36.6	11.2	35.6	27.8	
LOS	D	C		D	A	A	C	D	B	D	C	
Approach Delay		27.9			12.0			21.5			34.1	

10: Ave 17 & GS Blvd
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	22	183		81	70	0	59	43	0	87	25	
Queue Length 95th (ft)	55	#278		#170	132	28	110	81	62	132	65	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	147	1189		251	1579	884	347	383	533	582	416	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.31	0.69		0.70	0.44	0.37	0.39	0.24	0.49	0.63	0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 10 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 21.5
 Intersection Capacity Utilization 56.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23













Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.996			0.952			0.992	
Flt Protected					0.987			0.991			0.996	
Satd. Flow (prot)	0	1807	0	0	1746	0	0	1586	0	0	1647	0
Flt Permitted					0.861			0.924			0.974	
Satd. Flow (perm)	0	1807	0	0	1523	0	0	1479	0	0	1610	0
Right Turn on Red			vs			vs			vs			vs
Satd. Flow (RTOR)		32			4			56			6	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	0	187	53	70	188	8	45	114	88	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	0	203	58	76	204	9	49	124	96	12	147	10
Lane Group Flow (vph)	0	261	0	0	289	0	0	269	0	0	169	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	31.6	31.6	0.0	31.6	31.6	0.0	28.4	28.4	0.0	28.4	28.4	0.0
Total Split (%)	52.7%	52.7%	0.0%	52.7%	52.7%	0.0%	47.3%	47.3%	0.0%	47.3%	47.3%	0.0%
Maximum Green (s)	26.3	26.3		26.3	26.3		23.1	23.1		23.1	23.1	
Flow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		12.8			13.0			16.4			16.4	
Actuated g/C Ratio		0.36			0.37			0.49			0.49	
v/c Ratio		0.39			0.52			0.35			0.21	
Control Delay		8.7			11.9			8.8			9.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.7			11.9			8.8			9.0	
LOS		A			B			A			A	
Approach Delay		8.7			11.9			8.8			9.0	

11: Ave 17 & Road 23
 Mitigated 2010 Project PM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		24			32			25			18	
Queue Length 95th (ft)		79			102			88			62	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1018			848			937			999	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			0.34			0.29			0.17	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 33.3

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 9.7

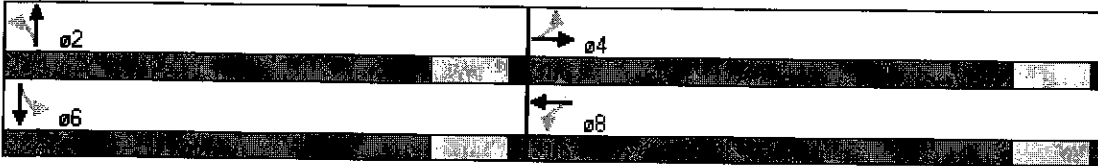
Intersection Capacity Utilization 62.8%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service B

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis & Road 26

Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.988			0.979	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3497	0	1770	3465	0
Flt Permitted		0.704			0.729		0.950			0.950		
Satd. Flow (perm)	0	1311	1583	0	1358	1583	1770	3497	0	1770	3465	0
Right Turn on Red												
Satd. Flow (RTOR)			15			233		13			27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	99	1	14	57	4	214	11	780	67	195	752	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	1	15	62	4	233	12	848	73	212	817	132
Lane Group Flow (vph)	0	109	15	0	66	233	12	921	0	212	949	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.7	10.7		10.7	10.7	7.0	26.5		10.7	36.3	
Actuated g/C Ratio		0.19	0.19		0.19	0.19	0.11	0.50		0.19	0.68	
v/c Ratio		0.43	0.05		0.25	0.47	0.06	0.53		0.62	0.40	
Control Delay		25.4	10.0		21.5	6.8	26.5	15.1		29.7	7.3	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.4	10.0		21.5	6.8	26.5	15.1		29.7	7.3	
LOS		C	A		C	A	C	B		C	A	
Approach Delay		23.5			10.0			15.2			11.4	
Approach LOS		C			B			B			B	

12: Ellis & Road 26

Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		33	0		19	0	4	128		65	58	
Queue Length 95th (ft)		72	12		47	46	17	214		#150	194	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		459	563		475	705	319	1784		373	2366	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.24	0.03		0.14	0.33	0.04	0.52		0.57	0.40	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 53.3

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 13.3

Intersection LOS: B

Intersection Capacity Utilization 56.7%

ICU Level of Service B

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.










Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis & Road 26












13: Kennedy & Gateway
 Mitigated 2010 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	215	3	0	174	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	234	3	0	189	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	274		465	232		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274		465	232		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1283		556	808		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	234	3	274			
Volume Left	0	3	0			
Volume Right	0	0	85			
cSH	1700	556	1700			
Volume to Capacity	0.14	0.01	0.16			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.5	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.5	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		24.4%		ICU Level of Service		A
Analysis Period (min)			15			

14: Gateway & AVE 16 Connector
 Mitigated 2010 Project PM Alternative A

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	78	3	108	297	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	3	117	323	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121				147	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				147	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				62	100
cM capacity (veh/h)	1461				846	1003
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	85	121	323			
Volume Left	0	0	323			
Volume Right	0	117	0			
cSH	1700	1700	846			
Volume to Capacity	0.05	0.07	0.38			
Queue Length 95th (ft)	0	0	45			
Control Delay (s)	0.0	0.0	11.9			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization		30.0%		ICU Level of Service		A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 Mitigated 2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	297	215	173	0	0	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	323	234	188	0	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked					0.96	
vC, conflicting volume	188				1067	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				1070	188
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	77				100	86
cM capacity (veh/h)	1386				179	849
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	557	188	117			
Volume Left	323	0	0			
Volume Right	0	0	117			
cSH	1386	1700	849			
Volume to Capacity	0.23	0.11	0.14			
Queue Length 95th (ft)	23	0	12			
Control Delay (s)	5.8	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	5.8	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization		43.5%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
Mitigated 2010 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				\forall s		\forall s
Satd. Flow (RTOR)				3		410
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	394	279	3	78	377
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	428	303	3	85	410
Lane Group Flow (vph)	98	428	303	3	85	410
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	13.9	36.5	22.6	22.6	23.5	23.5
Total Split (%)	23.2%	60.8%	37.7%	37.7%	39.2%	39.2%
Maximum Green (s)	9.0	31.6	17.7	17.7	19.0	19.0
Flow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	\forall s		\forall s	\forall s		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.4	19.9	13.4	13.4	9.4	9.4
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.24	0.24
v/c Ratio	0.28	0.44	0.47	0.01	0.20	0.59
Control Delay	19.6	7.1	15.0	9.3	15.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	7.1	15.0	9.3	15.7	6.1
LOS	B	A	B	A	B	A
Approach Delay		9.5	14.9		7.8	
Approach LOS		A	B		A	

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative A

10/22/2008

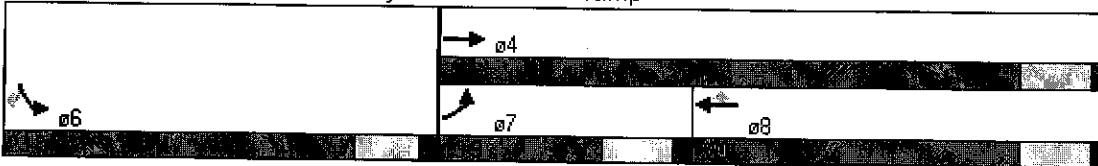
	↖	→	←	↖	↘	↘
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	38	56	0	17	0
Queue Length 95th (ft)	66	121	144	5	50	54
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	406	1221	829	706	744	903
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.35	0.37	0.00	0.11	0.45

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 38.5
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 44.7%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.943			0.963				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3337	0	1770	3408	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3337	0	1770	3408	0	1770	1770	1583	1770	1583	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		47			34				7		142	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	70	43	319	97	31	39	90	6	86	141	310
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	76	47	347	105	34	42	98	7	93	153	337
Lane Group Flow (vph)	3	123	0	347	139	0	42	98	7	93	490	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	22.0	34.0	0.0	8.9	23.3	23.3	13.8	28.2	0.0
Total Split (%)	11.1%	26.1%	0.0%	27.5%	42.5%	0.0%	11.1%	29.1%	29.1%	17.3%	35.3%	0.0%
Maximum Green (s)	4.0	16.0		17.1	29.1		4.0	18.4	18.4	8.9	23.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	vs	vs		vs	vs		vs	vs	vs	vs		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	5.0	8.0		16.6	24.4		4.9	22.6	22.6	8.8	27.8	
Actuated g/C Ratio	0.07	0.12		0.25	0.36		0.07	0.34	0.34	0.13	0.42	
v/c Ratio	0.03	0.29		0.79	0.11		0.34	0.16	0.01	0.41	0.66	
Control Delay	34.0	20.8		39.4	11.6		40.2	21.4	12.3	34.6	19.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	20.8		39.4	11.6		40.2	21.4	12.3	34.6	19.7	
LOS	C	C		D	B		D	C	B	C	B	
Approach Delay		21.1			31.4			26.4		22.1		
Approach LOS		C			C			C		C		

17: Ave 16 & Aviation Drive
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	16		141	13		18	33	0	38	134	
Queue Length 95th (ft)	9	39		#277	36		48	71	9	82	#301	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	119	763		472	1449		124	598	540	249	740	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.16		0.74	0.10		0.34	0.16	0.01	0.37	0.66	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 66.9
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 25.9
 Intersection Capacity Utilization 44.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						212			75			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	206	1136	0	0	1178	195	714	2	360	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	224	1235	0	0	1280	212	776	2	391	0	0	0
Lane Group Flow (vph)	224	1235	0	0	1280	212	388	390	391	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	15.0	47.0	0.0	0.0	32.0	32.0	23.0	23.0	23.0	0.0	0.0	0.0
Total Split (%)	21.4%	67.1%	0.0%	0.0%	45.7%	45.7%	32.9%	32.9%	32.9%	0.0%	0.0%	0.0%
Maximum Green (s)	10.4	42.4			27.4	27.4	18.5	18.5	18.5			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	11.0	43.0			28.0	28.0	19.0	19.0	19.0			
Actuated g/C Ratio	0.16	0.61			0.40	0.40	0.27	0.27	0.27			
v/c Ratio	0.81	0.57			0.90	0.28	0.85	0.85	0.81			
Control Delay	34.9	3.7			30.7	3.4	44.2	44.3	34.5			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	34.9	3.8			30.7	3.4	44.2	44.3	34.5			
LOS	C	A			C	A	D	D	C			
Approach Delay		8.5			26.8			41.0				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			C			D				
Queue Length 50th (ft)	87	47			264	0	166	167	127			
Queue Length 95th (ft) m#113		57			#397	37	#318	#321	#269			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	275	2153			1416	760	456	458	484			
Starvation Cap Reductn	0	131			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.81	0.61			0.90	0.28	0.85	0.85	0.81			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 63 (90%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 110.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↑	↑	↑↑						↓	↓	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)		50	50	50	50					50	50	50	
Trailing Detector (ft)		0	0	0	0					0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.850									0.850	
Flt Protected				0.950							0.953		
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509	
Flt Permitted				0.950							0.953		
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			675								27		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Link Speed (mph)		35			35			30			30		
Link Distance (ft)		1214			391			1434			886		
Travel Time (s)		23.6			7.6			32.6			20.1		
Volume (vph)	0	1138	713	257	1635	0	0	0	0	200	2	179	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%	
Adj. Flow (vph)	0	1237	775	279	1777	0	0	0	0	217	2	195	
Lane Group Flow (vph)	0	1237	775	279	1777	0	0	0	0	0	219	195	
Turn Type			Perm		Prot					Perm		Perm	
Protected Phases		4		3	8						6		
Permitted Phases			4							6		6	
Detector Phases		4	4	3	8					6	6	6	
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0	
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5	
Total Split (s)	0.0	32.5	32.5	17.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	20.5	
Total Split (%)	0.0%	46.4%	46.4%	24.3%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	29.3%	
Maximum Green (s)		27.9	27.9	12.4	44.9					16.0	16.0	16.0	
Flow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5	
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0	
Lead/Lag		Lag	Lag	Lead									
Lead-Lag Optimize?		Yes	Yes	Yes									
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0	
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None	
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0					0	0	0	
Act Effect Green (s)		30.4	30.4	13.8	48.3						13.7	13.7	
Actuated g/C Ratio		0.43	0.43	0.20	0.69						0.20	0.20	
v/c Ratio		0.80	0.72	0.80	0.73						0.66	0.61	
Control Delay		23.3	7.3	39.0	1.8						35.5	30.2	
Queue Delay		0.0	0.0	0.0	0.2						0.0	0.0	
Total Delay		23.3	7.3	39.0	2.0						35.5	30.2	
LOS		C	A	D	A						D	C	
Approach Delay		17.2			7.0						33.0		

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A						C	
Queue Length 50th (ft)		247	26	103	0						87	65
Queue Length 95th (ft)		#370	135	m127	m1						148	124
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1539	1070	356	2440						399	376
Starvation Cap Reductn		0	0	0	163						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.80	0.72	0.78	0.78						0.55	0.52

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 14.0
 Intersection Capacity Utilization 110.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



















20: Ave 15.5/Cleveland & Road 23
 Mitigated 2010 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	42	1	43	0	171	75	50	191	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	46	1	47	0	186	82	54	208	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	590	584	208	545	543	227	208			267		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	590	584	208	545	543	227	208			267		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	89	100	94	100			96		
cM capacity (veh/h)	381	405	833	428	423	805	1317			1220		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	93	267	262								
Volume Left	0	46	0	54								
Volume Right	1	47	82	0								
cSH	545	559	1317	1220								
Volume to Capacity	0.00	0.17	0.00	0.04								
Queue Length 95th (ft)	0	15	0	3								
Control Delay (s)	11.6	12.7	0.0	2.0								
Lane LOS	B	B		A								
Approach Delay (s)	11.6	12.7	0.0	2.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization		48.1%			ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group												
	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fit					0.968							0.852
Fit Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3426	0	0	0	0	1770	1587	0
Fit Permitted	0.308									0.950		
Satd. Flow (perm)	1102	3505	0	0	3426	0	0	0	0	1770	1587	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)					99						65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	558	477	0	0	592	159	0	0	0	128	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	607	518	0	0	643	173	0	0	0	139	1	65
Lane Group Flow (vph)	607	518	0	0	816	0	0	0	0	139	66	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	39.5	39.5	0.0	0.0	39.5	0.0	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	65.8%	65.8%	0.0%	0.0%	65.8%	0.0%	0.0%	0.0%	0.0%	34.2%	34.2%	0.0%
Maximum Green (s)	34.9	34.9			34.9					16.0	16.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	44.7	44.7			44.7					10.1	10.1	
Actuated g/C Ratio	0.74	0.74			0.74					0.17	0.17	
v/c Ratio	0.74	0.20			0.32					0.46	0.20	
Control Delay	12.7	1.4			3.6					26.9	7.9	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	12.7	1.4			3.6					26.9	7.9	
LOS	B	A			A					C	A	
Approach Delay		7.5			3.6						20.8	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	36	8			40					46	0	
Queue Length 95th (ft)	#194	23			77					85	26	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	821	2611			2578					487	484	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.74	0.20			0.32					0.29	0.14	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 47 (78%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 7.3
 Intersection Capacity Utilization 54.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.999				0.850
Fit Protected	0.950						0.950				0.989	
Satd. Flow (prot)	1736	1827	1553	0	0	0	3433	3536	0	0	3466	1568
Fit Permitted	0.950						0.950				0.671	
Satd. Flow (perm)	1736	1827	1553	0	0	0	3433	3536	0	0	2352	1568
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			448					2				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	251	101	570	0	0	0	133	784	7	83	275	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	273	110	620	0	0	0	145	852	8	90	299	272
Lane Group Flow (vph)	273	110	620	0	0	0	145	860	0	0	389	272
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				8.5	20.6		20.6	20.6	20.6
Total Split (s)	30.4	30.4	30.4	0.0	0.0	0.0	9.0	29.6	0.0	20.6	20.6	20.6
Total Split (%)	50.7%	50.7%	50.7%	0.0%	0.0%	0.0%	15.0%	49.3%	0.0%	34.3%	34.3%	34.3%
Maximum Green (s)	25.9	25.9	25.9				4.5	25.0		16.0	16.0	16.0
ℳlow Time (s)	3.5	3.5	3.5				3.5	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							ℳs			ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				None	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0					5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0					11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0					0		0	0	0
Act Effct Green (s)	26.4	26.4	26.4				5.0	25.6			18.4	18.4
Actuated g/C Ratio	0.44	0.44	0.44				0.08	0.43			0.31	0.31
v/c Ratio	0.36	0.14	0.66				0.51	0.57			0.54	0.41
Control Delay	11.5	9.8	8.1				33.0	14.8			17.6	3.1
Queue Delay	0.8	0.0	0.3				0.0	0.0			0.0	0.0
Total Delay	12.3	9.8	8.4				33.0	14.8			17.6	3.1
LOS	B	A	A				C	B			B	A
Approach Delay		9.6						17.5			11.6	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2010 Project PM Alternative A

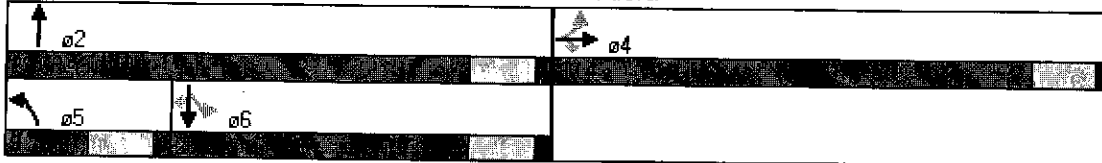
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A						B			B	
Queue Length 50th (ft)	49	19	9				26	117			50	0
Queue Length 95th (ft)	90	m38	88				51	167			74	14
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	764	804	934				286	1510			722	670
Starvation Cap Reductn	257	0	56				0	0			0	0
Spillback Cap Reductn	0	0	0				0	0			0	0
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	0.54	0.14	0.71				0.51	0.57			0.54	0.41

Intersection Summary







Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 13.1
 Intersection Capacity Utilization 55.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

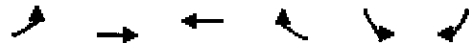
Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1495
Right Turn on Red				⊗s		⊗s
Satd. Flow (RTOR)						172
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	473	384	0	449	158
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	514	417	0	488	172
Lane Group Flow (vph)	0	514	417	0	488	172
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	29.5	29.5	0.0	30.5	30.5
Total Split (%)	0.0%	49.2%	49.2%	0.0%	50.8%	50.8%
Maximum Green (s)		25.0	25.0		26.0	26.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		37.6	37.6		14.4	14.4
Actuated g/C Ratio		0.63	0.63		0.24	0.24
v/c Ratio		0.23	0.19		0.63	0.35
Control Delay		5.8	2.6		23.6	5.3
Queue Delay		0.0	0.2		0.0	0.0
Total Delay		5.8	2.8		23.6	5.3
LOS		A	A		C	A
Approach Delay		5.8	2.8		18.9	



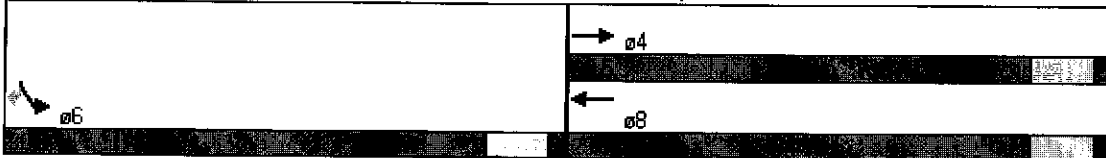
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		B	
Queue Length 50th (ft)		36	14		80	0
Queue Length 95th (ft)		71	21		109	35
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2217	2217		1432	756
Starvation Cap Reductn		0	957		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.23	0.33		0.34	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 46 (77%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 10.4
 Intersection Capacity Utilization 32.6%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 Mitigated 2010 Project PM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	49	89	12	16	38	53	5	119	25	67	110	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	97	13	17	41	58	5	129	27	73	120	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	116	162	220								
Volume Left (vph)	53	17	5	73								
Volume Right (vph)	13	58	27	27								
Hadj (s)	0.07	-0.10	0.09	0.26								
Departure Headway (s)	5.1	5.0	5.0	5.1								
Degree Utilization, x	0.23	0.16	0.23	0.31								
Capacity (veh/h)	644	647	665	660								
Control Delay (s)	9.7	9.0	9.5	10.4								
Approach Delay (s)	9.7	9.0	9.5	10.4								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.8									
HCM Level of Service			A									
Intersection Capacity Utilization		43.9%			ICU Level of Service				A			
Analysis Period (min)		15										

25: SB Ramps & GS Blvd
 Mitigated 2010 Project PM Alternative A

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↖	↖	↑	↗	↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.677	
Satd. Flow (perm)	3335	1538	1759	1495	1237	1827
Right Turn on Red		#s		#s		
Satd. Flow (RTOR)		91		286		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	668		408			1104
Travel Time (s)	15.2		9.3			25.1
Volume (vph)	438	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	476	91	125	286	91	142
Lane Group Flow (vph)	476	91	125	286	91	142
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	42.5	42.5	47.5	47.5	47.5	47.5
Total Split (%)	47.2%	47.2%	52.8%	52.8%	52.8%	52.8%
Maximum Green (s)	38.0	38.0	43.0	43.0	43.0	43.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	66.7	66.7	15.3	15.3	15.3	15.3
Actuated g/C Ratio	0.74	0.74	0.17	0.17	0.17	0.17
v/c Ratio	0.19	0.08	0.42	0.58	0.43	0.46
Control Delay	4.2	1.2	26.3	5.9	38.6	37.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	1.2	26.3	5.9	38.6	37.3
LOS	A	A	C	A	D	D
Approach Delay	3.7		12.1			37.8

25: SB Ramps & GS Blvd
 Mitigated 2010 Project PM Alternative A

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	A		B			D
Queue Length 50th (ft)	36	0	34	7	46	72
Queue Length 95th (ft)	64	14	m54	m56	87	120
Internal Link Dist (ft)	588		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2470	1163	850	870	598	883
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.08	0.15	0.33	0.15	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 71 (79%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 13.1
 Intersection Capacity Utilization 30.5%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850		0.947			0.877				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1618	0	3335	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1618	0	3335	1810	1538
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			32		33			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	238	29	14	289	160	46	18	85	481	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	259	32	15	314	174	50	20	92	523	30	65
Lane Group Flow (vph)	217	259	32	15	488	0	50	112	0	523	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	17.0	41.7	41.7	8.6	33.3	0.0	10.9	20.6	0.0	19.1	28.8	28.8
Total Split (%)	18.9%	46.3%	46.3%	9.6%	37.0%	0.0%	12.1%	22.9%	0.0%	21.2%	32.0%	32.0%
Maximum Green (s)	12.4	37.1	37.1	4.0	28.7		6.4	16.1		14.6	24.3	24.3
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effect Green (s)	13.0	42.9	42.9	4.6	29.3		6.7	16.6		15.1	29.2	29.2
Actuated g/C Ratio	0.14	0.48	0.48	0.05	0.33		0.07	0.18		0.17	0.32	0.32
v/c Ratio	0.90	0.31	0.04	0.17	0.86		0.38	0.30		0.93	0.05	0.12
Control Delay	77.1	16.8	5.9	54.0	33.4		48.5	12.3		58.5	20.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	77.1	16.8	5.9	54.0	33.4		48.5	12.3		58.5	20.0	5.1
LOS	E	B	A	D	C		D	B		E	C	A
Approach Delay		41.9			34.0			23.5			51.0	

26: Ave 12 & GS Blvd
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	123	80	0	9	55		28	10		157	13	0
Queue Length 95th (ft)	#254	158	17	m21	#394		64	54		#253	m26	11
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	241	838	729	86	570		134	373		560	587	542
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.90	0.31	0.04	0.17	0.86		0.37	0.30		0.93	0.05	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 6 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 41.2
 Intersection Capacity Utilization 66.4%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	41	90			110	0		105	0			
Queue Length 95th (ft)	m54	m131			198	60		163	47			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	403	1343			838	986		431	498			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.44	0.52			0.37	0.51		0.45	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 16 (18%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 57.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 19

MITIGATED OPENING DAY (2010)

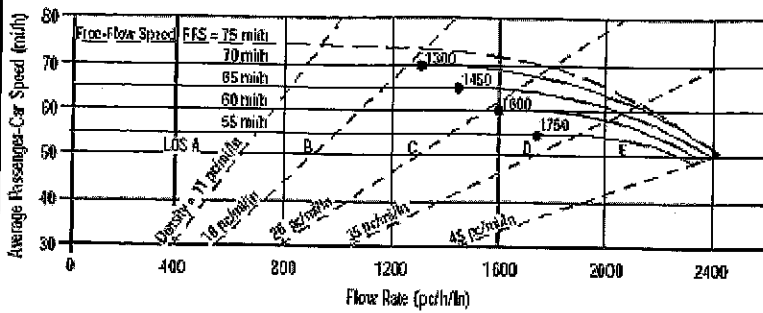
PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET																								
		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>		Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2010 Project Alt B AM	Analysis Year	2010																					
Project Description 04-837.2 Northfork Casino Alt B																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	2189	veh/h	Peak-Hour Factor, PHF 0.88																					
AADT		veh/day	%Trucks and Buses, P _T 24																					
Peak-Hr Prop. of AADT, K			%RVs, P _R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV =AADT x K x D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW} mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC} mi/h																					
Interchange Density	0.50	l/mi	f _{ID} mi/h																					
Number of Lanes, N	3		f _N mi/h																					
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	932	pc/h/ln	Design LOS																					
S	70.0	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																					
D = v _p / S	13.3	pc/mi/ln	f _p																					
LOS	B		S																					
			D = v _p / S																					
			Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt B PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3233	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

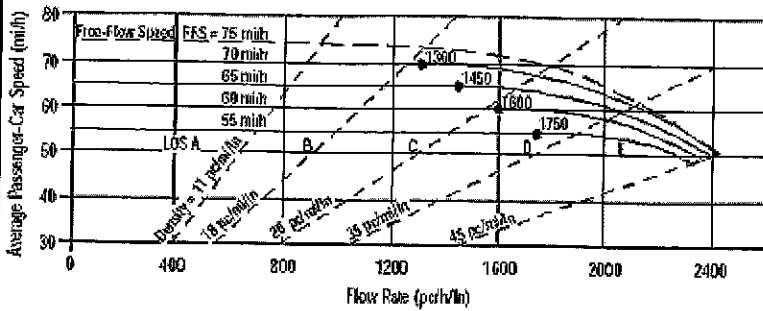
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1376 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.7 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst: R Davis
 Agency or Company: TPG Consulting, Inc.
 Date Performed: 9/22/08
 Analysis Time Period: Mit 2010 Project Alt B AM
 Project Description: 04-837.2 Northfork Casino Alt B

Site Information

Highway/Direction of Travel: SR 99 Northbound
 From/To: between Ave 18 1/2 & Ave 17
 Jurisdiction: Caltrans
 Analysis Year: 2010

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2718	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	mi
Driver type adjustment	1.00		Length	
			Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	l/mi
Number of Lanes, N	3	
FFS (measured)	70.0	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	70.0	mi/h

LOS and Performance Measures

Operational (LOS)

v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1157	pc/h/ln
S	70.0	mi/h
D = v _p / S	16.5	pc/mi/ln
LOS	B	

Design (N)

Design (N)

Design LOS

v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)		pc/h
f _p		
S		mi/h
D = v _p / S		pc/mi/ln
Required Number of Lanes, N		

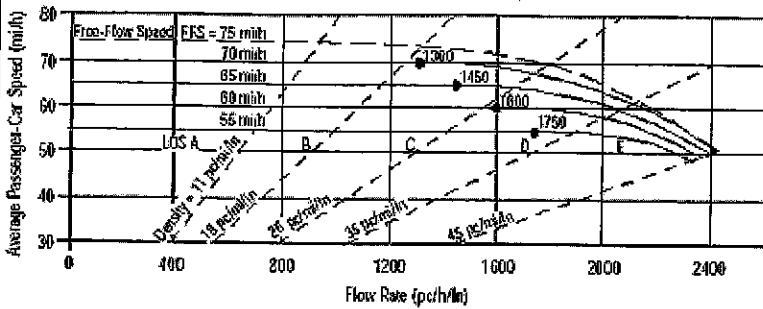
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt B PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2858	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

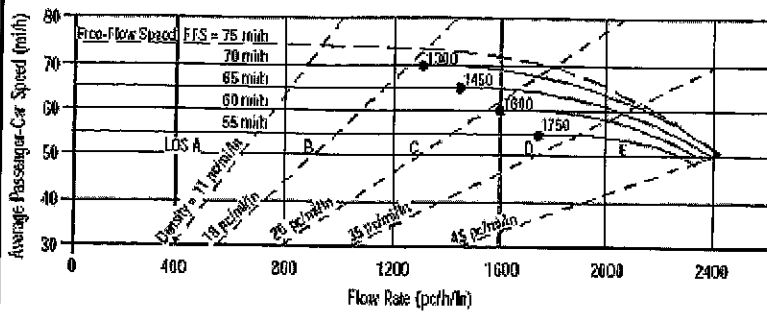
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1217 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	17.4 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt B AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	2295	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

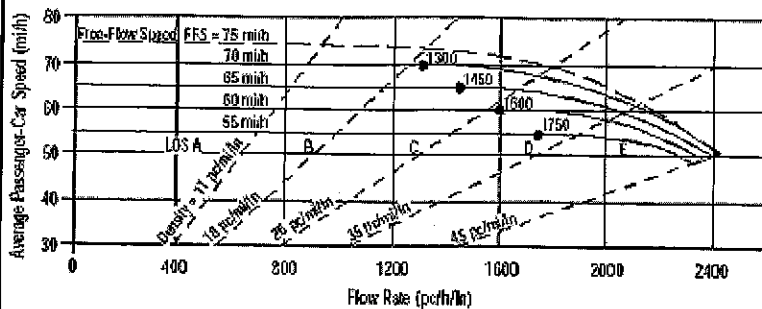
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV})	977 pc/h/ln	Design LOS	
f _p		v _p = V or DDHV / (PHF x N x f _{HV})	pc/h
S	70.0 mi/h	f _p	
D = v _p / S	14.0 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v _p	LOS, S, D																				
Design (N)	FFS, LOS, v _p	N, S, D																				
Design (v _p)	FFS, LOS, N	v _p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v _p)	FFS, LOS, N	v _p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2010 P Alt B PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3423	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P _T																			
Peak-Hr Prop. of AADT, K			% RVs, P _R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f _p	1.00	E _R	1.2																			
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f _{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																			
Interchange Density	0.50	l/mi	f _{ID}																			
Number of Lanes, N	3		f _N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1457	pc/h/ln	Design LOS																			
S	69.9	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																			
D = v _p / S	20.8	pc/mi/ln	S																			
LOS	C		D = v _p / S																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																			
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 Project Alt B AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3173	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

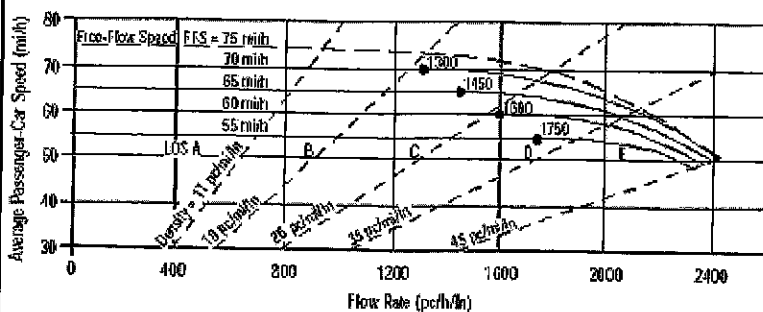
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1351 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.3 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt B PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3533	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

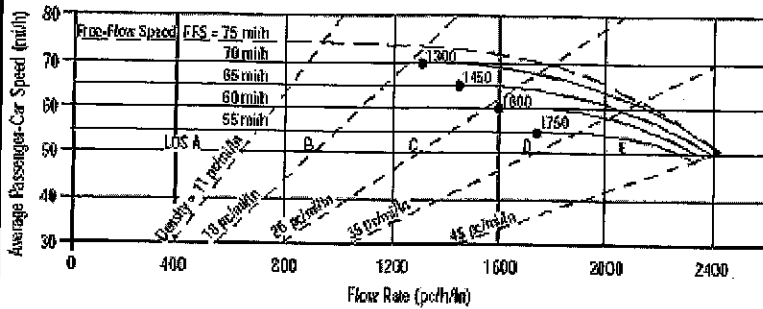
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1504 pc/h/ln	Design LOS	
S	69.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	21.5 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 Project Alt B AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2660	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

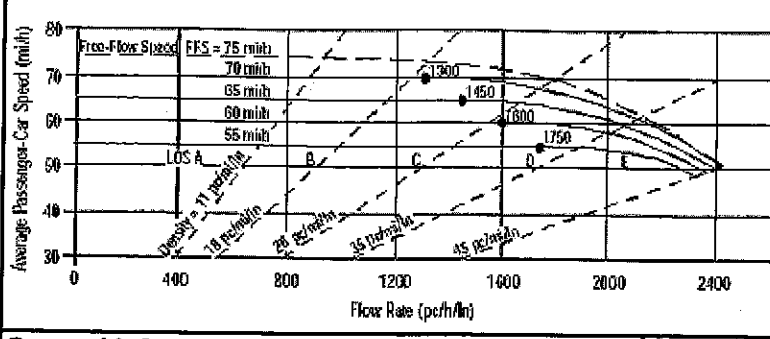
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1133 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	16.2 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt B PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4137	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = [1/P _T (E _T -1) + P _R (E _R -1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1761 pc/h/ln	Design LOS	
S	68.3 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.8 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 20

MITIGATED OPENING DAY (2010)

PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.985			0.857				
Fit Protected	0.950						0.950					
Satd. Flow (prot)	1271	1338	0	0	1573	0	1388	1253	0	0	0	0
Fit Permitted	0.683						0.950					
Satd. Flow (perm)	914	1338	0	0	1573	0	1388	1253	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		
Satd. Flow (RTOR)					13			42				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	170	51	0	0	94	12	184	2	39	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	185	55	0	0	102	13	200	2	42	0	0	0
Lane Group Flow (vph)	185	55	0	0	115	0	200	44	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	33.3	33.3	0.0	0.0	33.3	0.0	26.7	26.7	0.0	0.0	0.0	0.0
Total Split (%)	55.5%	55.5%	0.0%	0.0%	55.5%	0.0%	44.5%	44.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	28.7	28.7			28.7		22.1	22.1				
ℳlow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	38.3	38.3			38.3		13.7	13.7				
Actuated g/C Ratio	0.64	0.64			0.64		0.23	0.23				
v/c Ratio	0.32	0.06			0.11		0.63	0.14				
Control Delay	5.4	4.1			5.2		29.2	7.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.4	4.1			5.2		29.2	7.2				
LOS	A	A			A		C	A				
Approach Delay		5.1			5.2			25.3				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

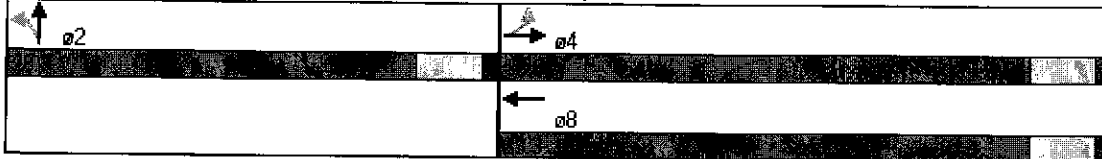
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	14	4			12		65	1				
Queue Length 95th (ft)	38	m14			36		110	19				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	583	854			1009		525	500				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.32	0.06			0.11		0.38	0.09				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 13 (22%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.3
 Intersection Capacity Utilization 32.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23













Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50		50		50	50	50	
Trailing Detector (ft)		0		0	0		0		0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.929	
Flt Protected					0.997		0.950				0.996	
Satd. Flow (prot)	0	1385	0	0	1540	0	1421	0	1272	0	1293	0
Flt Permitted					0.967		0.679				0.996	
Satd. Flow (perm)	0	1385	0	0	1494	0	1016	0	1272	0	1293	0
Right Turn on Red			RTOR			RTOR			RTOR		RTOR	
Satd. Flow (RTOR)		26							97		80	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			45		45		
Link Distance (ft)		295			223			1486		2043		
Travel Time (s)		5.7			4.3			22.5		31.0		
Volume (vph)	0	314	64	16	211	0	81	0	89	12	54	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	34%	23%	23%	23%	27%	27%	27%	36%	36%	36%
Adj. Flow (vph)	0	341	70	17	229	0	88	0	97	13	59	80
Lane Group Flow (vph)	0	411	0	0	246	0	88	0	97	0	152	0
Turn Type				Perm		custom		custom		Perm		
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Detector Phases		4		8	8		2		2	6	6	
Minimum Initial (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Minimum Split (s)		20.6		20.6	20.6		21.3		21.3	21.3	21.3	
Total Split (s)	0.0	35.7	0.0	35.7	35.7	0.0	24.3	0.0	24.3	24.3	24.3	0.0
Total Split (%)	0.0%	59.5%	0.0%	59.5%	59.5%	0.0%	40.5%	0.0%	40.5%	40.5%	40.5%	0.0%
Maximum Green (s)		31.1		31.1	31.1		19.0		19.0	19.0	19.0	
Yellow Time (s)		3.6		3.6	3.6		4.3		4.3	4.3	4.3	
All-Red Time (s)		1.0		1.0	1.0		1.0		1.0	1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		Min		Min	Min	Min	
Walk Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0		0	0	0	
Act Effct Green (s)		40.5		40.5	40.5		11.5		11.5	11.5	11.5	
Actuated g/C Ratio		0.68		0.68	0.68		0.19		0.19	0.19	0.19	
v/c Ratio		0.44		0.24	0.24		0.45		0.30	0.49	0.49	
Control Delay		6.8		2.0	2.0		27.9		7.4	16.0	16.0	
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay		6.8		2.0	2.0		27.9		7.4	16.0	16.0	
LOS		A		A	A		C		A	B	B	
Approach Delay		6.8		2.0	2.0					16.0	16.0	

3: Ave 18.5 & Road 23
 Mitigated 2010 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A							B
Queue Length 50th (ft)		49			8		29		0			23
Queue Length 95th (ft)		130			m20		60		29			61
Internal Link Dist (ft)		215			143			1406				1963
Turn Bay Length (ft)												
Base Capacity (vph)		944			1009		344		495			490
Starvation Cap Reductn		0			0		0		0			0
Spillback Cap Reductn		0			0		0		0			0
Storage Cap Reductn		0			0		0		0			0
Reduced v/c Ratio		0.44			0.24		0.26		0.20			0.31

Intersection Summary







Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 8.9
 Intersection Capacity Utilization 46.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2010 Project AM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	276	211	140	94	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	300	229	152	102	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	382				532	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				532	229
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				78	99
cM capacity (veh/h)	1026				460	741
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	301	229	152	107		
Volume Left	1	0	0	102		
Volume Right	0	0	152	4		
cSH	1026	1700	1700	467		
Volume to Capacity	0.00	0.13	0.09	0.23		
Queue Length 95th (ft)	0	0	0	22		
Control Delay (s)	0.0	0.0	0.0	15.0		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		29.9%		ICU Level of Service		A
Analysis Period (min)			15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	39	1	129	0	26	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	42	1	140	0	28	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357	313	114	322	313	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357	313	114	322	313	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	95	100			98		
cM capacity (veh/h)	546	577	920	589	571	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	49	141	142								
Volume Left	0	4	1	28								
Volume Right	3	42	0	0								
cSH	632	824	1323	1283								
Volume to Capacity	0.02	0.06	0.00	0.02								
Queue Length 95th (ft)	2	5	0	2								
Control Delay (s)	10.8	9.6	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.8	9.6	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			30.1%		ICU Level of Service					A		
Analysis Period (min)			15									













7: Ave 17 & SR 99 NB ramps
Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)			98			98			253		98	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	60	382	0	0	774	90	348	1	233	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	65	415	0	0	841	98	378	1	253	0	0	0
Lane Group Flow (vph)	65	415	0	0	841	98	189	190	253	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	14.7	46.4	0.0	0.0	31.7	31.7	23.6	23.6	23.6	0.0	0.0	0.0
Total Split (%)	21.0%	66.3%	0.0%	0.0%	45.3%	45.3%	33.7%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	9.4	41.1			26.4	26.4	19.0	19.0	19.0			
Flow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.4	47.9			39.1	39.1	14.1	14.1	14.1			
Actuated g/C Ratio	0.13	0.68			0.56	0.56	0.20	0.20	0.20			
v/c Ratio	0.32	0.20			0.44	0.11	0.58	0.58	0.34			
Control Delay	23.7	2.3			12.6	3.6	31.8	31.8	4.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	23.7	2.3			12.6	3.6	31.8	31.8	4.5			
LOS	C	A			B	A	C	C	A			
Approach Delay		5.2			11.7			20.9				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	26	14			127	0	77	77	0			
Queue Length 95th (ft)	51	19			204	26	127	128	26			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	234	2095			1921	903	453	454	933			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.28	0.20			0.44	0.11	0.42	0.42	0.27			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 51 (73%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 13.0
 Intersection Capacity Utilization 44.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fit						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3112	3438	0	1480	1324
Fit Permitted					0.950	
Satd. Flow (perm)	0	3112	3438	0	1480	1324
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						85
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	741	669	0	56	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	805	727	0	61	85
Lane Group Flow (vph)	0	805	727	0	61	85
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	39.4	39.4	0.0	30.6	30.6
Total Split (%)	0.0%	56.3%	56.3%	0.0%	43.7%	43.7%
Maximum Green (s)		34.1	34.1		26.0	26.0
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effect Green (s)		53.4	53.4		8.6	8.6
Actuated g/C Ratio		0.76	0.76		0.12	0.12
v/c Ratio		0.34	0.28		0.34	0.36
Control Delay		0.9	1.3		32.6	11.7
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		0.9	1.3		32.6	11.7
LOS		A	A		C	B
Approach Delay		0.9	1.3		20.4	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative B

10/22/2008

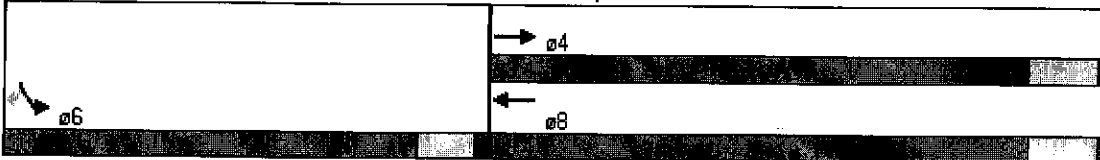
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		4	11		25	0
Queue Length 95th (ft)		3	15		56	35
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2376	2625		562	556
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.34	0.28		0.11	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 51 (73%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 2.7
 Intersection Capacity Utilization 30.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd

Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frnt		0.996				0.850			0.850		0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3269	0	1626	3252	1455	1433	1508	1282	3155	1590	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1641	3269	0	1626	3252	1455	1433	1508	1282	3155	1590	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		4				163			97		24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	32	470	14	137	460	150	108	41	89	182	25	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	35	511	15	149	500	163	117	45	97	198	27	24
Lane Group Flow (vph)	35	526	0	149	500	163	117	45	97	198	51	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.3	21.3		9.3	21.3	21.3	8.6	20.6	20.6	8.6	20.6	
Total Split (s)	10.0	22.4	0.0	14.0	26.4	26.4	13.0	22.6	22.6	11.0	20.6	0.0
Total Split (%)	14.3%	32.0%	0.0%	20.0%	37.7%	37.7%	18.6%	32.3%	32.3%	15.7%	29.4%	0.0%
Maximum Green (s)	4.7	17.1		8.7	21.1	21.1	8.4	18.0	18.0	6.4	16.0	
Yellow Time (s)	4.3	4.3		4.3	4.3	4.3	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	vs	vs		vs	vs	vs	vs	vs	vs	vs	vs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	8.2	27.9		10.0	36.4	36.4	8.6	9.1	9.1	7.0	9.7	
Actuated g/C Ratio	0.12	0.40		0.14	0.52	0.52	0.12	0.13	0.13	0.10	0.14	
v/c Ratio	0.18	0.40		0.64	0.30	0.20	0.67	0.23	0.39	0.63	0.21	
Control Delay	29.4	16.6		35.3	6.1	2.0	49.6	29.4	11.4	40.0	20.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.4	16.6		35.3	6.1	2.0	49.6	29.4	11.4	40.0	20.0	
LOS	C	B		D	A	A	D	C	B	D	C	
Approach Delay		17.4			10.6			31.8			35.9	

10: Ave 17 & GS Blvd
 Mitigated 2010 Project AM Alternative B

10/22/2008

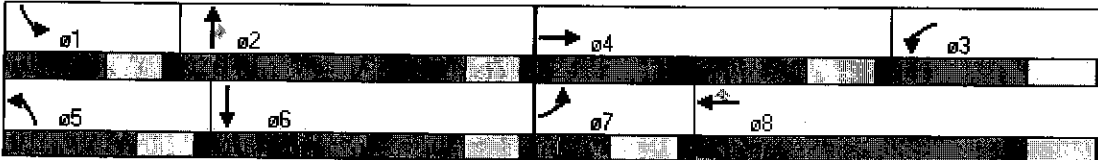
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C				D
Queue Length 50th (ft)	14	82		65	12	0	49	18	0	43	11	
Queue Length 95th (ft)	37	129		#130	75	15	#118	44	37	#80	39	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	193	1307		232	1690	834	184	401	412	316	397	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.18	0.40		0.64	0.30	0.20	0.64	0.11	0.24	0.63	0.13	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 18.9
 Intersection Capacity Utilization 43.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service A













Splits and Phases: 10: Ave 17 & GS Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.998			0.972				
Flt Protected					0.986			0.996			0.996	
Satd. Flow (prot)	0	1800	0	0	1715	0	0	1533	0	0	1514	0
Flt Permitted					0.893			0.979			0.976	
Satd. Flow (perm)	0	1800	0	0	1553	0	0	1507	0	0	1484	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		24			2			28				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	0	125	28	46	112	3	16	134	40	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	0	136	30	50	122	3	17	146	43	10	104	0
Lane Group Flow (vph)	0	166	0	0	175	0	0	206	0	0	114	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5		20.5	20.5	
Total Split (s)	30.5	30.5	0.0	30.5	30.5	0.0	29.5	29.5	0.0	29.5	29.5	0.0
Total Split (%)	50.8%	50.8%	0.0%	50.8%	50.8%	0.0%	49.2%	49.2%	0.0%	49.2%	49.2%	0.0%
Maximum Green (s)	26.0	26.0		26.0	26.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.8			13.0			27.1			27.1	
Actuated g/C Ratio		0.27			0.27			0.62			0.62	
v/c Ratio		0.33			0.41			0.22			0.12	
Control Delay		7.7			10.0			5.7			6.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.7			10.0			5.7			6.0	
LOS		A			A			A			A	
Approach Delay		7.7			10.0			5.7			6.0	

11: Ave 17 & Road 23
 Mitigated 2010 Project AM Alternative B

10/22/2008

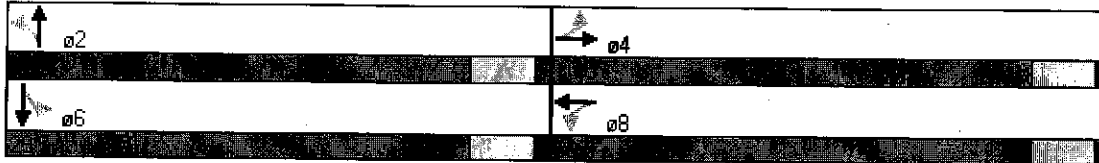
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		11			14			15			9	
Queue Length 95th (ft)		40			47			49			31	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		910			776			1136			1112	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.18			0.23			0.18			0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 43.7
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 40.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Ave 17 & Road 23



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fit			0.850			0.850		0.985			0.991	
Fit Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3387	0	1752	3473	0
Fit Permitted		0.728			0.730		0.950			0.950		
Satd. Flow (perm)	0	1356	1583	0	1360	1583	1719	3387	0	1752	3473	0
Right Turn on Red												
Satd. Flow (RTOR)			7			103		17			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	38	0	6	41	0	95	6	362	40	55	491	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	41	0	7	45	0	103	7	393	43	60	534	34
Lane Group Flow (vph)	0	41	7	0	45	103	7	436	0	60	568	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effect Green (s)		10.4	10.4		10.4	10.4	8.1	32.7		9.7	36.6	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.61		0.16	0.68	
v/c Ratio		0.17	0.02		0.18	0.28	0.03	0.21		0.21	0.24	
Control Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		14.1			8.9			8.0			6.5	

12: Ellis & Road 26

Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		4	0		4	0	1	15		6	22	
Queue Length 95th (ft)		29	8		31	29	10	76		38	91	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		521	613		523	672	360	2331		391	2518	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.01		0.09	0.15	0.02	0.19		0.15	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 53.8

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 7.6

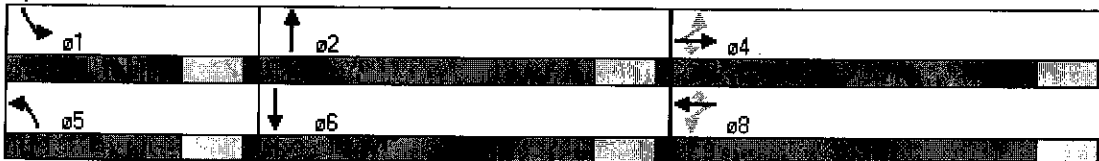
Intersection LOS: A

Intersection Capacity Utilization 36.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Ellis & Road 26












13: Kennedy & Gateway
 Mitigated 2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations		↗	↘		↖	↗
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			19.1%	ICU Level of Service		A
Analysis Period (min)			15			










14: Gateway & AVE 16 Connector
 Mitigated 2010 Project AM Alternative B

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			21.9%		ICU Level of Service	A
Analysis Period (min)			15			

15: Kennedy & AVE 16 Connector
 Mitigated 2010 Project AM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑	↗	↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)				1		237
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	285	165	1	49	218
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	310	179	1	53	237
Lane Group Flow (vph)	130	310	179	1	53	237
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
ℳlow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	ℳs		ℳs	ℳs		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.5	10.7	10.7	13.7	13.7
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.38	0.38
v/c Ratio	0.34	0.35	0.36	0.00	0.08	0.33
Control Delay	17.0	5.7	14.3	10.0	14.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	5.7	14.3	10.0	14.5	4.5
LOS	B	A	B	A	B	A
Approach Delay		9.0	14.3		6.3	

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative B

10/22/2008

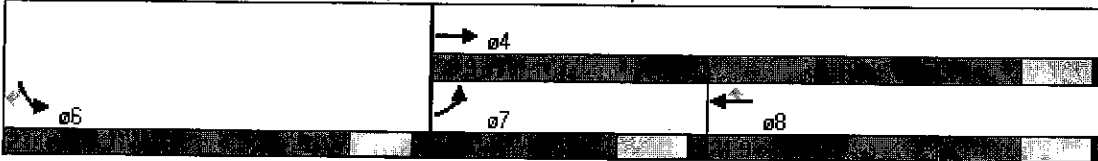
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	30	0	9	0
Queue Length 95th (ft)	71	68	82	3	34	42
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	456	1177	710	604	887	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.25	0.00	0.06	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.2
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 28.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
 Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.939			0.951				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3323	0	1770	3366	0	1770	1770	1583	1770	1583	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		37			22				3		207	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	50	34	147	42	20	20	41	3	47	79	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	54	37	160	46	22	22	45	3	51	86	228
Lane Group Flow (vph)	4	91	0	160	68	0	22	45	3	51	314	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	vs	vs		vs	vs		vs	vs	vs	vs	vs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.5	7.1		8.7	15.9		4.5	17.1	17.1	16.6	34.6	
Actuated g/C Ratio	0.06	0.11		0.14	0.25		0.07	0.27	0.27	0.26	0.55	
v/c Ratio	0.04	0.23		0.66	0.08		0.19	0.09	0.01	0.11	0.33	
Control Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	19.2		42.4	14.4		34.2	19.6	13.7	20.2	5.3	
LOS	C	B		D	B		C	B	B	C	A	
Approach Delay		19.7			34.0			23.9		7.3		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
 Mitigated 2010 Project AM Alternative B

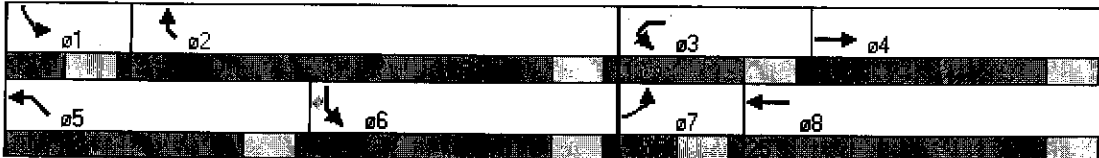
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	10		62	6		9	14	0	16	18	
Queue Length 95th (ft)	10	30		#143	23		29	37	6	41	73	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	114	763		252	1054		117	479	431	465	958	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.12		0.63	0.06		0.19	0.09	0.01	0.11	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 63.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 18.5
 Intersection Capacity Utilization 34.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						135			174			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35				35			30			30
Link Distance (ft)		391				1686			1254			906
Travel Time (s)		7.6				32.8			28.5			20.6
Volume (vph)	82	533	0	0	673	124	350	0	160	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	89	579	0	0	732	135	380	0	174	0	0	0
Lane Group Flow (vph)	89	579	0	0	732	135	190	190	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	12.4	38.5	0.0	0.0	26.1	26.1	21.5	21.5	21.5	0.0	0.0	0.0
Total Split (%)	20.7%	64.2%	0.0%	0.0%	43.5%	43.5%	35.8%	35.8%	35.8%	0.0%	0.0%	0.0%
Maximum Green (s)	7.8	33.9			21.5	21.5	17.0	17.0	17.0			
Flow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	7.8	34.5			24.7	24.7	17.5	17.5	17.5			
Actuated g/C Ratio	0.13	0.58			0.41	0.41	0.29	0.29	0.29			
v/c Ratio	0.39	0.29			0.51	0.19	0.40	0.40	0.31			
Control Delay	36.5	2.7			15.8	3.7	20.2	20.2	4.9			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.5	2.7			15.8	3.7	20.2	20.2	4.9			
LOS	D	A			B	A	C	C	A			
Approach Delay		7.2			13.9			15.4				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project AM Alternative B

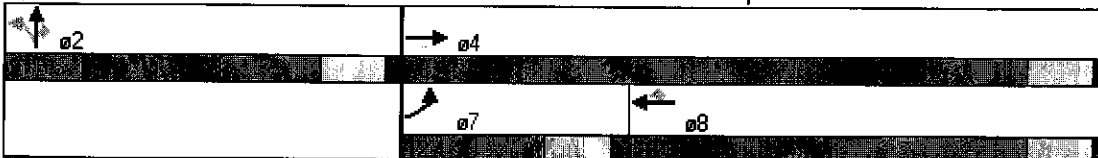
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	31	13			108	0	57	57	0			
Queue Length 95th (ft)	72	18			156	29	110	110	37			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	243	1996			1430	719	472	472	568			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.37	0.29			0.51	0.19	0.40	0.40	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 23 (38%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			393									111
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	503	362	278	745	0	0	0	0	112	0	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	547	393	302	810	0	0	0	0	122	0	111
Lane Group Flow (vph)	0	547	393	302	810	0	0	0	0	0	122	111
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	21.2	21.2	18.3	39.5	0.0	0.0	0.0	0.0	20.5	20.5	20.5
Total Split (%)	0.0%	35.3%	35.3%	30.5%	65.8%	0.0%	0.0%	0.0%	0.0%	34.2%	34.2%	34.2%
Maximum Green (s)		16.6	16.6	13.7	34.9					16.0	16.0	16.0
ℳlow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		25.7	25.7	14.3	44.8						10.1	10.1
Actuated g/C Ratio		0.43	0.43	0.24	0.75						0.17	0.17
v/c Ratio		0.38	0.45	0.74	0.32						0.46	0.33
Control Delay		14.3	3.9	27.0	1.7						27.2	7.9
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		14.3	3.9	27.0	1.7						27.2	7.9
LOS		B	A	C	A						C	A
Approach Delay		9.9			8.6						18.0	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A						B	
Queue Length 50th (ft)		72	0	88	11						40	0
Queue Length 95th (ft)		123	51	#199	34						78	33
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1443	870	410	2565						439	473
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.38	0.45	0.74	0.32						0.28	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 28 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 Mitigated 2010 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	1	22	0	167	29	18	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	1	24	0	182	32	20	136	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	388	136	372	372	197	136			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	388	136	372	372	197	136			213		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	540	538	913	578	549	844	1350			1262		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	61	213	155								
Volume Left	0	36	0	20								
Volume Right	0	24	32	0								
cSH	1700	659	1350	1262								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	8	0	1								
Control Delay (s)	0.0	11.0	0.0	1.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.0	0.0	1.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Mitigated 2010 Project AM Alternative B

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.976						0.850	
Fit Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3293	0	0	0	0	1752	1568	0
Fit Permitted	0.394									0.950		
Satd. Flow (perm)	1332	3312	0	0	3293	0	0	0	0	1752	1568	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)					53						467	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	394	351	0	0	474	90	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	428	382	0	0	515	98	0	0	0	158	0	78
Lane Group Flow (vph)	428	382	0	0	613	0	0	0	0	158	78	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	44.5	44.5	0.0	0.0	44.5	0.0	0.0	0.0	0.0	25.5	25.5	0.0
Total Split (%)	63.6%	63.6%	0.0%	0.0%	63.6%	0.0%	0.0%	0.0%	0.0%	36.4%	36.4%	0.0%
Maximum Green (s)	39.9	39.9			39.9					21.0	21.0	
ℳflow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	53.4	53.4			53.4					11.5	11.5	
Actuated g/C Ratio	0.76	0.76			0.76					0.16	0.16	
v/c Ratio	0.42	0.15			0.24					0.55	0.12	
Control Delay	4.7	2.4			3.5					33.3	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	4.7	2.4			3.5					33.3	0.4	
LOS	A	A			A					C	A	
Approach Delay		3.6			3.5						22.4	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

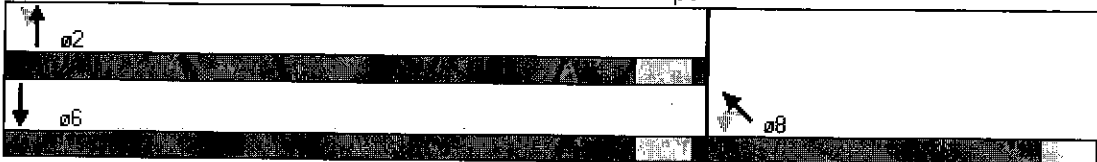
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	15	14			33					63	0	
Queue Length 95th (ft)	55	26			65					109	0	
Internal Link Dist (ft)		411			1218			1299				1757
Turn Bay Length (ft)												
Base Capacity (vph)	1016	2528			2526					538	805	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.42	0.15			0.24					0.29	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 16 (23%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 6.3
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps















22: AVE 14/Olive & SR 145/Madera
 Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50	
Trailing Detector (ft)	0	0	0				0	0		0	0	0	
Turning Speed (mph)	15		9	15			15		9	15		9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.994					0.850
Flt Protected	0.950						0.950				0.991		
Satd. Flow (prot)	1719	1810	1538	0	0	0	3213	3292	0	0	3440	1553	
Flt Permitted	0.950						0.950				0.783		
Satd. Flow (perm)	1719	1810	1538	0	0	0	3213	3292	0	0	2718	1553	
Right Turn on Red													
Satd. Flow (RTOR)			358					9					212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35		
Link Distance (ft)		226			1947			2148			491		
Travel Time (s)		5.1			44.3			41.8			9.6		
Volume (vph)	203	78	329	0	0	0	93	546	21	50	229	195	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%	4%
Adj. Flow (vph)	221	85	358	0	0	0	101	593	23	54	249	212	
Lane Group Flow (vph)	221	85	358	0	0	0	101	616	0	0	303	212	
Turn Type	Perm		Perm				Prot			Perm		Perm	
Protected Phases		4					5	2			6		6
Permitted Phases	4		4							6		6	6
Detector Phases	4	4	4				5	2		6	6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6	20.6
Total Split (s)	25.0	25.0	25.0	0.0	0.0	0.0	22.6	45.0	0.0	22.4	22.4	22.4	22.4
Total Split (%)	35.7%	35.7%	35.7%	0.0%	0.0%	0.0%	32.3%	64.3%	0.0%	32.0%	32.0%	32.0%	32.0%
Maximum Green (s)	20.5	20.5	20.5				18.0	40.4		17.8	17.8	17.8	17.8
Flow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead	
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0	3.0
Recall Mode	None	None	None				Max	C-Max		Max	Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0	0
Act Effct Green (s)	13.0	13.0	13.0				18.6	49.0			26.4	26.4	26.4
Actuated g/C Ratio	0.19	0.19	0.19				0.27	0.70			0.38	0.38	0.38
v/c Ratio	0.69	0.25	0.62				0.12	0.27			0.30	0.30	0.30
Control Delay	27.8	16.0	7.0				20.0	4.6			13.9	2.7	2.7
Queue Delay	0.5	0.0	0.3				0.0	0.0			0.0	0.0	0.0
Total Delay	28.4	16.0	7.2				20.0	4.6			13.9	2.7	2.7
LOS	C	B	A				B	A			B	A	A
Approach Delay		15.4						6.8			9.3		

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2010 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						A			A	
Queue Length 50th (ft)	85	18	0				17	41			42	0
Queue Length 95th (ft)	136	m37	0				34	76			64	15
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	516	543	712				854	2306			1024	717
Starvation Cap Reductn	83	0	65				0	0			0	0
Spillback Cap Reductn	0	0	0				0	0			0	0
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	0.51	0.16	0.55				0.12	0.27			0.30	0.30

Intersection Summary







Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 20 (29%), Referenced to phase 2:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 10.5
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



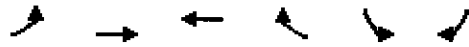
23: Ave 14/Olive & SR 99 SB off-ramp
Mitigated 2010 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	331	287	0	279	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	360	312	0	303	187
Lane Group Flow (vph)	0	360	312	0	303	187
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	34.5	34.5	0.0	35.5	35.5
Total Split (%)	0.0%	49.3%	49.3%	0.0%	50.7%	50.7%
Maximum Green (s)		30.0	30.0		31.0	31.0
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		50.3	50.3		11.7	11.7
Actuated g/C Ratio		0.72	0.72		0.17	0.17
v/c Ratio		0.14	0.12		0.56	0.46
Control Delay		3.6	2.8		30.4	8.2
Queue Delay		0.0	0.2		0.0	0.0
Total Delay		3.6	3.1		30.4	8.2
LOS		A	A		C	A
Approach Delay		3.6	3.1		21.9	

23: AVE 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative B

10/22/2008



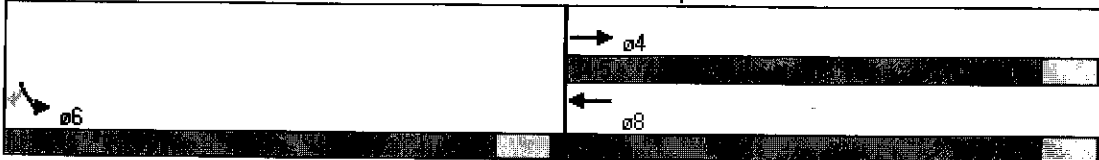
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		19	14		62	0
Queue Length 95th (ft)		38	24		92	47
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2518	2518		1459	776
Starvation Cap Reductn		0	1569		0	0
Spillback Cap Reductn		0	0		41	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.14	0.33		0.21	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 20 (29%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 25.3%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 Mitigated 2010 Project AM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	16	68	6	14	67	54	8	75	8	49	82	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	7	15	73	59	9	82	9	53	89	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	147	99	172								
Volume Left (vph)	17	15	9	53								
Volume Right (vph)	7	59	9	29								
Hadj (s)	0.13	0.02	0.30	0.25								
Departure Headway (s)	4.9	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.14	0.23								
Capacity (veh/h)	678	708	669	693								
Control Delay (s)	8.7	8.9	8.9	9.4								
Approach Delay (s)	8.7	8.9	8.9	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
HCM Level of Service			A									
Intersection Capacity Utilization		30.9%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
Mitigated 2010 Project AM Alternative B

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↖	↑	↗	↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.677	
Satd. Flow (perm)	3303	1524	1696	1442	1249	1845
Right Turn on Red		ℳs		ℳs		
Satd. Flow (RTOR)		82		239		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	745		408			1104
Travel Time (s)	16.9		9.3			25.1
Volume (vph)	387	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	421	82	125	239	155	74
Lane Group Flow (vph)	421	82	125	239	155	74
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	43.2	46.8	46.8	46.8	46.8	46.8
Total Split (%)	48.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Maximum Green (s)	38.7	42.3	42.3	42.3	42.3	42.3
ℳflow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	C-Min	C-Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	15.7	66.3	66.3	66.3	66.3	66.3
Actuated g/C Ratio	0.17	0.74	0.74	0.74	0.74	0.74
v/c Ratio	0.73	0.07	0.10	0.21	0.17	0.05
Control Delay	42.6	1.2	3.5	1.6	4.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	1.2	3.5	1.6	4.6	4.0
LOS	D	A	A	A	A	A
Approach Delay	35.9		2.2			4.4

25: SB Ramps & GS Blvd
 Mitigated 2010 Project AM Alternative B

10/22/2008

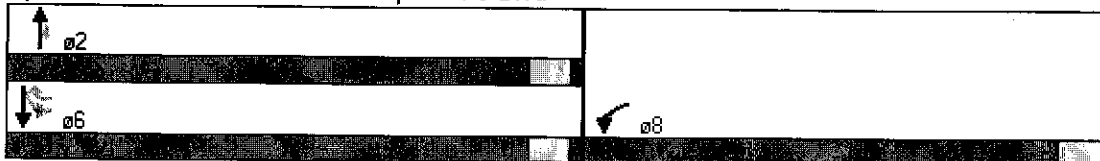
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		A			
Queue Length 50th (ft)	118	0	18	0	22	10
Queue Length 95th (ft)	158	12	m1	m0	49	24
Internal Link Dist (ft)	665		328		1024	
Turn Bay Length (ft)						
Base Capacity (vph)	1439	1144	1248	1125	920	1358
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.07	0.10	0.21	0.17	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 9 (10%), Referenced to phase 2:NBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 32.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
Mitigated 2010 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850		0.952			0.871				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1518	0	3273	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1518	0	3273	1776	1509
Right Turn on Red			vs			vs		vs			vs	
Satd. Flow (RTOR)			17		29			18				62
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	180	234	16	14	320	152	16	3	17	387	11	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	196	254	17	15	348	165	17	3	18	421	12	62
Lane Group Flow (vph)	196	254	17	15	513	0	17	21	0	421	12	62
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	17.0	43.8	43.8	8.6	35.4	0.0	8.6	20.6	0.0	17.0	29.0	29.0
Total Split (%)	18.9%	48.7%	48.7%	9.6%	39.3%	0.0%	9.6%	22.9%	0.0%	18.9%	32.2%	32.2%
Maximum Green (s)	12.4	39.2	39.2	4.0	30.8		4.1	16.1		12.5	24.5	24.5
Flow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	vs	vs	vs	vs	vs	vs	vs	vs	vs	vs	vs	vs
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	12.8	44.8	44.8	4.6	31.4		4.8	16.8		13.0	30.4	30.4
Actuated g/C Ratio	0.14	0.50	0.50	0.05	0.35		0.05	0.19		0.14	0.34	0.34
v/c Ratio	0.86	0.30	0.02	0.18	0.88		0.19	0.07		0.89	0.02	0.11
Control Delay	70.8	15.5	6.7	38.5	32.8		46.2	15.9		34.7	7.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	70.8	15.5	6.7	38.5	32.8		46.2	15.9		34.7	7.4	0.6
LOS	E	B	A	D	C		D	B		C	A	A
Approach Delay		38.4			32.9			29.4			29.8	

26: Ave 12 & GS Blvd
 Mitigated 2010 Project AM Alternative B

10/22/2008

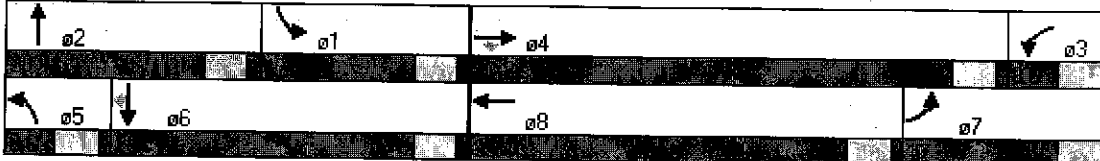
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	110	74	0	9	282		9	1		127	1	0
Queue Length 95th (ft)	#229	149	12	m21	#423		31	21		#176	m2	m0
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	233	843	726	82	582		89	298		473	599	550
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.84	0.30	0.02	0.18	0.88		0.19	0.07		0.89	0.02	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 63 (70%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 33.5
 Intersection Capacity Utilization 63.8%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd















27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑			↑	↗		↖	↗			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1656	1743	0	0	1792	1524	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	1743	0	0	1792	1524	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						421			129			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	81	557	0	0	292	387	194	0	119	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	88	605	0	0	317	421	211	0	129	0	0	0
Lane Group Flow (vph)	88	605	0	0	317	421	0	211	129	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.6	20.6	20.6			
Total Split (s)	20.7	59.2	0.0	0.0	38.5	38.5	30.8	30.8	30.8	0.0	0.0	0.0
Total Split (%)	23.0%	65.8%	0.0%	0.0%	42.8%	42.8%	34.2%	34.2%	34.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.1	54.6			33.9	33.9	26.2	26.2	26.2			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	14.7	65.0			48.4	48.4		17.0	17.0			
Actuated g/C Ratio	0.16	0.72			0.54	0.54		0.19	0.19			
v/c Ratio	0.33	0.48			0.33	0.41		0.70	0.34			
Control Delay	32.8	4.9			15.7	3.1		46.0	7.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	32.8	4.9			15.7	3.1		46.0	7.9			
LOS	C	A			B	A		D	A			
Approach Delay		8.4			8.5			31.6				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project AM Alternative B

10/22/2008

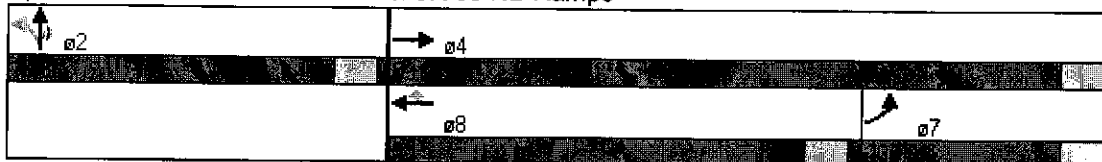
Lane Group												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	51	97			106	0		113	0			
Queue Length 95th (ft)	m73	m116			193	53		173	42			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	307	1259			965	1015		476	516			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.29	0.48			0.33	0.41		0.44	0.25			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 64 (71%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 49.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.991			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1467	1545	0	0	1652	0	1504	1346	0	0	0	0
Flt Permitted	0.678						0.950					
Satd. Flow (perm)	1047	1545	0	0	1652	0	1504	1346	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					7			884				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	154	66	0	0	106	7	239	0	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	167	72	0	0	115	8	260	0	55	0	0	0
Lane Group Flow (vph)	167	72	0	0	123	0	260	55	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	30.0	30.0	0.0	0.0	30.0	0.0	30.0	30.0	0.0	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	25.4	25.4			25.4		25.4	25.4				
Flow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	36.8	36.8			36.8		15.2	15.2				
Actuated g/C Ratio	0.61	0.61			0.61		0.25	0.25				
v/c Ratio	0.26	0.08			0.12		0.68	0.05				
Control Delay	3.7	2.9			6.3		28.7	0.1				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	3.7	2.9			6.3		28.7	0.1				
LOS	A	A			A		C	A				
Approach Delay		3.5			6.3			23.7				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative B

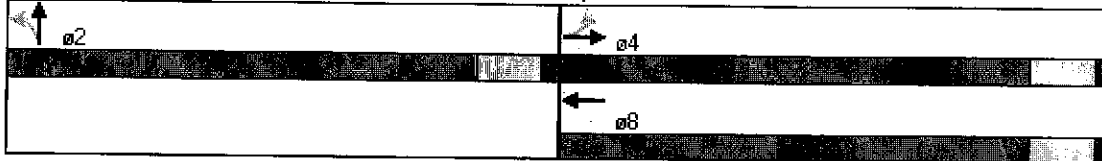
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	8	3			15		85	0				
Queue Length 95th (ft)	m21	m9			44		131	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	642	947			1015		652	1084				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.26	0.08			0.12		0.40	0.05				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 25 (42%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 35.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps















3: Ave 18.5 & Road 23
 Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕		↕		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50		50		50	50	50	
Trailing Detector (ft)		0		0	0		0		0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974							0.850		0.929	
Flt Protected					0.994		0.950				0.994	
Satd. Flow (prot)	0	1542	0	0	1587	0	1467	0	1313	0	1253	0
Flt Permitted					0.915		0.551				0.994	
Satd. Flow (perm)	0	1542	0	0	1461	0	851	0	1313	0	1253	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		34							71		93	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			45		45		
Link Distance (ft)		295			223			1486		2043		
Travel Time (s)		5.7			4.3			22.5		31.0		
Volume (vph)	0	435	103	32	252	0	79	0	65	23	75	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	20%	19%	19%	19%	23%	23%	23%	40%	40%	40%
Adj. Flow (vph)	0	473	112	35	274	0	86	0	71	25	82	118
Lane Group Flow (vph)	0	585	0	0	309	0	86	0	71	0	225	0
Turn Type			Perm			custom		custom		Perm		
Protected Phases		4			8							6
Permitted Phases				8			2		2	6		
Detector Phases		4		8	8		2		2	6		6
Minimum Initial (s)		4.0		4.0	4.0		4.0		4.0	4.0		4.0
Minimum Split (s)		20.6		20.6	20.6		21.3		21.3	21.3		21.3
Total Split (s)	0.0	38.7	0.0	38.7	38.7	0.0	21.3	0.0	21.3	21.3	21.3	0.0
Total Split (%)	0.0%	64.5%	0.0%	64.5%	64.5%	0.0%	35.5%	0.0%	35.5%	35.5%	35.5%	0.0%
Maximum Green (s)		34.1		34.1	34.1		16.0		16.0	16.0		16.0
ℳlow Time (s)		3.6		3.6	3.6		4.3		4.3	4.3		4.3
All-Red Time (s)		1.0		1.0	1.0		1.0		1.0	1.0		1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode		C-Max		C-Max	C-Max		Min		Min	Min		Min
Walk Time (s)		5.0		5.0	5.0		5.0		5.0	5.0		5.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)		0		0	0		0		0	0		0
Act Effct Green (s)		39.4			39.4		12.6		12.6			12.6
Actuated g/C Ratio		0.66			0.66		0.21		0.21			0.21
v/c Ratio		0.57			0.32		0.48		0.21			0.67
Control Delay		9.1			3.8		28.6		6.7			22.3
Queue Delay		0.0			0.0		0.0		0.0			0.0
Total Delay		9.1			3.8		28.6		6.7			22.3
LOS		A			A		C		A			C
Approach Delay		9.1			3.8							22.3

3: Ave 18.5 & Road 23
 Mitigated 2010 Project PM Alternative B

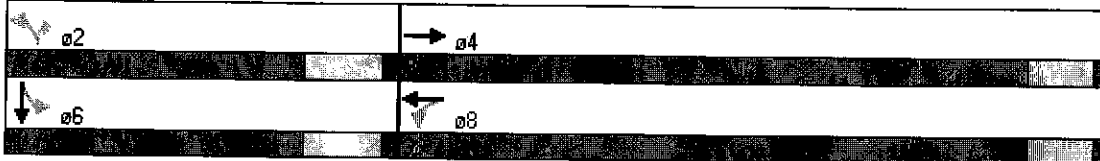
10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A							C
Queue Length 50th (ft)		90			11		27		0			42
Queue Length 95th (ft)		213			m48		60		24			97
Internal Link Dist (ft)		215			143			1406				1963
Turn Bay Length (ft)												
Base Capacity (vph)		1024			959		245		429			427
Starvation Cap Reductn		0			0		0		0			0
Spillback Cap Reductn		0			0		0		0			0
Storage Cap Reductn		0			0		0		0			0
Reduced v/c Ratio		0.57			0.32		0.35		0.17			0.53

Intersection Summary












Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 11.3
 Intersection Capacity Utilization 66.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2010 Project PM Alternative B













10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	376	212	228	156	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	409	230	248	170	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	478				663	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478				663	230
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				58	99
cM capacity (veh/h)	997				402	778
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	421	230	248	176		
Volume Left	12	0	0	170		
Volume Right	0	0	248	7		
cSH	997	1700	1700	409		
Volume to Capacity	0.01	0.14	0.15	0.43		
Queue Length 95th (ft)	1	0	0	53		
Control Delay (s)	0.4	0.0	0.0	20.3		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		20.3		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			44.3%		ICU Level of Service	A
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
 Mitigated 2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	117	93	138	190	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	127	101	150	207	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			978			
pX, platoon unblocked						
vC, conflicting volume	251				230	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251				230	101
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				69	100
cM capacity (veh/h)	1314				661	836
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	128	101	150	210		
Volume Left	1	0	0	207		
Volume Right	0	0	150	3		
cSH	1314	1700	1700	663		
Volume to Capacity	0.00	0.06	0.09	0.32		
Queue Length 95th (ft)	0	0	0	34		
Control Delay (s)	0.1	0.0	0.0	12.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			24.3%		ICU Level of Service	A
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	54	4	67	114	37	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	59	4	73	124	40	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	454	168	408	393	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	454	168	408	393	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	94	100			97		
cM capacity (veh/h)	442	472	853	515	520	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	75	201	210								
Volume Left	1	0	4	40								
Volume Right	7	59	124	2								
cSH	532	780	1316	1296								
Volume to Capacity	0.05	0.10	0.00	0.03								
Queue Length 95th (ft)	4	8	0	2								
Control Delay (s)	12.1	10.1	0.2	1.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.1	10.1	0.2	1.7								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			35.1%		ICU Level of Service				A			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950	0.953			
Satd. Flow (prot)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						208			228			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	74	854	0	0	1087	191	416	2	724	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	80	928	0	0	1182	208	452	2	787	0	0	0
Lane Group Flow (vph)	80	928	0	0	1182	208	226	228	787	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	12.0	50.0	0.0	0.0	38.0	38.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	15.0%	62.5%	0.0%	0.0%	47.5%	47.5%	37.5%	37.5%	37.5%	0.0%	0.0%	0.0%
Maximum Green (s)	6.7	44.7			32.7	32.7	25.4	25.4	25.4			
Yellow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	7.8	48.9			39.3	39.3	23.1	23.1	23.1			
Actuated g/C Ratio	0.10	0.61			0.49	0.49	0.29	0.29	0.29			
v/c Ratio	0.48	0.44			0.68	0.24	0.47	0.48	0.83			
Control Delay	36.0	6.5			19.9	3.0	26.3	26.3	26.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.0	6.5			19.9	3.0	26.3	26.3	26.5			
LOS	D	A			B	A	C	C	C			
Approach Delay		8.8			17.4			26.4				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative B

10/22/2008

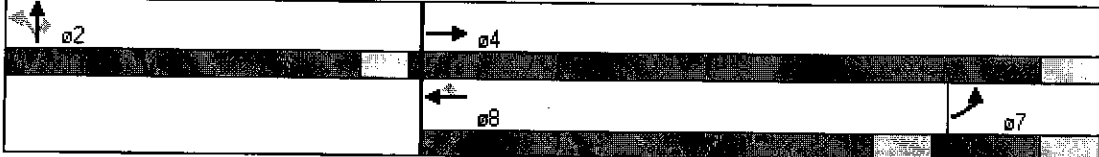
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	31	62			259	0	91	92	141			
Queue Length 95th (ft)	m64	116			340	37	157	158	216			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	172	2101			1738	883	536	538	1042			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.47	0.44			0.68	0.24	0.42	0.42	0.76			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 60 (75%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 55.7%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



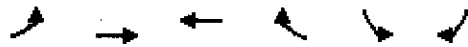
9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative B

10/22/2008

	↖	→	←	↙	↘	↗
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3471	3471	0	1687	1509
Flt Permitted					0.950	
Satd. Flow (perm)	0	3471	3471	0	1687	1509
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						90
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1253	1010	0	209	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	1362	1098	0	227	99
Lane Group Flow (vph)	0	1362	1098	0	227	99
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	50.7	50.7	0.0	29.3	29.3
Total Split (%)	0.0%	63.4%	63.4%	0.0%	36.6%	36.6%
Maximum Green (s)		45.4	45.4		24.7	24.7
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		56.2	56.2		15.8	15.8
Actuated g/C Ratio		0.70	0.70		0.20	0.20
v/c Ratio		0.56	0.45		0.68	0.27
Control Delay		1.9	2.3		39.6	8.8
Queue Delay		0.2	0.0		0.0	0.0
Total Delay		2.0	2.3		39.6	8.8
LOS		A	A		D	A
Approach Delay		2.0	2.3		30.3	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative B

10/22/2008



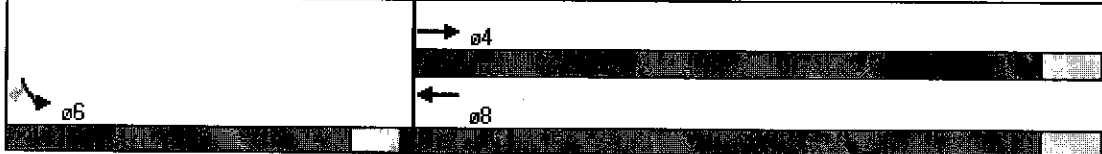
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		19	35		106	4
Queue Length 95th (ft)		52	88		163	38
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2437	2437		534	539
Starvation Cap Reductn		286	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.63	0.45		0.43	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 61 (76%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 5.5
 Intersection Capacity Utilization 52.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.983				0.850			0.850		0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3412	0	1719	3438	1538	1752	1845	1568	3099	1581	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3412	0	1719	3438	1538	1752	1845	1568	3099	1581	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		17				328			262		35	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	42	673	85	162	637	302	128	84	241	339	49	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	46	732	92	176	692	328	139	91	262	368	53	35
Lane Group Flow (vph)	46	824	0	176	692	328	139	91	262	368	88	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.3	21.3		9.3	21.3	21.3	8.6	20.6	20.6	8.6	20.6	
Total Split (s)	10.4	27.2	0.0	15.7	32.5	32.5	13.4	20.6	20.6	16.5	23.7	0.0
Total Split (%)	13.0%	34.0%	0.0%	19.6%	40.6%	40.6%	16.8%	25.8%	25.8%	20.6%	29.6%	0.0%
Maximum Green (s)	5.1	21.9		10.4	27.2	27.2	8.8	16.0	16.0	11.9	19.1	
Yellow Time (s)	4.3	4.3		4.3	4.3	4.3	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	7.2	27.5		11.7	36.5	36.5	15.9	9.9	9.9	14.9	8.8	
Actuated g/C Ratio	0.09	0.34		0.15	0.46	0.46	0.20	0.12	0.12	0.19	0.11	
v/c Ratio	0.30	0.69		0.70	0.44	0.37	0.40	0.40	0.62	0.64	0.43	
Control Delay	39.7	27.3		38.6	9.5	3.0	31.0	36.6	11.2	35.4	27.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.7	27.3		38.6	9.5	3.0	31.0	36.6	11.2	35.4	27.8	
LOS	D	C		D	A	A	C	D	B	D	C	
Approach Delay		27.9			12.0			21.5			33.9	

10: Ave 17 & GS Blvd
 Mitigated 2010 Project PM Alternative B

10/22/2008

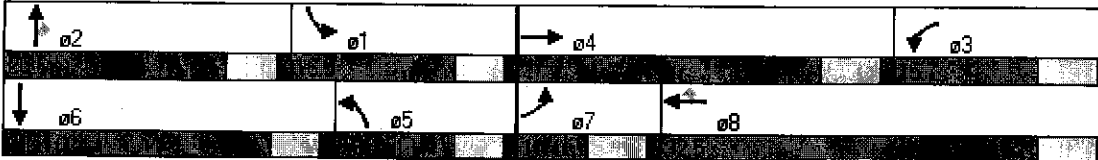
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C				C
Queue Length 50th (ft)	21	183		80	69	0	60	43	0	87	25	
Queue Length 95th (ft)	55	#278		#170	132	27	112	81	62	132	65	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	155	1186		251	1569	880	349	383	533	585	416	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	0.69		0.70	0.44	0.37	0.40	0.24	0.49	0.63	0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 2 (3%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 21.5
 Intersection Capacity Utilization 56.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.













Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23

Mitigated 2010 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected		0.970			0.996			0.953			0.992	
Flt Permitted					0.987			0.991			0.996	
Satd. Flow (prot)	0	1807	0	0	1746	0	0	1588	0	0	1647	0
Satd. Flow (perm)	0	1807	0	0	1528	0	0	1482	0	0	1612	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		32			4			54			6	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	0	187	53	70	190	8	45	114	86	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	0	203	58	76	207	9	49	124	93	12	147	10
Lane Group Flow (vph)	0	261	0	0	292	0	0	266	0	0	169	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5		20.5	20.5	
Total Split (s)	31.7	31.7	0.0	31.7	31.7	0.0	28.3	28.3	0.0	28.3	28.3	0.0
Total Split (%)	52.8%	52.8%	0.0%	52.8%	52.8%	0.0%	47.2%	47.2%	0.0%	47.2%	47.2%	0.0%
Maximum Green (s)	27.2	27.2		27.2	27.2		23.8	23.8		23.8	23.8	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.6			11.8			15.0			15.0	
Actuated g/C Ratio		0.35			0.36			0.49			0.49	
v/c Ratio		0.40			0.53			0.36			0.22	
Control Delay		8.5			11.9			8.5			8.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.5			11.9			8.5			8.7	
LOS		A			B			A			A	
Approach Delay		8.5			11.9			8.5			8.7	

11: Ave 17 & Road 23
 Mitigated 2010 Project PM Alternative B

10/22/2008

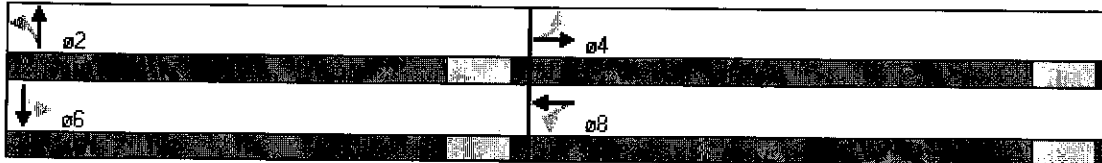
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		22			29			22			16	
Queue Length 95th (ft)		74			98			83			59	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1045			874			954			1018	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.25			0.33			0.28			0.17	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 30.9
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 9.5
 Intersection Capacity Utilization 62.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis & Road 26

Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.988			0.979	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3497	0	1770	3465	0
Flt Permitted		0.708			0.731		0.950			0.950		
Satd. Flow (perm)	0	1319	1583	0	1362	1583	1770	3497	0	1770	3465	0
Right Turn on Red												
Satd. Flow (RTOR)			15			226		13			27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	95	1	14	57	4	208	11	788	67	195	752	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1	15	62	4	226	12	857	73	212	817	132
Lane Group Flow (vph)	0	104	15	0	66	226	12	930	0	212	949	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.5	10.5		10.5	10.5	7.0	26.7		10.7	36.4	
Actuated g/C Ratio		0.19	0.19		0.19	0.19	0.11	0.50		0.19	0.68	
v/c Ratio		0.42	0.05		0.26	0.47	0.06	0.53		0.62	0.40	
Control Delay		25.1	10.1		21.7	6.9	26.5	15.0		29.6	7.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.1	10.1		21.7	6.9	26.5	15.0		29.6	7.2	
LOS		C	B		C	A	C	B		C	A	
Approach Delay		23.2			10.2			15.1			11.3	
Approach LOS		C			B			B			B	

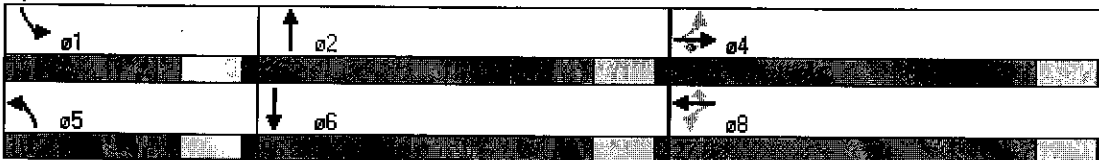
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		31	0		19	0	4	130		65	57	
Queue Length 95th (ft)		69	12		47	46	17	214		#148	192	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		459	561		474	698	318	1789		372	2374	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.23	0.03		0.14	0.32	0.04	0.52		0.57	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.4
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 56.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.










Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
 Mitigated 2010 Project PM Alternative B

10/22/2008

Movement						
	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	215	3	0	174	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	234	3	0	189	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	274		465	232		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274		465	232		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)						
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1283		556	808		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	234	3	274			
Volume Left	0	3	0			
Volume Right	0	0	85			
cSH	1700	556	1700			
Volume to Capacity	0.14	0.01	0.16			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	11.5	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	11.5	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		24.4%		ICU Level of Service		A
Analysis Period (min)			15			







14: Gateway & Ave 16 Connector
 Mitigated 2010 Project PM Alternative B

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↓		↑	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	78	3	108	303	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	3	117	329	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121				147	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				147	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				61	100
cM capacity (veh/h)	1461				846	1003
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	85	121	329			
Volume Left	0	0	329			
Volume Right	0	117	0			
cSH	1700	1700	846			
Volume to Capacity	0.05	0.07	0.39			
Queue Length 95th (ft)	0	0	47			
Control Delay (s)	0.0	0.0	11.9			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			7.4			
Intersection Capacity Utilization		30.3%		ICU Level of Service		A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 Mitigated 2010 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑			↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	303	215	173	0	0	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	329	234	188	0	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked					0.96	
vC, conflicting volume	188				1080	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				1084	188
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	76				100	86
cM capacity (veh/h)	1386				174	849
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	563	188	117			
Volume Left	329	0	0			
Volume Right	0	0	117			
cSH	1386	1700	849			
Volume to Capacity	0.24	0.11	0.14			
Queue Length 95th (ft)	23	0	12			
Control Delay (s)	5.9	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	5.9	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization		43.9%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frnt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				3		410
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	394	279	3	78	377
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	428	303	3	85	410
Lane Group Flow (vph)	98	428	303	3	85	410
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	13.9	36.5	22.6	22.6	23.5	23.5
Total Split (%)	23.2%	60.8%	37.7%	37.7%	39.2%	39.2%
Maximum Green (s)	9.0	31.6	17.7	17.7	19.0	19.0
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.4	19.9	13.4	13.4	9.4	9.4
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.24	0.24
v/c Ratio	0.28	0.44	0.47	0.01	0.20	0.59
Control Delay	19.6	7.1	15.0	9.3	15.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	7.1	15.0	9.3	15.7	6.1
LOS	B	A	B	A	B	A
Approach Delay		9.5	14.9		7.8	
Approach LOS		A	B		A	

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative B

10/22/2008

	↖	→	←	↖	↘	↘
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	38	56	0	17	0
Queue Length 95th (ft)	66	121	144	5	50	54
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	406	1221	829	706	744	903
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.35	0.37	0.00	0.11	0.45

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 38.5

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 10.1

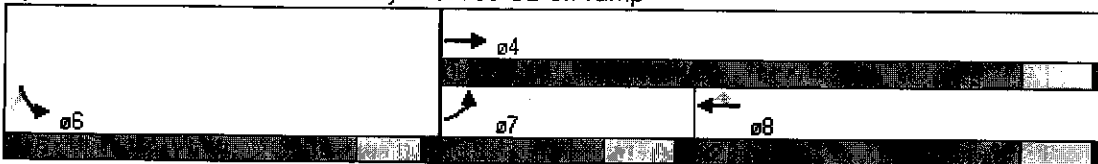
Intersection LOS: B

Intersection Capacity Utilization 44.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.944			0.963				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3341	0	1770	3408	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3341	0	1770	3408	0	1770	1770	1583	1770	1583	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		47			34				7		139	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	72	43	319	97	31	39	90	6	86	141	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	78	47	347	105	34	42	98	7	93	153	330
Lane Group Flow (vph)	3	125	0	347	139	0	42	98	7	93	483	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	22.0	34.0	0.0	8.9	23.3	23.3	13.8	28.2	0.0
Total Split (%)	11.1%	26.1%	0.0%	27.5%	42.5%	0.0%	11.1%	29.1%	29.1%	17.3%	35.3%	0.0%
Maximum Green (s)	4.0	16.0		17.1	29.1		4.0	18.4	18.4	8.9	23.3	
Flow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	vs	vs		vs	vs		vs	vs	vs	vs	vs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	5.0	8.1		16.6	24.4		4.9	22.6	22.6	8.8	27.7	
Actuated g/C Ratio	0.07	0.12		0.25	0.36		0.07	0.34	0.34	0.13	0.41	
v/c Ratio	0.03	0.29		0.79	0.11		0.34	0.16	0.01	0.41	0.66	
Control Delay	34.0	20.9		39.5	11.6		40.3	21.5	12.3	34.6	19.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	20.9		39.5	11.6		40.3	21.5	12.3	34.6	19.6	
LOS	C	C		D	B		D	C	B	C	B	
Approach Delay		21.2			31.5			26.4		22.0		
Approach LOS		C			C			C		C		

17: Ave 16 & Aviation Drive
 Mitigated 2010 Project PM Alternative B

10/22/2008

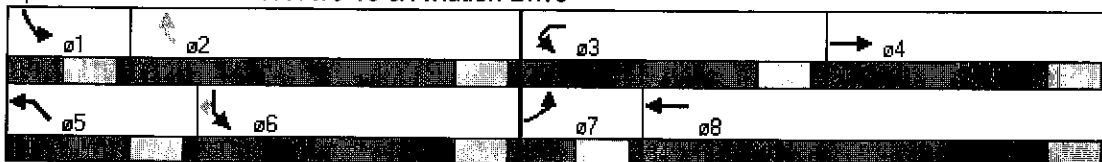
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	16		141	13		18	33	0	38	132	
Queue Length 95th (ft)	9	40		#278	36		48	71	9	82	#295	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	119	765		472	1450		124	597	539	249	737	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.16		0.74	0.10		0.34	0.16	0.01	0.37	0.66	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 66.9
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 25.9
 Intersection Capacity Utilization 44.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		
Satd. Flow (RTOR)						212		79				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	206	1136	0	0	1182	195	714	2	350	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	224	1235	0	0	1285	212	776	2	380	0	0	0
Lane Group Flow (vph)	224	1235	0	0	1285	212	388	390	380	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	17.0	54.0	0.0	0.0	37.0	37.0	26.0	26.0	26.0	0.0	0.0	0.0
Total Split (%)	21.3%	67.5%	0.0%	0.0%	46.3%	46.3%	32.5%	32.5%	32.5%	0.0%	0.0%	0.0%
Maximum Green (s)	12.4	49.4			32.4	32.4	21.5	21.5	21.5			
ℳlow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.0	50.0			33.0	33.0	22.0	22.0	22.0			
Actuated g/C Ratio	0.16	0.62			0.41	0.41	0.28	0.28	0.28			
v/c Ratio	0.79	0.56			0.88	0.27	0.84	0.84	0.77			
Control Delay	38.2	4.4			30.4	3.3	45.7	45.7	33.4			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	38.2	4.6			30.4	3.3	45.7	45.7	33.4			
LOS	D	A			C	A	D	D	C			
Approach Delay		9.7			26.6			41.7				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			C			D				
Queue Length 50th (ft)	114	54			302	0	191	192	139			
Queue Length 95th (ft) m#172		64			#435	38	#349	#350	#275			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	285	2191			1460	778	462	464	493			
Starvation Cap Reductn	0	230			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.79	0.63			0.88	0.27	0.84	0.84	0.77			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 74 (93%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 24.9
 Intersection Capacity Utilization 110.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps

Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Ⓢ			Ⓢ			Ⓢ		Ⓢ	
Satd. Flow (RTOR)			631									34
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1138	713	257	1635	0	0	0	0	200	2	179
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1237	775	279	1777	0	0	0	0	217	2	195
Lane Group Flow (vph)	0	1237	775	279	1777	0	0	0	0	0	219	195
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	38.5	38.5	21.0	59.5	0.0	0.0	0.0	0.0	20.5	20.5	20.5
Total Split (%)	0.0%	48.1%	48.1%	26.3%	74.4%	0.0%	0.0%	0.0%	0.0%	25.6%	25.6%	25.6%
Maximum Green (s)		33.9	33.9	16.4	54.9					16.0	16.0	16.0
Flow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Ⓢ	Ⓢ	Ⓢ								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		37.9	37.9	15.7	57.6						14.4	14.4
Actuated g/C Ratio		0.47	0.47	0.20	0.72						0.18	0.18
v/c Ratio		0.74	0.72	0.80	0.70						0.72	0.65
Control Delay		21.4	8.0	42.0	1.1						44.4	35.4
Queue Delay		0.0	0.0	0.0	0.2						0.0	0.0
Total Delay		21.4	8.0	42.0	1.4						44.4	35.4
LOS		C	A	D	A						D	D
Approach Delay		16.2			6.9						40.2	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A						D	
Queue Length 50th (ft)		274	44	118	0						102	73
Queue Length 95th (ft)		360	177	m145	1						173	139
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1678	1083	379	2548						349	338
Starvation Cap Reductn		0	0	0	204						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.74	0.72	0.74	0.76						0.63	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 110.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




























20: Ave 15.5/Cleveland & Road 23
 Mitigated 2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	42	1	43	0	169	77	50	191	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	46	1	47	0	184	84	54	208	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	589	584	208	543	542	226	208			267		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589	584	208	543	542	226	208			267		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	89	100	94	100			96		
cM capacity (veh/h)	381	405	833	429	424	806	1317			1220		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	93	267	262								
Volume Left	0	46	0	54								
Volume Right	1	47	84	0								
cSH	545	560	1317	1220								
Volume to Capacity	0.00	0.17	0.00	0.04								
Queue Length 95th (ft)	0	15	0	3								
Control Delay (s)	11.6	12.7	0.0	2.0								
Lane LOS	B	B		A								
Approach Delay (s)	11.6	12.7	0.0	2.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization		48.1%		ICU Level of Service					A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group												
	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 	 			 						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.968						0.852	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3426	0	0	0	0	1770	1587	0
Flt Permitted	0.316									0.950		
Satd. Flow (perm)	1131	3505	0	0	3426	0	0	0	0	1770	1587	0
Right Turn on Red												
Satd. Flow (RTOR)					99						65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	548	487	0	0	592	159	0	0	0	128	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	596	529	0	0	643	173	0	0	0	139	1	65
Lane Group Flow (vph)	596	529	0	0	816	0	0	0	0	139	66	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	49.5	49.5	0.0	0.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	70.7%	70.7%	0.0%	0.0%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	44.9	44.9			44.9					16.0	16.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effect Green (s)	54.0	54.0			54.0					10.9	10.9	
Actuated g/C Ratio	0.77	0.77			0.77					0.16	0.16	
v/c Ratio	0.68	0.20			0.31					0.50	0.22	
Control Delay	12.1	2.1			3.4					32.8	9.1	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	12.1	2.1			3.4					32.8	9.1	
LOS	B	A			A					C	A	
Approach Delay		7.4			3.4						25.1	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	90	15			43					56	0	
Queue Length 95th (ft)	#197	29			81					99	29	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	873	2704			2666					417	424	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.68	0.20			0.31					0.33	0.16	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 5 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 54.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A




















95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps















22: AVe 14/Olive & SR 145/Madera
Mitigated 2010 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.999				0.850
Flt Protected	0.950						0.950				0.989	
Satd. Flow (prot)	1736	1827	1553	0	0	0	3433	3536	0	0	3466	1568
Flt Permitted	0.950						0.950				0.663	
Satd. Flow (perm)	1736	1827	1553	0	0	0	3433	3536	0	0	2324	1568
Right Turn on Red			\forall s			\forall s		\forall s			\forall s	
Satd. Flow (RTOR)			620					2				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	251	101	570	0	0	0	133	784	7	83	275	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	273	110	620	0	0	0	145	852	8	90	299	272
Lane Group Flow (vph)	273	110	620	0	0	0	145	860	0	0	389	272
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	27.0	27.0	27.0	0.0	0.0	0.0	20.6	43.0	0.0	22.4	22.4	22.4
Total Split (%)	38.6%	38.6%	38.6%	0.0%	0.0%	0.0%	29.4%	61.4%	0.0%	32.0%	32.0%	32.0%
Maximum Green (s)	22.5	22.5	22.5				16.0	38.4		17.8	17.8	17.8
Flow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							\forall s			\forall s	\forall s	\forall s
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	18.4	18.4	18.4				21.2	43.6			18.4	18.4
Actuated g/C Ratio	0.26	0.26	0.26				0.30	0.62			0.26	0.26
v/c Ratio	0.60	0.23	0.72				0.14	0.39			0.64	0.44
Control Delay	25.0	17.5	9.2				20.5	8.2			25.2	3.9
Queue Delay	1.4	0.6	0.2				0.0	0.0			0.0	0.0
Total Delay	26.4	18.1	9.4				20.5	8.2			25.2	3.9
LOS	C	B	A				C	A			C	A
Approach Delay		15.0						10.0			16.5	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2010 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						A			B	
Queue Length 50th (ft)	64	25	16				25	103			82	0
Queue Length 95th (ft)	m110	m46	78				47	142			115	12
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	570	600	927				1041	2204			611	613
Starvation Cap Reductn	147	268	35				0	0			0	0
Spillback Cap Reductn	0	0	0				0	0			0	0
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	0.65	0.33	0.70				0.14	0.39			0.64	0.44

Intersection Summary







Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 62 (89%), Referenced to phase 2:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 13.5
 Intersection LOS: B
 Intersection Capacity Utilization 55.8%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						172
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	473	384	0	449	158
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	514	417	0	488	172
Lane Group Flow (vph)	0	514	417	0	488	172
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	34.1	34.1	0.0	35.9	35.9
Total Split (%)	0.0%	48.7%	48.7%	0.0%	51.3%	51.3%
Maximum Green (s)		29.6	29.6		31.4	31.4
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		46.3	46.3		15.7	15.7
Actuated g/C Ratio		0.66	0.66		0.22	0.22
v/c Ratio		0.22	0.18		0.67	0.37
Control Delay		5.5	2.6		29.2	6.1
Queue Delay		0.0	0.2		0.0	0.0
Total Delay		5.5	2.7		29.2	6.1
LOS		A	A		C	A
Approach Delay		5.5	2.7		23.2	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative B

10/22/2008

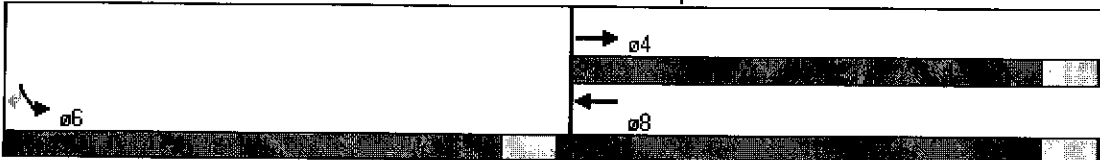
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		38	15		99	0
Queue Length 95th (ft)		73	22		131	40
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2342	2342		1477	775
Starvation Cap Reductn		0	1124		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.22	0.34		0.33	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 5 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 32.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 Mitigated 2010 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	49	89	12	16	38	53	5	119	25	67	110	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	97	13	17	41	58	5	129	27	73	120	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	116	162	220								
Volume Left (vph)	53	17	5	73								
Volume Right (vph)	13	58	27	27								
Hadj (s)	0.07	-0.10	0.09	0.26								
Departure Headway (s)	5.1	5.0	5.0	5.1								
Degree Utilization, x	0.23	0.16	0.23	0.31								
Capacity (veh/h)	644	647	665	660								
Control Delay (s)	9.7	9.0	9.5	10.4								
Approach Delay (s)	9.7	9.0	9.5	10.4								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.8									
HCM Level of Service			A									
Intersection Capacity Utilization		43.9%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
 Mitigated 2010 Project PM Alternative B

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.677	
Satd. Flow (perm)	3335	1538	1759	1495	1237	1827
Right Turn on Red		vs		vs		
Satd. Flow (RTOR)		91		286		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	668		408			1104
Travel Time (s)	15.2		9.3			25.1
Volume (vph)	438	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	476	91	125	286	91	142
Lane Group Flow (vph)	476	91	125	286	91	142
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	47.0	53.0	53.0	53.0	53.0	53.0
Total Split (%)	47.0%	53.0%	53.0%	53.0%	53.0%	53.0%
Maximum Green (s)	42.5	48.5	48.5	48.5	48.5	48.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	75.3	16.7	16.7	16.7	16.7	16.7
Actuated g/C Ratio	0.75	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.19	0.27	0.43	0.59	0.44	0.47
Control Delay	4.6	8.7	24.8	7.9	41.9	40.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	8.7	24.8	7.9	41.9	40.7
LOS	A	A	C	A	D	D
Approach Delay	5.2		13.1			41.2

25: SB Ramps & GS Blvd
 Mitigated 2010 Project PM Alternative B

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	A		B		D	
Queue Length 50th (ft)	34	0	54	23	54	84
Queue Length 95th (ft)	75	38	m48	m30	92	128
Internal Link Dist (ft)	588		328		1024	
Turn Bay Length (ft)						
Base Capacity (vph)	2513	800	862	878	606	895
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.11	0.15	0.33	0.15	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 9 (9%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 14.8
 Intersection Capacity Utilization 30.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
 Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850		0.947			0.877				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1618	0	3335	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1618	0	3335	1810	1538
Right Turn on Red												
Satd. Flow (RTOR)			32		30			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	238	29	14	289	160	46	18	85	481	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	259	32	15	314	174	50	20	92	523	30	65
Lane Group Flow (vph)	217	259	32	15	488	0	50	112	0	523	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	20.0	48.8	48.8	8.6	37.4	0.0	11.2	20.6	0.0	22.0	31.4	31.4
Total Split (%)	20.0%	48.8%	48.8%	8.6%	37.4%	0.0%	11.2%	20.6%	0.0%	22.0%	31.4%	31.4%
Maximum Green (s)	15.4	44.2	44.2	4.0	32.8		6.7	16.1		17.5	26.9	26.9
Flow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	15.4	49.4	49.4	4.6	33.4		7.0	17.4		17.8	30.2	30.2
Actuated g/C Ratio	0.15	0.49	0.49	0.05	0.33		0.07	0.17		0.18	0.30	0.30
v/c Ratio	0.84	0.30	0.04	0.19	0.84		0.41	0.31		0.88	0.05	0.13
Control Delay	69.2	17.0	5.7	52.7	39.1		54.9	13.7		57.1	21.8	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	69.2	17.0	5.7	52.7	39.1		54.9	13.7		57.1	21.8	4.6
LOS	E	B	A	D	D		D	B		E	C	A
Approach Delay		38.6			39.5			26.4			49.9	

26: Ave 12 & GS Blvd
 Mitigated 2010 Project PM Alternative B

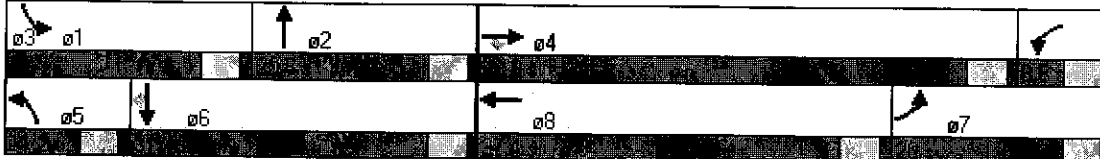
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	135	86	0	10	173		31	11		144	13	1
Queue Length 95th (ft)	#257	164	17	m24	#263		69	58		#265	m31	14
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	267	868	754	78	582		126	357		600	547	510
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.81	0.30	0.04	0.19	0.84		0.40	0.31		0.87	0.05	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 91 (91%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 41.6
 Intersection Capacity Utilization 66.4%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2010 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	1827	0	0	1827	1553	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	1827	0	0	1827	1553	0	1692	1509	0	0	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)						507			153			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	164	640	0	0	284	466	179	1	141	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	178	696	0	0	309	507	195	1	153	0	0	0
Lane Group Flow (vph)	178	696	0	0	309	507	0	196	153	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.6	20.6	20.6			
Total Split (s)	28.6	69.9	0.0	0.0	41.3	41.3	30.1	30.1	30.1	0.0	0.0	0.0
Total Split (%)	28.6%	69.9%	0.0%	0.0%	41.3%	41.3%	30.1%	30.1%	30.1%	0.0%	0.0%	0.0%
Maximum Green (s)	24.0	65.3			36.7	36.7	25.5	25.5	25.5			
ℳlow Time (s)	3.6	3.6			3.6	3.6	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	17.0	75.2			54.2	54.2		16.8	16.8			
Actuated g/C Ratio	0.17	0.75			0.54	0.54		0.17	0.17			
v/c Ratio	0.60	0.51			0.31	0.47		0.69	0.40			
Control Delay	35.0	5.6			16.0	3.2		51.2	8.8			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	35.0	5.6			16.0	3.2		51.2	8.8			
LOS	D	A			B	A		D	A			
Approach Delay		11.6			8.1			32.6				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project PM Alternative B

10/22/2008

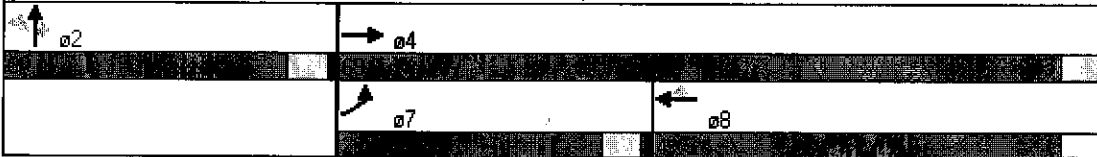
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			C				
Queue Length 50th (ft)	57	101			109	0		119	0			
Queue Length 95th (ft)	m63	m405			201	58		181	50			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	427	1373			990	1074		442	507			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.42	0.51			0.31	0.47		0.44	0.30			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 96 (96%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 57.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 21

MITIGATED OPENING DAY (2010)

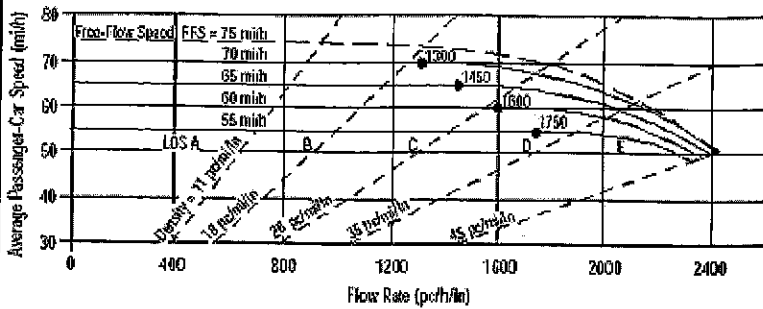
PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET																								
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different density and Level of Service (LOS) conditions. Key points on the curves are labeled with flow rates: 1300, 1450, 1600, and 1750. Density values shown include 11 pc/mi/ln, 18 pc/mi/ln, 25 pc/mi/ln, 35 pc/mi/ln, and 45 pc/mi/ln. Free-Flow Speed (FFS) values are listed as 75 mi/h, 70 mi/h, 65 mi/h, and 55 mi/h.</p>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>		Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v_p	LOS, S, D																						
Design (N)	FFS, LOS, v_p	N, S, D																						
Design (v_p)	FFS, LOS, N	v_p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v_p)	FFS, LOS, N	v_p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2010 Project Alt C AM	Analysis Year	2010																					
Project Description 04-837.2 Northfork Casino Alt C																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	2185	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P_T																					
Peak-Hr Prop. of AADT, K			%RVs, P_R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT x K x D		veh/h	Grade % Length																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00		E_R																					
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																					
Interchange Density	0.50	l/mi	f_{ID}																					
Number of Lanes, N	3		f_N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	930	pc/h/ln	Design LOS																					
S	70.0	mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																					
$D = v_p / S$	13.3	pc/mi/ln	S																					
LOS	B		$D = v_p / S$																					
			Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information **Site Information**

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	3231	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	3		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

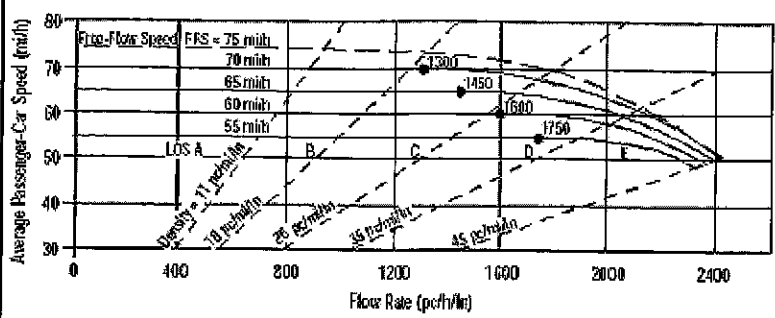
LOS and Performance Measures **Design (N)**

Operational (LOS)				Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1376	pc/h/ln	Design LOS		
S	70.0	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)		pc/h
D = v _p / S	19.7	pc/mi/ln	S		mi/h
LOS	C		D = v _p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 Project Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2716	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

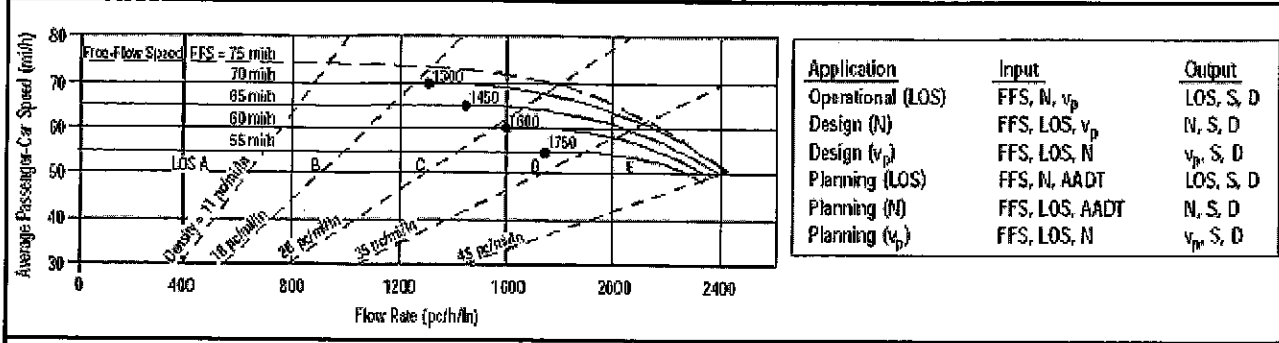
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1156 pc/h/ln	Design LOS	
S	70.0 mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	16.5 pc/mi/ln	S	mi/h
LOS	B	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different levels of service (LOS) and free-flow speeds (FFS). Key points on the graph include: <ul style="list-style-type: none"> FFS = 75 mi/h FFS = 70 mi/h FFS = 65 mi/h FFS = 60 mi/h FFS = 55 mi/h LOS A, B, C, D curves Flow rate markers: 1200, 1450, 1600, 1750 </p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2010 P Alt C PM	Analysis Year	2010																			
Project Description 04-837.2 Northfork Casino Alt C																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	2856	veh/h	Peak-Hour Factor, PHF 0.88																			
AADT		veh/day	% Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AADT, K			%RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AADT x K x D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	3		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1216	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$ pc/h																			
S	70.0	mi/h	S mi/h																			
$D = v_p / S$	17.4	pc/mi/ln	$D = v_p / S$ pc/mi/ln																			
LOS	B		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt C AM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	2295	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T + (E _T - 1) * P _R * (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

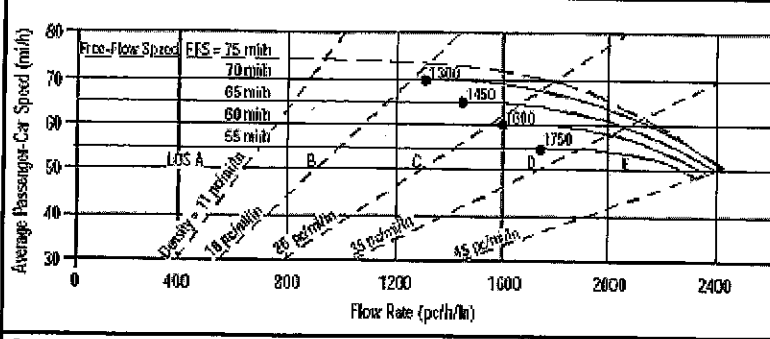
LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	977 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	14.0 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																										
			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Application</th> <th style="text-align: left;">Input</th> <th style="text-align: left;">Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst: <i>R Davis</i>		Highway/Direction of Travel: <i>SR 99 Southbound</i>																								
Agency or Company: <i>TPG Consulting, Inc.</i>		From/To: <i>between Ave 18 1/2 & Ave 17</i>																								
Date Performed: <i>9/22/08</i>		Jurisdiction: <i>Caltrans</i>																								
Analysis Time Period: <i>Mit 2010 P Alt C PM</i>		Analysis Year: <i>2010</i>																								
Project Description: <i>04-837.2 Northfork Casino Alt C</i>																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)		<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V: <i>3423</i> veh/h		Peak-Hour Factor, PHF: <i>0.88</i>																								
AADT: <i></i> veh/day		%Trucks and Buses, P _T : <i>24</i>																								
Peak-Hr Prop. of AADT, K: <i></i>		%RVs, P _R : <i>2</i>																								
Peak-Hr Direction Prop, D: <i></i>		General Terrain: <i>Level</i>																								
DDHV = AADT x K x D: <i></i> veh/h		Grade % Length: <i>mi</i>																								
Driver type adjustment: <i>1.00</i>		Up/Down %: <i></i>																								
Calculate Flow Adjustments																										
f _p : <i>1.00</i>		E _R : <i>1.2</i>																								
E _T : <i>1.5</i>		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]: <i>0.890</i>																								
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width: <i>12.0</i> ft		f _{LW} : <i></i> mi/h																								
Rt-Shoulder Lat. Clearance: <i>6.0</i> ft		f _{LC} : <i></i> mi/h																								
Interchange Density: <i>0.50</i> l/mi		f _{ID} : <i></i> mi/h																								
Number of Lanes, N: <i>3</i>		f _N : <i></i> mi/h																								
FFS (measured): <i>70.0</i> mi/h		FFS: <i>70.0</i> mi/h																								
Base free-flow Speed, BFFS: <i></i> mi/h																										
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p): <i>1457</i> pc/h/ln			Design LOS																							
S: <i>69.9</i> mi/h			v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p): <i></i> pc/h																							
D = v _p / S: <i>20.8</i> pc/mi/ln			S: <i></i> mi/h																							
LOS: <i>C</i>			D = v _p / S: <i></i> pc/mi/ln																							
			Required Number of Lanes, N: <i></i>																							
Glossary			Factor Location																							
N - Number of lanes		S - Speed		E _R - Exhibits 23-8, 23-10																						
V - Hourly volume		D - Density		f _{LW} - Exhibit 23-4																						
v _p - Flow rate		FFS - Free-flow speed		E _T - Exhibits 23-8, 23-10, 23-11																						
LOS - Level of service		BFFS - Base free-flow speed		f _{LC} - Exhibit 23-5																						
DDHV - Directional design hour volume				f _p - Page 23-12																						
				LOS, S, FFS, v _p - Exhibits 23-2, 23-3																						
				f _N - Exhibit 23-6																						
				f _{ID} - Exhibit 23-7																						

BASIC FREEWAY SEGMENTS WORKSHEET																										
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Application	Input	Output																								
Operational (LOS)	FFS, N, v_p	LOS, S, D																								
Design (N)	FFS, LOS, v_p	N, S, D																								
Design (v_p)	FFS, LOS, N	v_p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v_p)	FFS, LOS, N	v_p , S, D																								
General Information			Site Information																							
Analyst	R Davis		Highway/Direction of Travel	SR 99 Northbound																						
Agency or Company	TPG Consulting, Inc.		From/To	south of Avenue 17																						
Date Performed	9/22/08		Jurisdiction	Caltrans																						
Analysis Time Period	Mit 2010 Alt C AM		Analysis Year	2010																						
Project Description 04-837.2 Northfork Casino Alt C																										
<input checked="" type="checkbox"/> Oper. (LOS)		<input checked="" type="checkbox"/> Des. (N)		<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	3177	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	% Trucks and Buses, P_T	24																						
Peak-Hr Prop. of AADT, K			% RVs, P_R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT x K x D		veh/h	Grade % Length	mi																						
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f_p	1.00		E_R	1.2																						
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f_{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h																						
Interchange Density	0.50	1/mi	f_{ID}	mi/h																						
Number of Lanes, N	3		f_N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$			Design LOS																							
v_p	1353	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h																						
S	70.0	mi/h	f_p	mi/h																						
$D = v_p / S$	19.3	pc/mi/ln	S	mi/h																						
LOS	C		$D = v_p / S$	pc/mi/ln																						
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																						
v_p - Flow rate	FFS - Free-flow speed		f_p - Page 23-12	f_N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																										

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mt 2010 Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper. (LOS)
 Des. (N)
 Planning Data

Flow Inputs			
Volume, V	3541	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

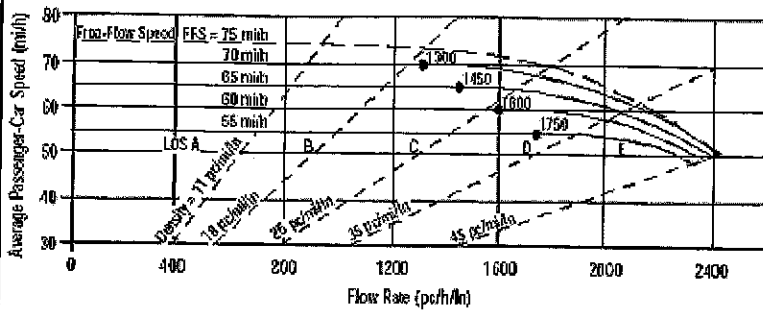
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T + (E _T - 1) * P _R * (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1508 pc/h/ln	Design LOS	
S	69.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	21.6 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst: R Davis
 Agency or Company: TPG Consulting, Inc.
 Date Performed: 9/22/08
 Analysis Time Period: Mit 2010 Project Alt C AM

Site Information

Highway/Direction of Travel: SR 99 Southbound
 From/To: south of Avenue 17
 Jurisdiction: Caltrans
 Analysis Year: 2010

Project Description: 04-837.2 Northfork Casino Alt C

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	2670	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	mi
Driver type adjustment	1.00		Length	
			Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	1/mi
Number of Lanes, N	3	
FFS (measured)	70.0	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	70.0	mi/h

LOS and Performance Measures

Operational (LOS)			
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1137	pc/h/ln	
S	70.0	mi/h	
D = v _p / S	16.2	pc/mi/ln	
LOS	B		

Design (N)

Design (N)			
Design LOS			
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)		pc/h	
S		mi/h	
D = v _p / S		pc/mi/ln	
Required Number of Lanes, N			

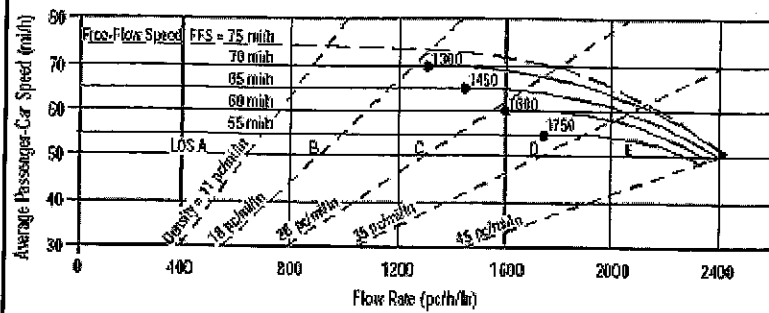
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2010 P Alt C PM	Analysis Year	2010
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4153	veh/h	Peak-Hour Factor, PHF 0.88
AAVT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1768 pc/h/ln	Design LOS	
S	68.2 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.9 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 22

MITIGATED OPENING DAY (2010)

PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.985			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1271	1338	0	0	1573	0	1388	1253	0	0	0	0
Flt Permitted	0.683						0.950					
Satd. Flow (perm)	914	1338	0	0	1573	0	1388	1253	0	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)					13			42				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	170	51	0	0	94	12	184	2	39	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	185	55	0	0	102	13	200	2	42	0	0	0
Lane Group Flow (vph)	185	55	0	0	115	0	200	44	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	33.3	33.3	0.0	0.0	33.3	0.0	26.7	26.7	0.0	0.0	0.0	0.0
Total Split (%)	55.5%	55.5%	0.0%	0.0%	55.5%	0.0%	44.5%	44.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	28.7	28.7			28.7		22.1	22.1				
Flow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	38.3	38.3			38.3		13.7	13.7				
Actuated g/C Ratio	0.64	0.64			0.64		0.23	0.23				
v/c Ratio	0.32	0.06			0.11		0.63	0.14				
Control Delay	5.4	4.1			5.2		29.2	7.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.4	4.1			5.2		29.2	7.2				
LOS	A	A			A		C	A				
Approach Delay		5.1			5.2			25.3				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative C

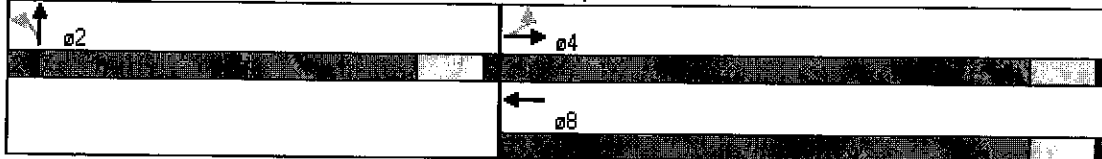
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	14	4			12		65	1				
Queue Length 95th (ft)	38	m14			36		110	19				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	583	854			1009		525	500				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.32	0.06			0.11		0.38	0.09				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 13 (22%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.3
 Intersection Capacity Utilization 32.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps















3: Ave 18.5 & Road 23
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50		50		50	50	50	
Trailing Detector (ft)		0		0	0		0		0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.929	
Flt Protected					0.997		0.950				0.996	
Satd. Flow (prot)	0	1385	0	0	1540	0	1421	0	1272	0	1293	0
Flt Permitted					0.967		0.679				0.996	
Satd. Flow (perm)	0	1385	0	0	1494	0	1016	0	1272	0	1293	0
Right Turn on Red			rs			rs			rs		rs	
Satd. Flow (RTOR)		26							97		80	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			45		45		
Link Distance (ft)		295			223			1486		2043		
Travel Time (s)		5.7			4.3			22.5		31.0		
Volume (vph)	0	314	64	16	211	0	81	0	89	12	54	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	34%	23%	23%	23%	27%	27%	27%	36%	36%	36%
Adj. Flow (vph)	0	341	70	17	229	0	88	0	97	13	59	80
Lane Group Flow (vph)	0	411	0	0	246	0	88	0	97	0	152	0
Turn Type				Perm		custom		custom		Perm		
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Detector Phases		4		8	8		2		2	6	6	
Minimum Initial (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Minimum Split (s)		20.6		20.6	20.6		21.3		21.3	21.3	21.3	
Total Split (s)	0.0	35.7	0.0	35.7	35.7	0.0	24.3	0.0	24.3	24.3	24.3	0.0
Total Split (%)	0.0%	59.5%	0.0%	59.5%	59.5%	0.0%	40.5%	0.0%	40.5%	40.5%	40.5%	0.0%
Maximum Green (s)		31.1		31.1	31.1		19.0		19.0	19.0	19.0	
Flow Time (s)		3.6		3.6	3.6		4.3		4.3	4.3	4.3	
All-Red Time (s)		1.0		1.0	1.0		1.0		1.0	1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		Min		Min	Min	Min	
Walk Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0		0	0	0	
Act Effct Green (s)		40.5		40.5	40.5		11.5		11.5	11.5	11.5	
Actuated g/C Ratio		0.68		0.68	0.68		0.19		0.19	0.19	0.19	
v/c Ratio		0.44		0.24	0.24		0.45		0.30	0.49	0.49	
Control Delay		6.8		2.0	2.0		27.9		7.4	16.0	16.0	
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay		6.8		2.0	2.0		27.9		7.4	16.0	16.0	
LOS		A		A	A		C		A	B	B	
Approach Delay		6.8		2.0	2.0					16.0	16.0	

3: Ave 18.5 & Road 23
 Mitigated 2010 Project AM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A							B
Queue Length 50th (ft)		49			8		29		0			23
Queue Length 95th (ft)		130			m20		60		29			61
Internal Link Dist (ft)		215			143			1406				1963
Turn Bay Length (ft)												
Base Capacity (vph)		944			1009		344		495			490
Starvation Cap Reductn		0			0		0		0			0
Spillback Cap Reductn		0			0		0		0			0
Storage Cap Reductn		0			0		0		0			0
Reduced v/c Ratio		0.44			0.24		0.26		0.20			0.31

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 8.9
 Intersection Capacity Utilization 46.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.











Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 3: Ave 18.5 & Road 23









4: Ave 18.5 & Pistacchio
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	276	211	140	94	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	300	229	152	102	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	382				532	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				532	229
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				78	99
cM capacity (veh/h)	1026				460	741
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	301	229	152	107		
Volume Left	1	0	0	102		
Volume Right	0	0	152	4		
cSH	1026	1700	1700	467		
Volume to Capacity	0.00	0.13	0.09	0.23		
Queue Length 95th (ft)	0	0	0	22		
Control Delay (s)	0.0	0.0	0.0	15.0		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.0		15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		29.9%		ICU Level of Service	A	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	80	83	126	152	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	87	90	137	165	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			978			
pX, platoon unblocked						
vC, conflicting volume	227				184	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227				184	90
tC, single (s)	4.1				7.1	6.9
tC, 2 stage (s)						
tF (s)	2.2				4.1	3.9
p0 queue free %	100				75	99
cM capacity (veh/h)	1335				673	811
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	90	90	137	170		
Volume Left	3	0	0	165		
Volume Right	0	0	137	4		
cSH	1335	1700	1700	676		
Volume to Capacity	0.00	0.05	0.08	0.25		
Queue Length 95th (ft)	0	0	0	25		
Control Delay (s)	0.3	0.0	0.0	12.1		
Lane LOS	A			B		
Approach Delay (s)	0.3	0.0		12.1		
Approach LOS				B		
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			22.0%		ICU Level of Service	A
Analysis Period (min)			15			

6: Ave 18 & Road 23
 Mitigated 2010 Project AM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	10	3	4	2	39	1	129	0	26	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	3	4	2	42	1	140	0	28	114	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357	313	114	322	313	140	114			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357	313	114	322	313	140	114			140		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	98	100	99	100	95	100			98		
cM capacity (veh/h)	546	577	920	589	571	879	1323			1283		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	49	141	142								
Volume Left	0	4	1	28								
Volume Right	3	42	0	0								
cSH	632	824	1323	1283								
Volume to Capacity	0.02	0.06	0.00	0.02								
Queue Length 95th (ft)	2	5	0	2								
Control Delay (s)	10.8	9.6	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.8	9.6	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization		30.1%			ICU Level of Service					A		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						98			253			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	60	382	0	0	774	90	352	1	233	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	65	415	0	0	841	98	383	1	253	0	0	0
Lane Group Flow (vph)	65	415	0	0	841	98	192	192	253	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	14.7	46.4	0.0	0.0	31.7	31.7	23.6	23.6	23.6	0.0	0.0	0.0
Total Split (%)	21.0%	66.3%	0.0%	0.0%	45.3%	45.3%	33.7%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	9.4	41.1			26.4	26.4	19.0	19.0	19.0			
Yellow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.4	47.8			39.0	39.0	14.2	14.2	14.2			
Actuated g/C Ratio	0.13	0.68			0.56	0.56	0.20	0.20	0.20			
v/c Ratio	0.32	0.20			0.44	0.11	0.59	0.59	0.34			
Control Delay	23.8	2.3			12.7	3.6	31.9	31.8	4.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	23.8	2.3			12.7	3.6	31.9	31.8	4.5			
LOS	C	A			B	A	C	C	A			
Approach Delay		5.2			11.7			21.0				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	26	14			127	0	78	78	0			
Queue Length 95th (ft)	51	19			204	26	129	129	26			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	234	2091			1916	901	453	454	933			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.28	0.20			0.44	0.11	0.42	0.42	0.27			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 13.1
 Intersection Capacity Utilization 44.5%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3112	3438	0	1480	1324
Flt Permitted					0.950	
Satd. Flow (perm)	0	3112	3438	0	1480	1324
Right Turn on Red				ⓧs		ⓧs
Satd. Flow (RTOR)						85
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	745	673	0	56	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	810	732	0	61	85
Lane Group Flow (vph)	0	810	732	0	61	85
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	39.4	39.4	0.0	30.6	30.6
Total Split (%)	0.0%	56.3%	56.3%	0.0%	43.7%	43.7%
Maximum Green (s)		34.1	34.1		26.0	26.0
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effect Green (s)		53.4	53.4		8.6	8.6
Actuated g/C Ratio		0.76	0.76		0.12	0.12
v/c Ratio		0.34	0.28		0.34	0.36
Control Delay		0.9	1.3		32.6	11.7
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		0.9	1.3		32.6	11.7
LOS		A	A		C	B
Approach Delay		0.9	1.3		20.4	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative C

10/22/2008

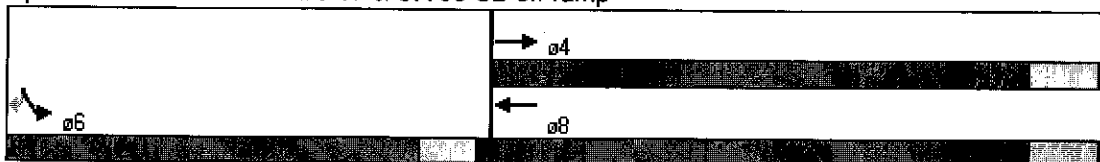
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		4	11		25	0
Queue Length 95th (ft)		3	15		56	35
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2376	2625		562	556
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.34	0.28		0.11	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 2.7
 Intersection Capacity Utilization 30.6%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.996				0.850			0.850		0.933	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3269	0	1626	3252	1455	1433	1508	1282	3155	1597	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1641	3269	0	1626	3252	1455	1433	1508	1282	3155	1597	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		4				167			97		22	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	32	470	14	137	460	154	108	41	89	186	25	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	35	511	15	149	500	167	117	45	97	202	27	22
Lane Group Flow (vph)	35	526	0	149	500	167	117	45	97	202	49	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5	8.5	20.5	
Total Split (s)	10.0	22.5	0.0	14.0	26.5	26.5	13.0	22.5	22.5	11.0	20.5	0.0
Total Split (%)	14.3%	32.1%	0.0%	20.0%	37.9%	37.9%	18.6%	32.1%	32.1%	15.7%	29.3%	0.0%
Maximum Green (s)	5.5	18.0		9.5	22.0	22.0	8.5	18.0	18.0	6.5	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	vs	vs		vs	vs	vs	vs	vs	vs	vs	vs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	7.4	28.1		10.0	36.8	36.8	8.6	8.9	8.9	7.0	9.5	
Actuated g/C Ratio	0.11	0.40		0.14	0.53	0.53	0.12	0.13	0.13	0.10	0.14	
v/c Ratio	0.20	0.40		0.64	0.29	0.20	0.67	0.23	0.39	0.64	0.21	
Control Delay	30.6	16.5		35.3	5.8	1.9	49.7	29.6	11.5	40.7	20.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.6	16.5		35.3	5.8	1.9	49.7	29.6	11.5	40.7	20.5	
LOS	C	B		D	A	A	D	C	B	D	C	
Approach Delay		17.4			10.4			31.9			36.7	

10: Ave 17 & GS Blvd
 Mitigated 2010 Project AM Alternative C

10/22/2008

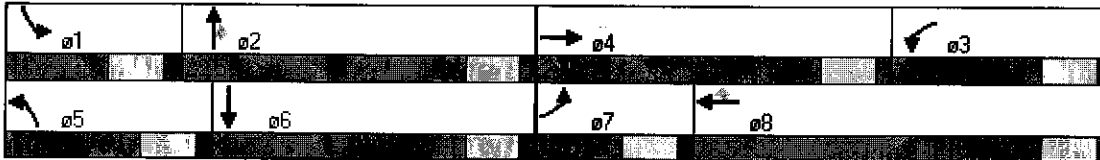
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C				D
Queue Length 50th (ft)	14	81		65	12	0	49	18	0	44	11	
Queue Length 95th (ft)	38	128		#130	74	15	#118	44	37	#82	39	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	174	1313		232	1711	844	184	399	410	316	395	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.40		0.64	0.29	0.20	0.64	0.11	0.24	0.64	0.12	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 60 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 18.9
 Intersection Capacity Utilization 43.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23













Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.998			0.973				
Flt Protected					0.986			0.996			0.996	
Satd. Flow (prot)	0	1800	0	0	1715	0	0	1534	0	0	1514	0
Flt Permitted					0.894			0.977			0.975	
Satd. Flow (perm)	0	1800	0	0	1555	0	0	1505	0	0	1482	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		24			2			26				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	0	125	28	44	112	3	16	134	38	9	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	0	136	30	48	122	3	17	146	41	10	104	0
Lane Group Flow (vph)	0	166	0	0	173	0	0	204	0	0	114	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	30.3	30.3	0.0	30.3	30.3	0.0	29.7	29.7	0.0	29.7	29.7	0.0
Total Split (%)	50.5%	50.5%	0.0%	50.5%	50.5%	0.0%	49.5%	49.5%	0.0%	49.5%	49.5%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		24.4	24.4		24.4	24.4	
ℳlow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.1			14.3			29.1			29.1	
Actuated g/C Ratio		0.28			0.28			0.63			0.63	
v/c Ratio		0.32			0.40			0.21			0.12	
Control Delay		7.8			10.0			5.9			6.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.8			10.0			5.9			6.2	
LOS		A			A			A			A	
Approach Delay		7.8			10.0			5.9			6.2	

11: Ave 17 & Road 23
 Mitigated 2010 Project AM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		13			16			16			10	
Queue Length 95th (ft)		43			51			53			34	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		885			755			1123			1099	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.19			0.23			0.18			0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 46.4
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 7.5
 Intersection Capacity Utilization 40.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis & Road 26

Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.985			0.991	
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1770	1583	1719	3387	0	1752	3473	0
Flt Permitted		0.728			0.730		0.950			0.950		
Satd. Flow (perm)	0	1356	1583	0	1360	1583	1719	3387	0	1752	3473	0
Right Turn on Red												
Satd. Flow (RTOR)			7			103		17			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	38	0	6	41	0	95	6	362	40	55	491	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	41	0	7	45	0	103	7	393	43	60	534	34
Lane Group Flow (vph)	0	41	7	0	45	103	7	436	0	60	568	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.4	10.4		10.4	10.4	8.1	32.7		9.7	36.6	
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.13	0.61		0.16	0.68	
v/c Ratio		0.17	0.02		0.18	0.28	0.03	0.21		0.21	0.24	
Control Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	9.8		15.0	6.3	18.0	7.8		15.7	5.5	
LOS		B	A		B	A	B	A		B	A	
Approach Delay		14.1			8.9			8.0			6.5	

12: Ellis & Road 26

Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		4	0		4	0	1	15		6	22	
Queue Length 95th (ft)		29	8		31	29	10	76		38	91	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		521	613		523	672	360	2331		391	2518	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.01		0.09	0.15	0.02	0.19		0.15	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 53.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 36.8%
 Analysis Period (min) 15










Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)			15			







14: Gateway & AVE 16 Connector
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			21.9%		ICU Level of Service	A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑			↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t				0.850		0.850
Fl _t Protected	0.950				0.950	
Satd. Flow (prot)	1752	1845	1759	1495	1703	1524
Fl _t Permitted	0.950				0.950	
Satd. Flow (perm)	1752	1845	1759	1495	1703	1524
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)				1		239
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		817	
Travel Time (s)		10.1	15.1		18.6	
Volume (vph)	120	285	165	1	49	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	8%	6%	6%
Adj. Flow (vph)	130	310	179	1	53	239
Lane Group Flow (vph)	130	310	179	1	53	239
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	15.0	36.9	21.9	21.9	23.1	23.1
Total Split (%)	25.0%	61.5%	36.5%	36.5%	38.5%	38.5%
Maximum Green (s)	10.1	32.0	17.0	17.0	18.6	18.6
ℳlow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	ℳs		ℳs	ℳs		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.8	18.5	10.7	10.7	13.7	13.7
Actuated g/C Ratio	0.22	0.48	0.28	0.28	0.38	0.38
v/c Ratio	0.34	0.35	0.36	0.00	0.08	0.33
Control Delay	17.0	5.7	14.3	10.0	14.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	5.7	14.3	10.0	14.5	4.5
LOS	B	A	B	A	B	A
Approach Delay		9.0	14.3		6.3	

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative C

10/22/2008

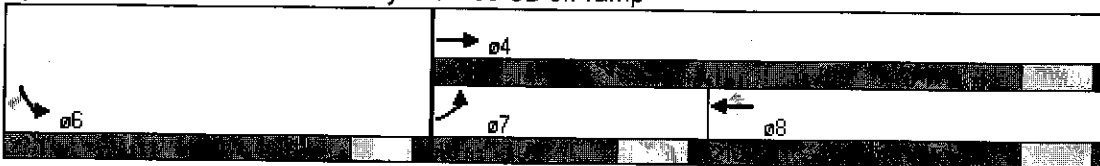
	↖	→	←	↖	↘	↘
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		A	
Queue Length 50th (ft)	22	23	30	0	9	0
Queue Length 95th (ft)	71	68	82	3	34	43
Internal Link Dist (ft)		514	808		737	
Turn Bay Length (ft)						
Base Capacity (vph)	456	1177	710	604	887	909
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.25	0.00	0.06	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 36.2
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 29.0%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.939			0.949				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3323	0	1770	3359	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3323	0	1770	3359	0	1770	1770	1583	1770	1583	0
Right Turn on Red												
Satd. Flow (RTOR)		37			22				3		207	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			2553			1297		1356		
Travel Time (s)		18.9			43.5			22.1		23.1		
Volume (vph)	4	50	34	147	40	20	20	41	3	47	79	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	54	37	160	43	22	22	45	3	51	86	228
Lane Group Flow (vph)	4	91	0	160	65	0	22	45	3	51	314	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	20.5	20.5	
Total Split (s)	8.5	20.5	0.0	13.0	25.0	0.0	8.5	21.0	21.0	20.5	33.0	0.0
Total Split (%)	11.3%	27.3%	0.0%	17.3%	33.3%	0.0%	11.3%	28.0%	28.0%	27.3%	44.0%	0.0%
Maximum Green (s)	4.0	16.0		8.5	20.5		4.0	16.5	16.5	16.0	28.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	4.5	7.1		8.7	15.9		4.5	17.1	17.1	16.6	34.6	
Actuated g/C Ratio	0.06	0.11		0.14	0.25		0.07	0.27	0.27	0.26	0.55	
v/c Ratio	0.04	0.23		0.66	0.08		0.19	0.09	0.01	0.11	0.33	
Control Delay	31.5	19.2		42.4	14.2		34.2	19.6	13.7	20.2	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	19.2		42.4	14.2		34.2	19.6	13.7	20.2	5.3	
LOS	C	B		D	B		C	B	B	C	A	
Approach Delay		19.7			34.2			23.9		7.3		
Approach LOS		B			C			C		A		

17: Ave 16 & Aviation Drive
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	2	10		62	6		9	14	0	16	18	
Queue Length 95th (ft)	10	30		#143	22		29	37	6	41	73	
Internal Link Dist (ft)		1030			2473			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	114	763		252	1052		117	479	431	465	958	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.12		0.63	0.06		0.19	0.09	0.01	0.11	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 63.3
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 18.5
 Intersection Capacity Utilization 34.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 17: Ave 16 & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						137			174			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	82	533	0	0	673	126	350	0	160	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	89	579	0	0	732	137	380	0	174	0	0	0
Lane Group Flow (vph)	89	579	0	0	732	137	190	190	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	12.4	38.5	0.0	0.0	26.1	26.1	21.5	21.5	21.5	0.0	0.0	0.0
Total Split (%)	20.7%	64.2%	0.0%	0.0%	43.5%	43.5%	35.8%	35.8%	35.8%	0.0%	0.0%	0.0%
Maximum Green (s)	7.8	33.9			21.5	21.5	17.0	17.0	17.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	7.8	34.5			24.7	24.7	17.5	17.5	17.5			
Actuated g/C Ratio	0.13	0.58			0.41	0.41	0.29	0.29	0.29			
v/c Ratio	0.39	0.29			0.51	0.19	0.40	0.40	0.31			
Control Delay	36.5	2.7			15.8	3.7	20.2	20.2	4.9			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.5	2.7			15.8	3.7	20.2	20.2	4.9			
LOS	D	A			B	A	C	C	A			
Approach Delay		7.2			13.8			15.4				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

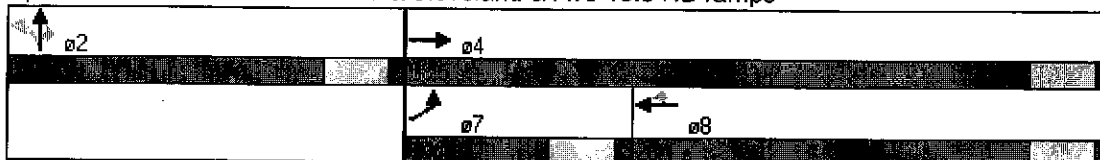
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	31	13			108	0	57	57	0			
Queue Length 95th (ft)	72	18			156	29	110	110	37			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	243	1996			1430	721	472	472	568			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.37	0.29			0.51	0.19	0.40	0.40	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 23 (38%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			393									111
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	503	362	278	745	0	0	0	0	112	0	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	547	393	302	810	0	0	0	0	122	0	111
Lane Group Flow (vph)	0	547	393	302	810	0	0	0	0	0	122	111
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	21.2	21.2	18.3	39.5	0.0	0.0	0.0	0.0	20.5	20.5	20.5
Total Split (%)	0.0%	35.3%	35.3%	30.5%	65.8%	0.0%	0.0%	0.0%	0.0%	34.2%	34.2%	34.2%
Maximum Green (s)		16.6	16.6	13.7	34.9					16.0	16.0	16.0
Flow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		25.7	25.7	14.3	44.8					10.1	10.1	
Actuated g/C Ratio		0.43	0.43	0.24	0.75					0.17	0.17	
v/c Ratio		0.38	0.45	0.74	0.32					0.46	0.33	
Control Delay		14.3	3.9	27.0	1.7					27.2	7.9	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		14.3	3.9	27.0	1.7					27.2	7.9	
LOS		B	A	C	A					C	A	
Approach Delay		9.9			8.6					18.0		

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A						B	
Queue Length 50th (ft)		72	0	88	11						40	0
Queue Length 95th (ft)		123	51	#199	34						78	33
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1443	870	410	2565						439	473
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.38	0.45	0.74	0.32						0.28	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 28 (47%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 54.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
























20: Ave 15.5/Cleveland & Road 23
 Mitigated 2010 Project AM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	1	22	0	167	29	18	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	1	24	0	182	32	20	136	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	388	136	372	372	197	136			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	388	136	372	372	197	136			213		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	94	100	97	100			98		
cM capacity (veh/h)	540	538	913	578	549	844	1350			1262		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	61	213	155								
Volume Left	0	36	0	20								
Volume Right	0	24	32	0								
cSH	1700	659	1350	1262								
Volume to Capacity	0.00	0.09	0.00	0.02								
Queue Length 95th (ft)	0	8	0	1								
Control Delay (s)	0.0	11.0	0.0	1.1								
Lane LOS	A	B		A								
Approach Delay (s)	0.0	11.0	0.0	1.1								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization		31.5%			ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Mitigated 2010 Project AM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.976						0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3293	0	0	0	0	1752	1568	0
Flt Permitted	0.394									0.950		
Satd. Flow (perm)	1332	3312	0	0	3293	0	0	0	0	1752	1568	0
Right Turn on Red												
Satd. Flow (RTOR)					53						467	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	394	351	0	0	474	90	0	0	0	145	0	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	428	382	0	0	515	98	0	0	0	158	0	78
Lane Group Flow (vph)	428	382	0	0	613	0	0	0	0	158	78	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	44.5	44.5	0.0	0.0	44.5	0.0	0.0	0.0	0.0	25.5	25.5	0.0
Total Split (%)	63.6%	63.6%	0.0%	0.0%	63.6%	0.0%	0.0%	0.0%	0.0%	36.4%	36.4%	0.0%
Maximum Green (s)	39.9	39.9			39.9					21.0	21.0	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	53.4	53.4			53.4					11.5	11.5	
Actuated g/C Ratio	0.76	0.76			0.76					0.16	0.16	
v/c Ratio	0.42	0.15			0.24					0.55	0.12	
Control Delay	4.7	2.4			3.5					33.3	0.4	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	4.7	2.4			3.5					33.3	0.4	
LOS	A	A			A					C	A	
Approach Delay		3.6			3.5						22.4	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

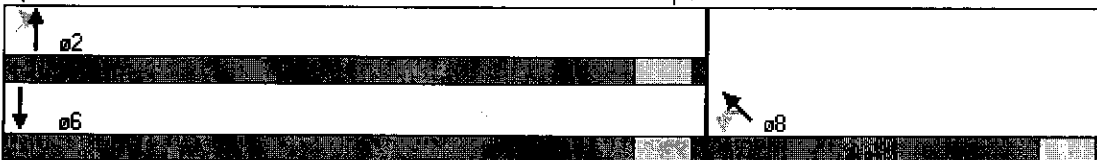
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	15	14			33					63	0	
Queue Length 95th (ft)	55	26			65					109	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1016	2528			2526					538	805	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.42	0.15			0.24					0.29	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 24 (34%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 6.3
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.994				0.850
Flt Protected	0.950						0.950				0.991	
Satd. Flow (prot)	1719	1810	1538	0	0	0	3213	3292	0	0	3440	1553
Flt Permitted	0.950						0.950				0.783	
Satd. Flow (perm)	1719	1810	1538	0	0	0	3213	3292	0	0	2718	1553
Right Turn on Red												
Satd. Flow (RTOR)			358					9				212
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	203	78	329	0	0	0	93	546	21	50	229	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	221	85	358	0	0	0	101	593	23	54	249	212
Lane Group Flow (vph)	221	85	358	0	0	0	101	616	0	0	303	212
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	25.0	25.0	25.0	0.0	0.0	0.0	22.6	45.0	0.0	22.4	22.4	22.4
Total Split (%)	35.7%	35.7%	35.7%	0.0%	0.0%	0.0%	32.3%	64.3%	0.0%	32.0%	32.0%	32.0%
Maximum Green (s)	20.5	20.5	20.5				18.0	40.4		17.8	17.8	17.8
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	13.0	13.0	13.0				18.6	49.0			26.4	26.4
Actuated g/C Ratio	0.19	0.19	0.19				0.27	0.70			0.38	0.38
v/c Ratio	0.69	0.25	0.62				0.12	0.27			0.30	0.30
Control Delay	27.8	16.0	7.0				20.0	4.6			13.9	2.7
Queue Delay	0.5	0.0	0.3				0.0	0.0			0.0	0.0
Total Delay	28.4	16.0	7.2				20.0	4.6			13.9	2.7
LOS	C	B	A				B	A			B	A
Approach Delay		15.4						6.8			9.3	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						A			A	
Queue Length 50th (ft)	85	18	0				17	41			42	0
Queue Length 95th (ft)	136	m37	0				34	76			64	15
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	516	543	712				854	2306			1024	717
Starvation Cap Reductn	83	0	65				0	0			0	0
Spillback Cap Reductn	0	0	0				0	0			0	0
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	0.51	0.16	0.55				0.12	0.27			0.30	0.30

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 28 (40%), Referenced to phase 2:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 10.5
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

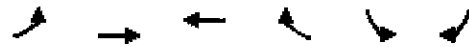
Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	3242	1495
Right Turn on Red				Ⓢ		Ⓢ
Satd. Flow (RTOR)						187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	331	287	0	279	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	360	312	0	303	187
Lane Group Flow (vph)	0	360	312	0	303	187
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	34.5	34.5	0.0	35.5	35.5
Total Split (%)	0.0%	49.3%	49.3%	0.0%	50.7%	50.7%
Maximum Green (s)		30.0	30.0		31.0	31.0
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		50.3	50.3		11.7	11.7
Actuated g/C Ratio		0.72	0.72		0.17	0.17
v/c Ratio		0.14	0.12		0.56	0.46
Control Delay		3.6	2.8		30.4	8.2
Queue Delay		0.0	0.2		0.0	0.0
Total Delay		3.6	3.1		30.4	8.2
LOS		A	A		C	A
Approach Delay		3.6	3.1		21.9	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project AM Alternative C

10/22/2008



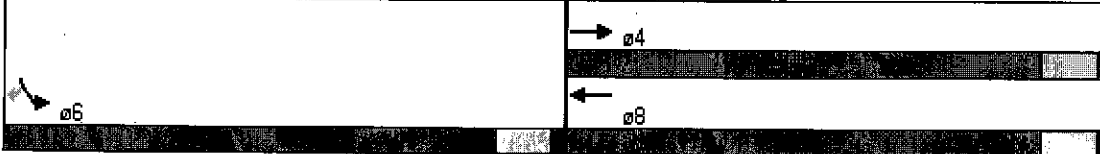
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		19	14		62	0
Queue Length 95th (ft)		38	24		92	47
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2518	2518		1459	776
Starvation Cap Reductn		0	1569		0	0
Spillback Cap Reductn		0	0		41	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.14	0.33		0.21	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 28 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 25.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	16	68	6	14	67	54	8	75	8	49	82	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	7	15	73	59	9	82	9	53	89	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	147	99	172								
Volume Left (vph)	17	15	9	53								
Volume Right (vph)	7	59	9	29								
Hadj (s)	0.13	0.02	0.30	0.25								
Departure Headway (s)	4.9	4.7	5.0	4.9								
Degree Utilization, x	0.13	0.19	0.14	0.23								
Capacity (veh/h)	678	708	669	693								
Control Delay (s)	8.7	8.9	8.9	9.4								
Approach Delay (s)	8.7	8.9	8.9	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
HCM Level of Service			A									
Intersection Capacity Utilization			30.9%	ICU Level of Service				A				
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.677	
Satd. Flow (perm)	3303	1524	1696	1442	1249	1845
Right Turn on Red						
Satd. Flow (RTOR)		82		239		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	745		408			1104
Travel Time (s)	16.9		9.3			25.1
Volume (vph)	387	75	115	220	143	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	421	82	125	239	155	74
Lane Group Flow (vph)	421	82	125	239	155	74
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	42.6	42.6	47.4	47.4	47.4	47.4
Total Split (%)	47.3%	47.3%	52.7%	52.7%	52.7%	52.7%
Maximum Green (s)	38.1	38.1	42.9	42.9	42.9	42.9
Flow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	65.1	65.1	16.9	16.9	16.9	16.9
Actuated g/C Ratio	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.18	0.07	0.39	0.51	0.66	0.21
Control Delay	4.7	1.3	26.4	4.8	46.8	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	1.3	26.4	4.8	46.8	30.7
LOS	A	A	C	A	D	C
Approach Delay	4.1		12.2			41.6

25: SB Ramps & GS Blvd
 Mitigated 2010 Project AM Alternative C

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	A		B			D
Queue Length 50th (ft)	38	0	34	7	79	34
Queue Length 95th (ft)	59	13	m32	m14	140	69
Internal Link Dist (ft)	665		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2388	1125	818	819	602	890
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.07	0.15	0.29	0.26	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 9 (10%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 32.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
 Mitigated 2010 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850		0.952			0.871				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	1696	1442	1612	1615	0	1656	1518	0	3273	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	1696	1442	1612	1615	0	1656	1518	0	3273	1776	1509
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)			17		29			18				62
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	180	234	16	14	320	152	16	3	17	387	11	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	196	254	17	15	348	165	17	3	18	421	12	62
Lane Group Flow (vph)	196	254	17	15	513	0	17	21	0	421	12	62
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	17.0	43.8	43.8	8.6	35.4	0.0	8.6	20.6	0.0	17.0	29.0	29.0
Total Split (%)	18.9%	48.7%	48.7%	9.6%	39.3%	0.0%	9.6%	22.9%	0.0%	18.9%	32.2%	32.2%
Maximum Green (s)	12.4	39.2	39.2	4.0	30.8		4.1	16.1		12.5	24.5	24.5
ℳlow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	12.8	45.0	45.0	4.6	31.6		4.6	16.6		13.0	30.2	30.2
Actuated g/C Ratio	0.14	0.50	0.50	0.05	0.35		0.05	0.18		0.14	0.34	0.34
v/c Ratio	0.86	0.30	0.02	0.18	0.88		0.20	0.07		0.89	0.02	0.11
Control Delay	70.8	15.5	6.7	52.9	35.1		46.6	15.9		56.9	19.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	70.8	15.5	6.7	52.9	35.1		46.6	15.9		56.9	19.5	5.8
LOS	E	B	A	D	D		D	B		E	B	A
Approach Delay		38.4			35.6			29.6			49.6	

26: Ave 12 & GS Blvd
 Mitigated 2010 Project AM Alternative C

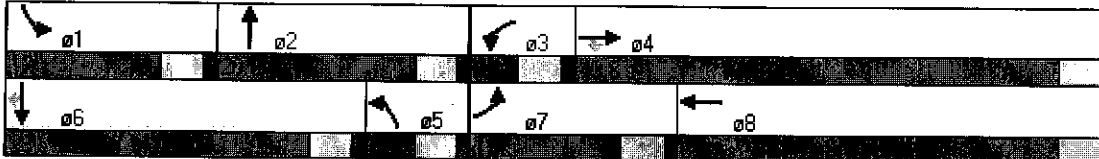
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	110	74	0	9	114		9	1		125	5	0
Queue Length 95th (ft)	#229	149	12	m23	#423		31	21		#208	12	9
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	233	847	729	82	586		85	295		473	595	547
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.84	0.30	0.02	0.18	0.88		0.20	0.07		0.89	0.02	0.11

Intersection Summary













Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 40.8
 Intersection Capacity Utilization 63.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project AM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	21	93			106	0		113	0			
Queue Length 95th (ft)	m30	m125			193	53		173	42			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	307	1259			965	1015		476	516			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.29	0.48			0.33	0.41		0.44	0.25			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 52 (58%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 13.0
 Intersection Capacity Utilization 49.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.991			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1467	1545	0	0	1652	0	1504	1346	0	0	0	0
Flt Permitted	0.678						0.950					
Satd. Flow (perm)	1047	1545	0	0	1652	0	1504	1346	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7			884				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	154	66	0	0	106	7	239	0	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	167	72	0	0	115	8	260	0	55	0	0	0
Lane Group Flow (vph)	167	72	0	0	123	0	260	55	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	30.0	30.0	0.0	0.0	30.0	0.0	30.0	30.0	0.0	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	25.4	25.4			25.4		25.4	25.4				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	36.8	36.8			36.8		15.2	15.2				
Actuated g/C Ratio	0.61	0.61			0.61		0.25	0.25				
v/c Ratio	0.26	0.08			0.12		0.68	0.05				
Control Delay	3.7	2.9			6.3		28.7	0.1				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	3.7	2.9			6.3		28.7	0.1				
LOS	A	A			A		C	A				
Approach Delay		3.5			6.3			23.7				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	8	3			15		85	0				
Queue Length 95th (ft)	m21	m9			44		131	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	642	947			1015		652	1084				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.26	0.08			0.12		0.40	0.05				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 25 (42%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 35.1%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A













Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23













Mitigated 2010 Project PM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕		↕		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50		50		50	50	50	
Trailing Detector (ft)		0		0	0		0		0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected					0.994		0.950				0.929	0.994
Satd. Flow (prot)	0	1544	0	0	1587	0	1467	0	1313	0	1253	0
Flt Permitted					0.916		0.551				0.994	
Satd. Flow (perm)	0	1544	0	0	1463	0	851	0	1313	0	1253	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		33							71		93	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				45		45	
Link Distance (ft)		295			223			1486			2043	
Travel Time (s)		5.7			4.3			22.5			31.0	
Volume (vph)	0	435	101	32	252	0	77	0	65	23	75	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	20%	19%	19%	19%	23%	23%	23%	40%	40%	40%
Adj. Flow (vph)	0	473	110	35	274	0	84	0	71	25	82	118
Lane Group Flow (vph)	0	583	0	0	309	0	84	0	71	0	225	0
Turn Type				Perm		custom		custom		Perm		
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Detector Phases		4		8	8		2		2	6	6	
Minimum Initial (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Minimum Split (s)		20.6		20.6	20.6		21.3		21.3	21.3	21.3	
Total Split (s)	0.0	38.7	0.0	38.7	38.7	0.0	21.3	0.0	21.3	21.3	21.3	0.0
Total Split (%)	0.0%	64.5%	0.0%	64.5%	64.5%	0.0%	35.5%	0.0%	35.5%	35.5%	35.5%	0.0%
Maximum Green (s)		34.1		34.1	34.1		16.0		16.0	16.0	16.0	
Yellow Time (s)		3.6		3.6	3.6		4.3		4.3	4.3	4.3	
All-Red Time (s)		1.0		1.0	1.0		1.0		1.0	1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		Min		Min	Min	Min	
Walk Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0		0	0	0	
Act Effect Green (s)		39.4		39.4	39.4		12.6		12.6	12.6	12.6	
Actuated g/C Ratio		0.66		0.66	0.66		0.21		0.21	0.21	0.21	
v/c Ratio		0.57		0.32	0.32		0.47		0.21	0.67	0.67	
Control Delay		9.1		3.8	3.8		28.2		6.7	22.3	22.3	
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay		9.1		3.8	3.8		28.2		6.7	22.3	22.3	
LOS		A		A	A		C		A	C	C	
Approach Delay		9.1		3.8	3.8					22.3	22.3	

3: Ave 18.5 & Road 23
 Mitigated 2010 Project PM Alternative C

10/22/2008

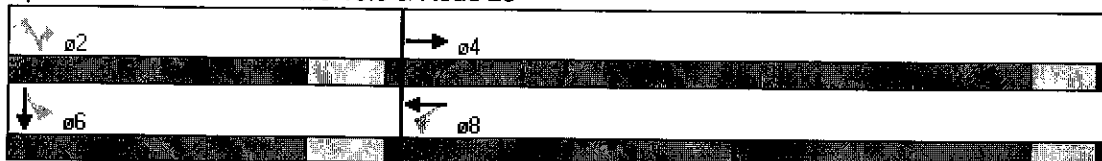
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A							C
Queue Length 50th (ft)		90			11		27		0			42
Queue Length 95th (ft)		212			m48		59		24			97
Internal Link Dist (ft)		215			143			1406				1963
Turn Bay Length (ft)												
Base Capacity (vph)		1025			960		245		429			427
Starvation Cap Reductn		0			0		0		0			0
Spillback Cap Reductn		0			0		0		0			0
Storage Cap Reductn		0			0		0		0			0
Reduced v/c Ratio		0.57			0.32		0.34		0.17			0.53

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 11.3
 Intersection Capacity Utilization 66.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 3: Ave 18.5 & Road 23









4: Ave 18.5 & Pistacchio
 Mitigated 2010 Project PM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	11	376	210	228	156	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	409	228	248	170	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	476				661	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476				661	228
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	99				58	99
cM capacity (veh/h)	998				403	780
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	421	228	248	176		
Volume Left	12	0	0	170		
Volume Right	0	0	248	7		
cSH	998	1700	1700	410		
Volume to Capacity	0.01	0.13	0.15	0.43		
Queue Length 95th (ft)	1	0	0	53		
Control Delay (s)	0.4	0.0	0.0	20.2		
Lane LOS	A			C		
Approach Delay (s)	0.4	0.0		20.2		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization		44.3%		ICU Level of Service		A
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
 Mitigated 2010 Project PM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	117	91	138	190	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	127	99	150	207	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			978			
pX, platoon unblocked						
vC, conflicting volume	249				228	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	249				228	99
tC, single (s)	4.1				6.9	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	100				69	100
cM capacity (veh/h)	1317				663	838
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	128	99	150	210		
Volume Left	1	0	0	207		
Volume Right	0	0	150	3		
cSH	1317	1700	1700	665		
Volume to Capacity	0.00	0.06	0.09	0.32		
Queue Length 95th (ft)	0	0	0	34		
Control Delay (s)	0.1	0.0	0.0	12.9		
Lane LOS	A			B		
Approach Delay (s)	0.1	0.0		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			24.3%		ICU Level of Service	A
Analysis Period (min)			15			

6: Ave 18 & Road 23
Mitigated 2010 Project PM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	16	6	0	15	54	4	67	114	33	154	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	7	0	16	59	4	73	124	36	167	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	451	446	168	399	385	135	170			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451	446	168	399	385	135	170			197		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	100	96	99	100	97	94	100			97		
cM capacity (veh/h)	449	479	853	524	527	906	1316			1296		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	75	201	205								
Volume Left	1	0	4	36								
Volume Right	7	59	124	2								
cSH	539	784	1316	1296								
Volume to Capacity	0.05	0.10	0.00	0.03								
Queue Length 95th (ft)	4	8	0	2								
Control Delay (s)	12.0	10.1	0.2	1.6								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.0	10.1	0.2	1.6								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization		34.9%		ICU Level of Service					A			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950	0.953			
Satd. Flow (prot)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						208			230			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	72	852	0	0	1087	191	428	2	720	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	78	926	0	0	1182	208	465	2	783	0	0	0
Lane Group Flow (vph)	78	926	0	0	1182	208	233	234	783	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	11.0	50.0	0.0	0.0	39.0	39.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	13.8%	62.5%	0.0%	0.0%	48.8%	48.8%	37.5%	37.5%	37.5%	0.0%	0.0%	0.0%
Maximum Green (s)	6.5	45.5			34.5	34.5	25.5	25.5	25.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	6.8	49.0			40.2	40.2	23.0	23.0	23.0			
Actuated g/C Ratio	0.08	0.61			0.50	0.50	0.29	0.29	0.29			
v/c Ratio	0.53	0.44			0.67	0.23	0.49	0.49	0.82			
Control Delay	39.9	6.1			18.9	2.9	26.7	26.7	26.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	39.9	6.1			18.9	2.9	26.7	26.7	26.3			
LOS	D	A			B	A	C	C	C			
Approach Delay		8.8			16.5			26.4				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

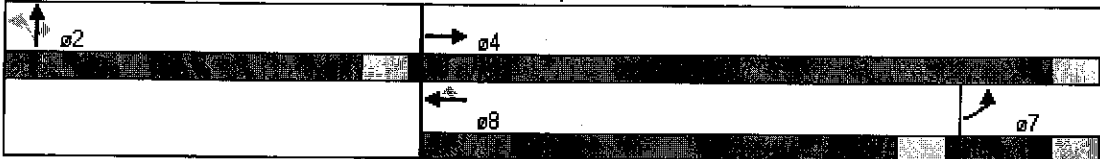
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	32	60			253	0	94	95	139			
Queue Length 95th (ft)	m63	109			332	36	162	163	214			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	150	2105			1777	899	536	538	1043			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.52	0.44			0.67	0.23	0.43	0.43	0.75			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 64 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 17.8
 Intersection Capacity Utilization 55.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: B
 ICU Level of Service B

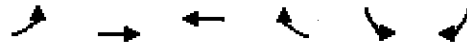
Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fit						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3471	3471	0	1687	1509
Fit Permitted					0.950	
Satd. Flow (perm)	0	3471	3471	0	1687	1509
Right Turn on Red				xs		xs
Satd. Flow (RTOR)						87
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1257	1020	0	211	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	1366	1109	0	229	99
Lane Group Flow (vph)	0	1366	1109	0	229	99
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	50.6	50.6	0.0	29.4	29.4
Total Split (%)	0.0%	63.3%	63.3%	0.0%	36.8%	36.8%
Maximum Green (s)		45.3	45.3		24.8	24.8
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		56.1	56.1		15.9	15.9
Actuated g/C Ratio		0.70	0.70		0.20	0.20
v/c Ratio		0.56	0.46		0.68	0.27
Control Delay		1.9	2.6		39.7	9.3
Queue Delay		0.2	0.0		0.0	0.0
Total Delay		2.0	2.6		39.7	9.3
LOS		A	A		D	A
Approach Delay		2.0	2.6		30.5	



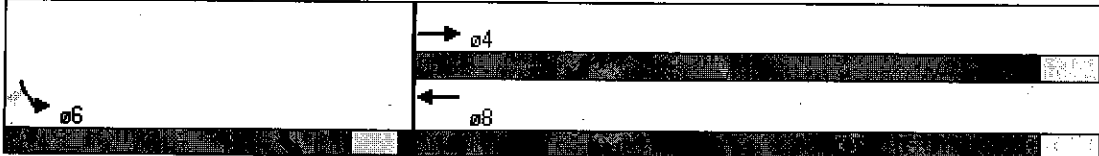
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		19	31		107	5
Queue Length 95th (ft)		52	91		164	39
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2434	2434		536	538
Starvation Cap Reductn		285	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.64	0.46		0.43	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 64 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 5.6
 Intersection Capacity Utilization 53.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd

Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.984				0.850			0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3416	0	1719	3438	1538	1752	1845	1568	3099	1584	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3416	0	1719	3438	1538	1752	1845	1568	3099	1584	0
Right Turn on Red			∅s			∅s			∅s		∅s	
Satd. Flow (RTOR)		17				335			258		33	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	42	675	83	162	639	308	128	84	237	345	49	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	46	734	90	176	695	335	139	91	258	375	53	33
Lane Group Flow (vph)	46	824	0	176	695	335	139	91	258	375	86	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.3	21.3		9.3	21.3	21.3	8.6	20.6	20.6	8.6	20.6	
Total Split (s)	10.4	27.1	0.0	15.7	32.4	32.4	13.4	20.6	20.6	16.6	23.8	0.0
Total Split (%)	13.0%	33.9%	0.0%	19.6%	40.5%	40.5%	16.8%	25.8%	25.8%	20.8%	29.8%	0.0%
Maximum Green (s)	5.1	21.8		10.4	27.1	27.1	8.8	16.0	16.0	12.0	19.2	
Flow Time (s)	4.3	4.3		4.3	4.3	4.3	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	∅s	∅s		∅s	∅s	∅s	∅s	∅s	∅s	∅s	∅s	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	7.2	27.4		11.7	36.3	36.3	16.1	9.9	9.9	15.1	8.8	
Actuated g/C Ratio	0.09	0.34		0.15	0.45	0.45	0.20	0.12	0.12	0.19	0.11	
v/c Ratio	0.30	0.70		0.70	0.45	0.38	0.39	0.40	0.61	0.64	0.42	
Control Delay	39.7	27.5		38.9	9.9	3.3	30.8	36.7	11.2	35.3	28.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.7	27.5		38.9	9.9	3.3	30.8	36.7	11.2	35.3	28.1	
LOS	D	C		D	A	A	C	D	B	D	C	
Approach Delay		28.1			12.3			21.5			34.0	

10: Ave 17 & GS Blvd
 Mitigated 2010 Project PM Alternative C

10/22/2008

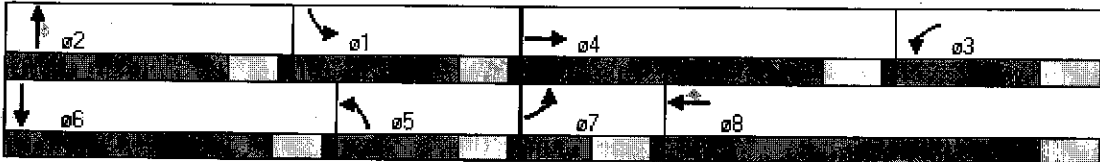
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	21	184		80	75	5	59	43	0	88	25	
Queue Length 95th (ft)	55	#290		#169	135	36	112	81	61	134	64	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	155	1179		251	1561	881	353	383	530	592	417	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	0.70		0.70	0.45	0.38	0.39	0.24	0.49	0.63	0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 5 (6%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 21.6
 Intersection Capacity Utilization 56.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service B













Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23













Mitigated 2010 Project PM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.996			0.956			0.992	
Flt Protected					0.988			0.989			0.996	
Satd. Flow (prot)	0	1812	0	0	1747	0	0	1590	0	0	1647	0
Flt Permitted					0.874			0.909			0.974	
Satd. Flow (perm)	0	1812	0	0	1546	0	0	1461	0	0	1610	0
Right Turn on Red			↖s			↖s			↖s			↖s
Satd. Flow (RTOR)		27			4			51			7	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	0	187	47	62	180	8	53	114	82	11	135	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	0	203	51	67	196	9	58	124	89	12	147	10
Lane Group Flow (vph)	0	254	0	0	272	0	0	271	0	0	169	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	30.7	30.7	0.0	30.7	30.7	0.0	29.3	29.3	0.0	29.3	29.3	0.0
Total Split (%)	51.2%	51.2%	0.0%	51.2%	51.2%	0.0%	48.8%	48.8%	0.0%	48.8%	48.8%	0.0%
Maximum Green (s)	25.4	25.4		25.4	25.4		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.5			12.6			16.7			16.7	
Actuated g/C Ratio		0.35			0.35			0.50			0.50	
v/c Ratio		0.39			0.50			0.36			0.21	
Control Delay		9.1			11.8			8.6			8.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.1			11.8			8.6			8.6	
LOS		A			B			A			A	
Approach Delay		9.1			11.8			8.6			8.6	

11: Ave 17 & Road 23
 Mitigated 2010 Project PM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		24			30			25			17	
Queue Length 95th (ft)		79			96			86			59	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		994			840			941			1019	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			0.32			0.29			0.17	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 33.3
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 9.6
 Intersection Capacity Utilization 61.6%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 11: Ave 17 & Road 23



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.988			0.981	
Flt Protected		0.953			0.955		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1779	1583	1770	3497	0	1770	3472	0
Flt Permitted		0.702			0.727		0.950			0.950		
Satd. Flow (perm)	0	1308	1583	0	1354	1583	1770	3497	0	1770	3472	0
Right Turn on Red												
Satd. Flow (RTOR)			15			246		14			24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	103	1	14	57	4	226	11	770	67	193	766	113
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	1	15	62	4	246	12	837	73	210	833	123
Lane Group Flow (vph)	0	113	15	0	66	246	12	910	0	210	956	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		10.8	10.8		10.8	10.8	7.0	26.1		10.7	35.7	
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.11	0.50		0.20	0.68	
v/c Ratio		0.44	0.05		0.25	0.48	0.06	0.52		0.61	0.40	
Control Delay		25.3	9.9		21.2	6.7	26.7	15.1		29.4	7.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.3	9.9		21.2	6.7	26.7	15.1		29.4	7.5	
LOS		C	A		C	A	C	B		C	A	
Approach Delay		23.5			9.8			15.3			11.4	
Approach LOS		C			A			B			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		34	0		19	0	4	127		65	61	
Queue Length 95th (ft)		74	12		47	47	17	213		#148	199	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		464	571		480	720	324	1781		379	2361	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.24	0.03		0.14	0.34	0.04	0.51		0.55	0.40	

Intersection Summary










Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 52.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 56.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis & Road 26









13: Kennedy & Gateway
 Mitigated 2010 Project AM Alternative C

10/22/2008

Movement						
	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	0	140	3	0	104	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	3	0	113	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)	1071					
pX, platoon unblocked						
vC, conflicting volume	173		295	143		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173		295	143		
tC, single (s)	4.2		6.7	6.5		
tC, 2 stage (s)						
tF (s)	2.3		3.8	3.6		
p0 queue free %	100		99	100		
cM capacity (veh/h)	1380		635	829		
Direction, Lane #	EB 1	SB 1	NW 1			
Volume Total	152	3	173			
Volume Left	0	3	0			
Volume Right	0	0	60			
cSH	1700	635	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	10.7	0.0			
Lane LOS		B				
Approach Delay (s)	0.0	10.7	0.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)			15			










14: Gateway & AVE 16 Connector
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↑		↑	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	55	3	61	204	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	3	66	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				96	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				96	36
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1458				903	1036
Direction, Lane #	NB 1	SB 1	NE 1			
Volume Total	60	70	222			
Volume Left	0	0	222			
Volume Right	0	66	0			
cSH	1700	1700	903			
Volume to Capacity	0.04	0.04	0.25			
Queue Length 95th (ft)	0	0	24			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)			15			













15: Kennedy & AVE 16 Connector
 Mitigated 2010 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	204	140	103	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	222	152	112	0	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)		888				
pX, platoon unblocked						
vC, conflicting volume	112				708	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				708	112
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	85				100	93
cM capacity (veh/h)	1471				336	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	374	112	66			
Volume Left	222	0	0			
Volume Right	0	0	66			
cSH	1471	1700	930			
Volume to Capacity	0.15	0.07	0.07			
Queue Length 95th (ft)	13	0	6			
Control Delay (s)	5.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	5.2	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			







16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				3		416
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		594	888		707	
Travel Time (s)		10.1	15.1		16.1	
Volume (vph)	90	394	279	3	90	383
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	428	303	3	98	416
Lane Group Flow (vph)	98	428	303	3	98	416
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.9	20.9	20.9	20.9	20.5	20.5
Total Split (s)	13.9	36.5	22.6	22.6	23.5	23.5
Total Split (%)	23.2%	60.8%	37.7%	37.7%	39.2%	39.2%
Maximum Green (s)	9.0	31.6	17.7	17.7	19.0	19.0
Yellow Time (s)	3.9	3.9	3.9	3.9	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	8.4	19.9	13.4	13.4	9.6	9.6
Actuated g/C Ratio	0.20	0.52	0.35	0.35	0.25	0.25
v/c Ratio	0.28	0.45	0.47	0.01	0.22	0.59
Control Delay	19.7	7.2	15.1	9.3	15.9	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	7.2	15.1	9.3	15.9	6.1
LOS	B	A	B	A	B	A
Approach Delay		9.5	15.0		8.0	
Approach LOS		A	B		A	

16: Kennedy & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative C

10/22/2008

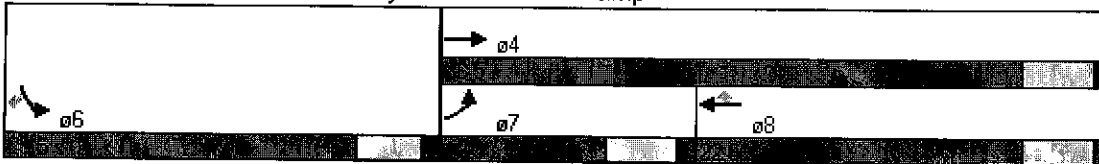
						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)	19	39	57	0	20	0
Queue Length 95th (ft)	66	122	145	5	56	55
Internal Link Dist (ft)		514	808		627	
Turn Bay Length (ft)						
Base Capacity (vph)	404	1217	826	703	744	906
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.35	0.37	0.00	0.13	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 38.6
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 10.2
 Intersection Capacity Utilization 45.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 16: Kennedy & SR 99 SB off-ramp



17: Ave 16 & Aviation Drive
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.940			0.961				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3327	0	1770	3401	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3327	0	1770	3401	0	1770	1770	1583	1770	1583	0
Right Turn on Red												
Satd. Flow (RTOR)		53			34				7		140	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			2553			1293		1356		
Travel Time (s)		18.2			43.5			22.0		23.1		
Volume (vph)	3	74	49	319	89	31	39	90	6	86	143	310
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	80	53	347	97	34	42	98	7	93	155	337
Lane Group Flow (vph)	3	133	0	347	131	0	42	98	7	93	492	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.9	20.9		8.9	20.9		8.9	20.9	20.9	8.9	20.9	
Total Split (s)	8.9	20.9	0.0	22.0	34.0	0.0	8.9	23.3	23.3	13.8	28.2	0.0
Total Split (%)	11.1%	26.1%	0.0%	27.5%	42.5%	0.0%	11.1%	29.1%	29.1%	17.3%	35.3%	0.0%
Maximum Green (s)	4.0	16.0		17.1	29.1		4.0	18.4	18.4	8.9	23.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	5.0	8.1		16.6	24.4		4.9	22.6	22.6	8.8	27.8	
Actuated g/C Ratio	0.07	0.12		0.25	0.36		0.07	0.34	0.34	0.13	0.41	
v/c Ratio	0.03	0.30		0.79	0.10		0.34	0.16	0.01	0.41	0.67	
Control Delay	34.0	20.3		39.6	11.4		40.4	21.5	12.3	34.7	20.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	20.3		39.6	11.4		40.4	21.5	12.3	34.7	20.0	
LOS	C	C		D	B		D	C	B	C	C	
Approach Delay		20.6			31.9			26.5		22.4		
Approach LOS		C			C			C		C		

17: Ave 16 & Aviation Drive
 Mitigated 2010 Project PM Alternative C

10/22/2008

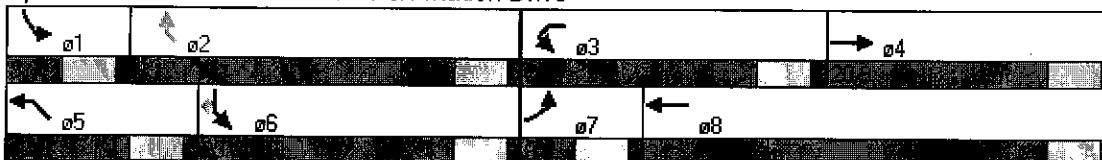
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	1	16		141	12		18	33	0	38	137	
Queue Length 95th (ft)	9	41		#279	34		48	72	9	82	#306	
Internal Link Dist (ft)		986			2473			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	118	766		471	1446		124	598	539	248	739	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.17		0.74	0.09		0.34	0.16	0.01	0.38	0.67	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 67
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 26.0
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 17: Ave 16 & Aviation Drive















18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)						212			79			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	206	1140	0	0	1198	195	698	2	352	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	224	1239	0	0	1302	212	759	2	383	0	0	0
Lane Group Flow (vph)	224	1239	0	0	1302	212	380	381	383	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	15.0	48.0	0.0	0.0	33.0	33.0	22.0	22.0	22.0	0.0	0.0	0.0
Total Split (%)	21.4%	68.6%	0.0%	0.0%	47.1%	47.1%	31.4%	31.4%	31.4%	0.0%	0.0%	0.0%
Maximum Green (s)	10.4	43.4			28.4	28.4	17.5	17.5	17.5			
Flow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	11.0	44.0			29.0	29.0	18.0	18.0	18.0			
Actuated g/C Ratio	0.16	0.63			0.41	0.41	0.26	0.26	0.26			
v/c Ratio	0.81	0.56			0.89	0.27	0.88	0.88	0.82			
Control Delay	34.2	3.5			28.4	3.2	49.3	49.0	36.3			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	34.2	3.6			28.4	3.2	49.3	49.0	36.3			
LOS	C	A			C	A	D	D	D			
Approach Delay		8.3			24.9			44.9				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

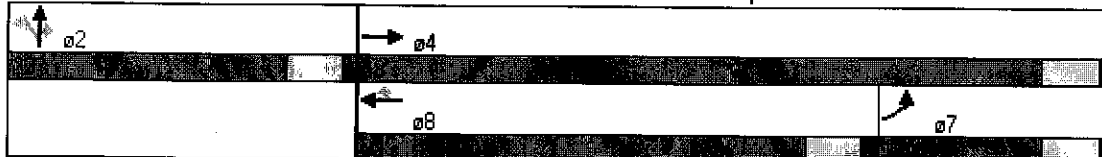
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			C			D				
Queue Length 50th (ft)	82	48			263	0	165	165	124			
Queue Length 95th (ft) m#108		58			#396	36	#321	#322	#268			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	275	2203			1466	780	432	434	466			
Starvation Cap Reductn	0	138			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.81	0.60			0.89	0.27	0.88	0.88	0.82			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 59 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 24.5
 Intersection Capacity Utilization 111.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps

Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			665									27
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1138	719	261	1635	0	0	0	0	204	2	179
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1237	782	284	1777	0	0	0	0	222	2	195
Lane Group Flow (vph)	0	1237	782	284	1777	0	0	0	0	0	224	195
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	31.5	31.5	18.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	20.5
Total Split (%)	0.0%	45.0%	45.0%	25.7%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	29.3%
Maximum Green (s)		26.9	26.9	13.4	44.9					16.0	16.0	16.0
ℳlow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effect Green (s)		30.0	30.0	14.2	48.2						13.8	13.8
Actuated g/C Ratio		0.43	0.43	0.20	0.69						0.20	0.20
v/c Ratio		0.82	0.74	0.79	0.73						0.67	0.61
Control Delay		24.5	8.2	38.6	1.8						35.8	30.0
Queue Delay		0.0	0.0	0.0	0.3						0.0	0.0
Total Delay		24.5	8.2	38.6	2.1						35.8	30.0
LOS		C	A	D	A						D	C
Approach Delay		18.2			7.1						33.1	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A						C	
Queue Length 50th (ft)		253	32	107	0						89	65
Queue Length 95th (ft)		#382	157	m131	m0						152	124
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1517	1059	372	2435						399	376
Starvation Cap Reductn		0	0	0	165						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.82	0.74	0.76	0.78						0.56	0.52

Intersection Summary













Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 68 (97%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 14.5
 Intersection Capacity Utilization 111.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
 Mitigated 2010 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	42	1	43	0	165	77	44	185	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	46	1	47	0	179	84	48	201	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565	560	201	520	518	221	201			263		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565	560	201	520	518	221	201			263		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	100	90	100	94	100			96		
cM capacity (veh/h)	397	420	840	447	440	811	1325			1224		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	93	263	249								
Volume Left	0	46	0	48								
Volume Right	1	47	84	0								
cSH	560	576	1325	1224								
Volume to Capacity	0.00	0.16	0.00	0.04								
Queue Length 95th (ft)	0	14	0	3								
Control Delay (s)	11.5	12.5	0.0	1.8								
Lane LOS	B	B		A								
Approach Delay (s)	11.5	12.5	0.0	1.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization		47.2%			ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.970						0.852	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3433	0	0	0	0	1770	1587	0
Flt Permitted	0.320									0.950		
Satd. Flow (perm)	1145	3505	0	0	3433	0	0	0	0	1770	1587	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)					92						65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	554	485	0	0	592	151	0	0	0	128	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	602	527	0	0	643	164	0	0	0	139	1	65
Lane Group Flow (vph)	602	527	0	0	807	0	0	0	0	139	66	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	49.5	49.5	0.0	0.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	70.7%	70.7%	0.0%	0.0%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	44.9	44.9			44.9					16.0	16.0	
ℳlow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	54.0	54.0			54.0					10.9	10.9	
Actuated g/C Ratio	0.77	0.77			0.77					0.16	0.16	
v/c Ratio	0.68	0.19			0.30					0.50	0.22	
Control Delay	10.3	2.2			3.4					32.8	9.1	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	10.3	2.2			3.4					32.8	9.1	
LOS	B	A			A					C	A	
Approach Delay		6.5			3.4						25.1	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		A			A							C
Queue Length 50th (ft)	34	21			43					56	0	
Queue Length 95th (ft)	#201	37			80					99	29	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	883	2704			2669					417	424	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	0.68	0.19			0.30					0.33	0.16	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 57 (81%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 7.1
 Intersection Capacity Utilization 54.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: Ave 14/Olive & SR 145/Madera
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15			9	15		9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Fr			0.850					0.999				0.850
Flt Protected	0.950						0.950				0.989	
Satd. Flow (prot)	1736	1827	1553	0	0	0	3433	3536	0	0	3466	1568
Flt Permitted	0.950						0.950				0.600	
Satd. Flow (perm)	1736	1827	1553	0	0	0	3433	3536	0	0	2103	1568
Right Turn on Red												
Satd. Flow (RTOR)			615					2				272
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30				30		35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	251	101	566	0	0	0	133	788	7	83	275	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	273	110	615	0	0	0	145	857	8	90	299	272
Lane Group Flow (vph)	273	110	615	0	0	0	145	865	0	0	389	272
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6	20.6				20.6	20.6		20.6	20.6	20.6
Total Split (s)	26.4	26.4	26.4	0.0	0.0	0.0	20.6	43.6	0.0	23.0	23.0	23.0
Total Split (%)	37.7%	37.7%	37.7%	0.0%	0.0%	0.0%	29.4%	62.3%	0.0%	32.9%	32.9%	32.9%
Maximum Green (s)	21.9	21.9	21.9				16.0	39.0		18.4	18.4	18.4
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	22.4	22.4	22.4				16.6	39.6		19.0	19.0	19.0
Actuated g/C Ratio	0.32	0.32	0.32				0.24	0.57		0.27	0.27	0.27
v/c Ratio	0.49	0.19	0.67				0.18	0.43		0.68	0.44	0.44
Control Delay	18.7	15.5	7.1				22.0	9.6		25.3	3.6	3.6
Queue Delay	1.5	0.6	0.2				0.0	0.0		0.0	0.0	0.0
Total Delay	20.2	16.1	7.3				22.0	9.6		25.3	3.6	3.6
LOS	C	B	A				C	A		C	A	A
Approach Delay		11.8						11.3			16.4	

22: AVE 14/Olive & SR 145/Madera
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						B			B	
Queue Length 50th (ft)	65	25	15				25	102			63	0
Queue Length 95th (ft)	m112	m47	77				47	140			90	17
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	556	585	915				814	2001			571	624
Starvation Cap Reductn	141	255	35				0	0			0	0
Spillback Cap Reductn	0	0	0				0	0			0	0
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	0.66	0.33	0.70				0.18	0.43			0.68	0.44

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 30 (43%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 55.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1495
Right Turn on Red				⊗s		⊗s
Satd. Flow (RTOR)						170
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	473	384	0	445	156
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	514	417	0	484	170
Lane Group Flow (vph)	0	514	417	0	484	170
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	34.2	34.2	0.0	35.8	35.8
Total Split (%)	0.0%	48.9%	48.9%	0.0%	51.1%	51.1%
Maximum Green (s)		29.7	29.7		31.3	31.3
⊗flow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		46.4	46.4		15.6	15.6
Actuated g/C Ratio		0.66	0.66		0.22	0.22
v/c Ratio		0.22	0.18		0.67	0.37
Control Delay		5.5	2.7		29.3	6.1
Queue Delay		0.0	0.2		0.0	0.0
Total Delay		5.5	2.8		29.3	6.1
LOS		A	A		C	A
Approach Delay		5.5	2.8		23.2	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		38	15		98	0
Queue Length 95th (ft)		72	23		130	40
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2347	2347		1473	772
Starvation Cap Reductn		0	1135		0	0
Spillback Cap Reductn		0	0		3	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.22	0.34		0.33	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 69 (99%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 32.4%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp

















24: Ave 14/Olive & Road 23
 Mitigated 2010 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	49	89	12	16	38	53	5	117	25	69	100	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	97	13	17	41	58	5	127	27	75	109	27
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	116	160	211								
Volume Left (vph)	53	17	5	75								
Volume Right (vph)	13	58	27	27								
Hadj (s)	0.07	-0.10	0.09	0.27								
Departure Headway (s)	5.1	5.0	5.0	5.1								
Degree Utilization, x	0.23	0.16	0.22	0.30								
Capacity (veh/h)	649	652	668	660								
Control Delay (s)	9.6	9.0	9.5	10.3								
Approach Delay (s)	9.6	9.0	9.5	10.3								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.7									
HCM Level of Service			A									
Intersection Capacity Utilization		43.3%			ICU Level of Service				A			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
Mitigated 2010 Project PM Alternative C

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 				 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.677	
Satd. Flow (perm)	3335	1538	1759	1495	1237	1827
Right Turn on Red		8s		8s		
Satd. Flow (RTOR)		91		286		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	668		408			1104
Travel Time (s)	15.2		9.3			25.1
Volume (vph)	448	84	115	263	84	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	487	91	125	286	91	142
Lane Group Flow (vph)	487	91	125	286	91	142
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	42.5	42.5	47.5	47.5	47.5	47.5
Total Split (%)	47.2%	47.2%	52.8%	52.8%	52.8%	52.8%
Maximum Green (s)	38.0	38.0	43.0	43.0	43.0	43.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	66.8	66.8	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.74	0.74	0.17	0.17	0.17	0.17
v/c Ratio	0.20	0.08	0.42	0.58	0.44	0.46
Control Delay	4.3	1.3	25.9	6.0	38.6	37.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	1.3	25.9	6.0	38.6	37.3
LOS	A	A	C	A	D	D
Approach Delay	3.8		12.1			37.8

25: SB Ramps & GS Blvd
 Mitigated 2010 Project PM Alternative C

10/22/2008

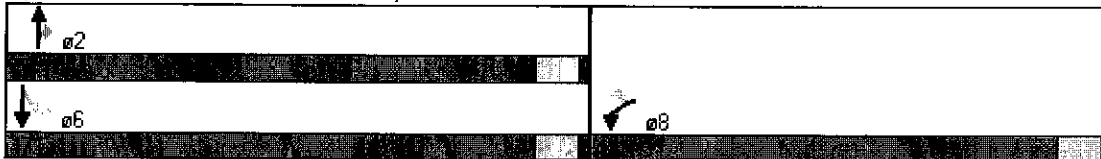
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	A		B			D
Queue Length 50th (ft)	35	0	36	8	47	73
Queue Length 95th (ft)	70	14	m54	m87	85	117
Internal Link Dist (ft)	588		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2475	1165	850	870	598	883
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.08	0.15	0.33	0.15	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 76 (84%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 13.1
 Intersection Capacity Utilization 30.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850		0.947			0.877				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	1759	1495	1687	1682	0	1752	1618	0	3335	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	1759	1495	1687	1682	0	1752	1618	0	3335	1810	1538
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			32		32			92				65
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	200	228	29	14	289	160	46	18	85	491	28	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	217	248	32	15	314	174	50	20	92	534	30	65
Lane Group Flow (vph)	217	248	32	15	488	0	50	112	0	534	30	65
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phases	7	4	4	3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6	20.6	8.6	20.6		8.6	20.6		8.6	20.6	20.6
Total Split (s)	17.0	40.8	40.8	8.6	32.4	0.0	10.9	20.6	0.0	20.0	29.7	29.7
Total Split (%)	18.9%	45.3%	45.3%	9.6%	36.0%	0.0%	12.1%	22.9%	0.0%	22.2%	33.0%	33.0%
Maximum Green (s)	12.4	36.2	36.2	4.0	27.8		6.4	16.1		15.5	25.2	25.2
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effect Green (s)	13.0	42.0	42.0	4.6	28.4		6.7	16.6		16.0	30.1	30.1
Actuated g/C Ratio	0.14	0.47	0.47	0.05	0.32		0.07	0.18		0.18	0.33	0.33
v/c Ratio	0.90	0.30	0.04	0.17	0.88		0.38	0.30		0.90	0.05	0.12
Control Delay	77.1	17.3	6.1	55.0	36.8		48.5	12.3		51.8	19.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	77.1	17.3	6.1	55.0	36.8		48.5	12.3		51.8	19.4	4.9
LOS	E	B	A	D	D		D	B		D	B	A
Approach Delay		42.7			37.4			23.5			45.4	

26: Ave 12 & GS Blvd
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	123	77	0	9	159		28	10		159	12	0
Queue Length 95th (ft)	#254	154	17	m21	#405		64	54		#236	m26	10
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	241	820	714	86	553		134	373		593	605	557
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.90	0.30	0.04	0.17	0.88		0.37	0.30		0.90	0.05	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 11 (12%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 40.4
 Intersection Capacity Utilization 66.7%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	1827	0	0	1827	1553	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	1827	0	0	1827	1553	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						507			153			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	164	640	0	0	284	466	179	1	141	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	178	696	0	0	309	507	195	1	153	0	0	0
Lane Group Flow (vph)	178	696	0	0	309	507	0	196	153	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.6	20.6	20.6			
Total Split (s)	24.9	63.1	0.0	0.0	38.2	38.2	26.9	26.9	26.9	0.0	0.0	0.0
Total Split (%)	27.7%	70.1%	0.0%	0.0%	42.4%	42.4%	29.9%	29.9%	29.9%	0.0%	0.0%	0.0%
Maximum Green (s)	20.3	58.5			33.6	33.6	22.3	22.3	22.3			
Flow Time (s)	3.6	3.6			3.6	3.6	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	20.9	66.2			41.3	41.3		15.8	15.8			
Actuated g/C Ratio	0.23	0.74			0.46	0.46		0.18	0.18			
v/c Ratio	0.44	0.52			0.37	0.51		0.66	0.39			
Control Delay	16.7	8.0			18.6	3.8		44.6	8.1			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	16.7	8.0			18.6	3.8		44.6	8.1			
LOS	B	A			B	A		D	A			
Approach Delay		9.8			9.4			28.6				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2010 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	41	92			110	0		105	0			
Queue Length 95th (ft)	m55	m148			198	60		163	47			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	403	1343			838	986		431	498			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.44	0.52			0.37	0.51		0.45	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 20 (22%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 57.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



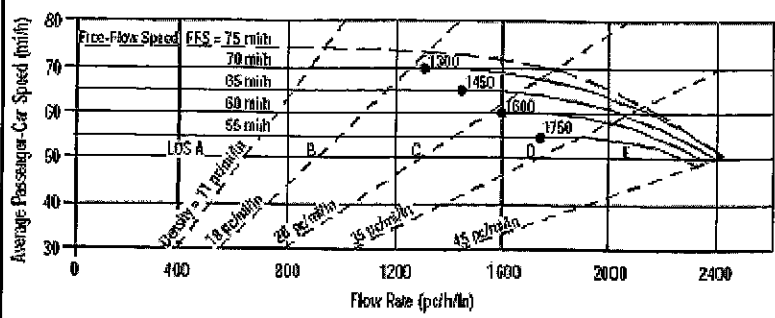
ATTACHMENT VI – C - 23

2030 NO PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4229	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

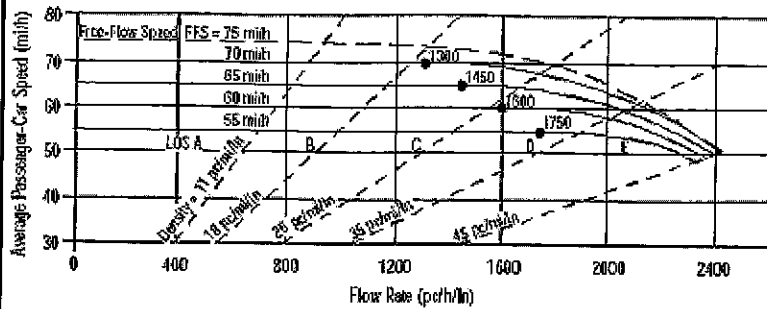
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = [1/P _T (E _T -1) + P _R (E _R -1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	1801 pc/h/ln	Design LOS	
S	67.8 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.5 pc/mi/ln	f _p	mi/h
LOS	D	S	mi/h
		D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4912	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

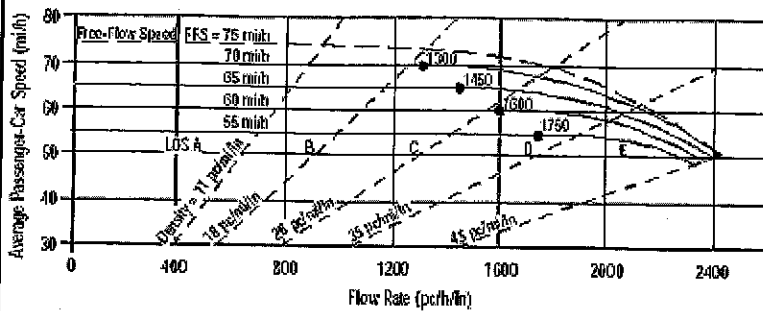
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2091 pc/h/ln	Design LOS	
S	62.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	33.2 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	
DDHV - Directional design hour volume			f _{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper. (LOS) Des. (N) Planning Data

Flow Inputs			
Volume, V	3880	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	% Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			% RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

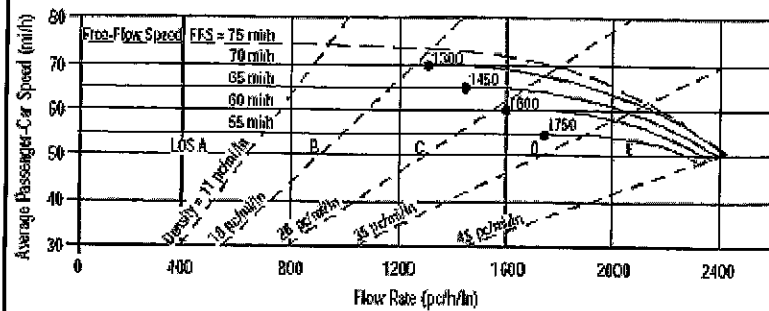
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1652 pc/h/ln	Design LOS	
S	69.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	23.9 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	5462	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	3		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

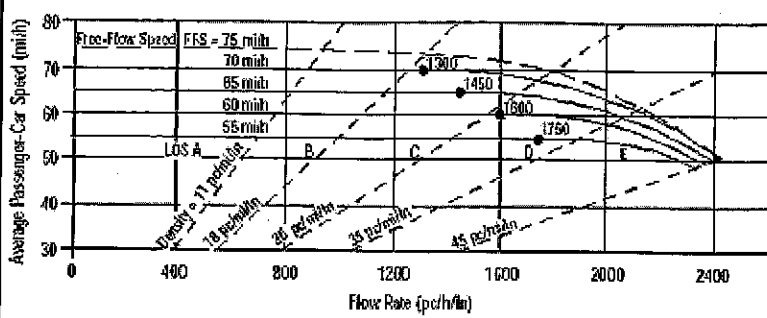
Operational (LOS)			Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2325	pc/h/ln	Design LOS	
S	56.1	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	41.4	pc/mi/ln	S	mi/h
LOS	E		D = v _p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4210	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

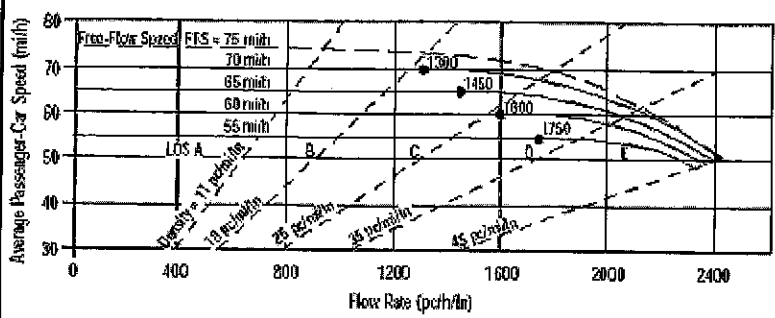
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T + (E_T - 1) P_R (E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1792 pc/h/ln	Design LOS	
S	67.9 mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	26.4 pc/mi/ln	S	mi/h
LOS	D	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (D)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4752	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

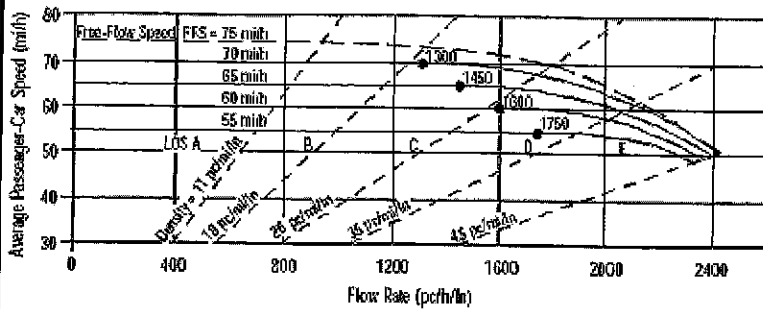
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2023 pc/h/ln	Design LOS	
S	64.4 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	31.4 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3830	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AAADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

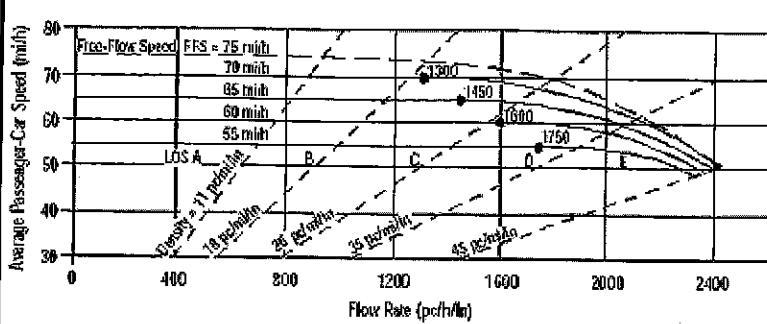
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1631 pc/h/ln	Design LOS	
S	69.3 mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	23.5 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

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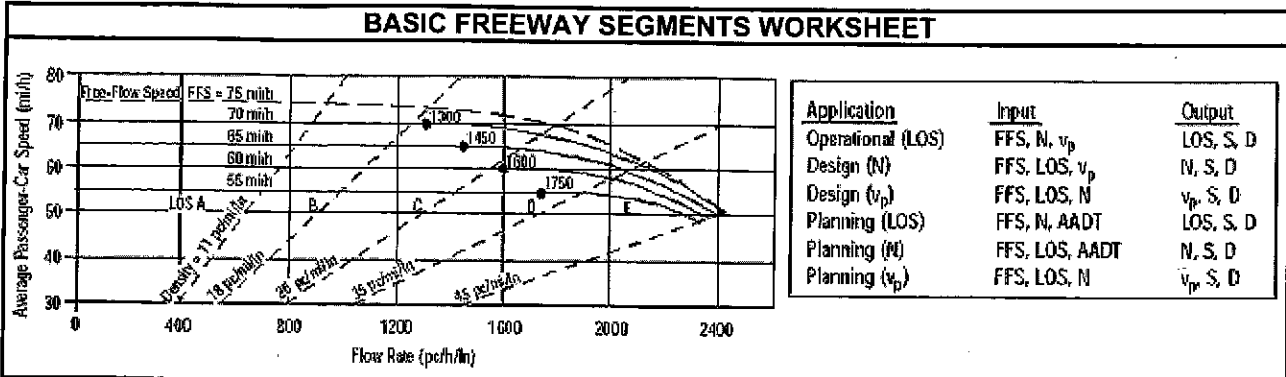
Flow Inputs			
Volume, V	5409	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	2303 pc/h/ln	Design LOS	
S	56.9 mi/h	v _p = V or DDHV / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	40.5 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper. (LOS) Des. (N) Planning Data

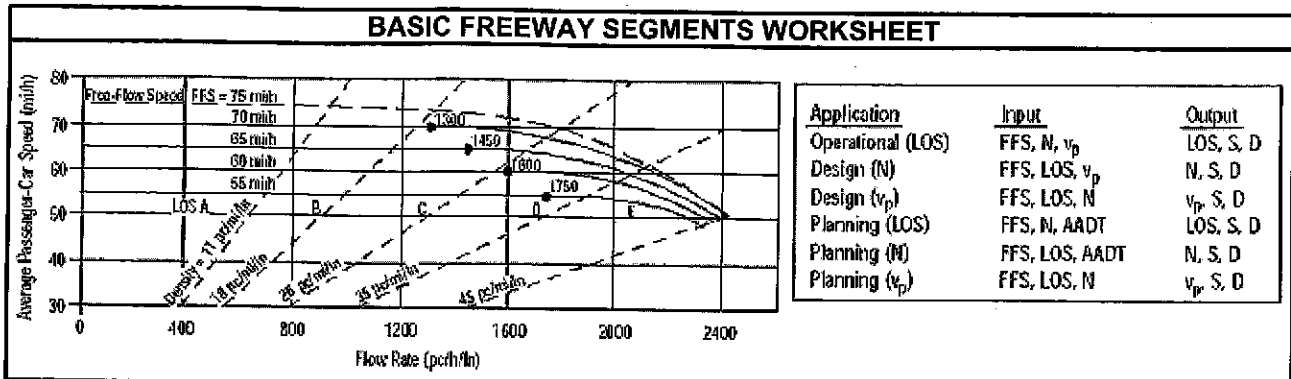
Flow Inputs			
Volume, V	5323	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2266 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	58.1 mi/h	f _p	
D = v _p / S	39.0 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project PM	Analysis Year	2030

Project Description 04-837.2 Northfork Casino Alts A, B & C

Oper. (LOS) Des. (N) Planning Data

Flow Inputs			
Volume, V	7061	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

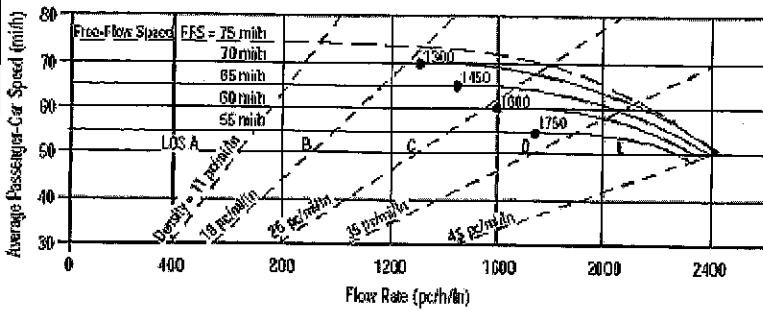
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = [1/P _T (E _T -1) + P _R (E _R -1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	3006 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	mi/h	S	mi/h
D = v _p / S	pc/mi/ln	D = v _p / S	pc/mi/ln
LOS	F	Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

Oper.(LOS)
 Des.(N)
 Planning Data

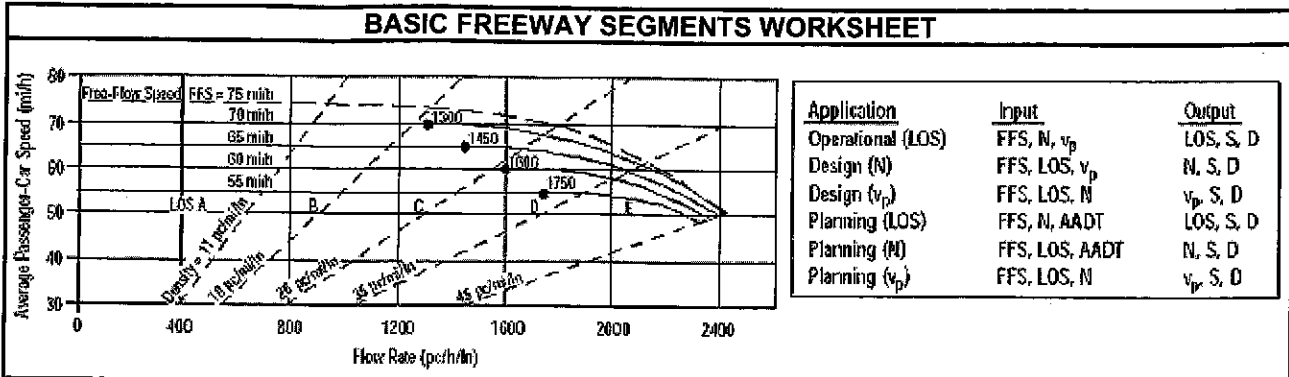
Flow Inputs			
Volume, V	7421	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T + (E _T - 1) * P _R * (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV})	3160 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV})	pc/h
S	mi/h	f _p	
D = v _p / S	pc/mi/ln	S	mi/h
LOS	F	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 No Project AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alts A, B & C			

<input checked="" type="checkbox"/> Oper. (LOS)	<input type="checkbox"/> Des. (N)	<input type="checkbox"/> Planning Data
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Flow Inputs				
Volume, V	4532	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	% Trucks and Buses, P_T	24
Peak-Hr Prop. of AADT, K			% RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1930 pc/h/ln	Design LOS	
S	66.1 mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	29.2 pc/mi/ln	S	mi/h
LOS	D	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 24



















2030 NO PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

INTERSECTION LEVEL OF SERVICE CALCULATIONS







1: Ave 18.5 & SR 99 NB ramps
2030 No Project AM

10/22/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Free			Free			Stop				Stop	
Grade		0%			0%			0%				0%	
Volume (veh/h)	336	97	0	0	173	29	227	3	61	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	365	105	0	0	188	32	247	3	66	0	0	0	0
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None				None	
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	220			105			1040	1055	105	1108	1040	204	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	220			105			1040	1055	105	1108	1040	204	
tC, single (s)	4.5			4.3			7.4	6.8	6.5	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.6			2.4			3.8	4.3	3.6	3.5	4.0	3.3	
p0 queue free %	68			100			0	98	92	100	100	100	
cM capacity (veh/h)	1145			1386			139	137	878	129	158	842	
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2								
Volume Total	365	105	220	247	70								
Volume Left	365	0	0	247	0								
Volume Right	0	0	32	0	66								
cSH	1145	1700	1700	139	701								
Volume to Capacity	0.32	0.06	0.13	1.77	0.10								
Queue Length 95th (ft)	35	0	0	461	8								
Control Delay (s)	9.6	0.0	0.0	430.0	10.7								
Lane LOS	A			F	B								
Approach Delay (s)	7.5		0.0	337.7									
Approach LOS				F									
Intersection Summary													
Average Delay			109.6										
Intersection Capacity Utilization			52.1%			ICU Level of Service			A				
Analysis Period (min)			15										












3: Ave 18.5 & Road 23
2030 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		∨	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	568	297	0	107	264
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	617	323	0	116	287
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	323				940	323
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	323				940	323
tC, single (s)	4.4				6.8	6.6
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	100				54	56
cM capacity (veh/h)	1077				255	646
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	617	323	403			
Volume Left	0	0	116			
Volume Right	0	0	287			
cSH	1700	1700	448			
Volume to Capacity	0.36	0.19	0.90			
Queue Length 95th (ft)	0	0	246			
Control Delay (s)	0.0	0.0	52.0			
Lane LOS			F			
Approach Delay (s)	0.0	0.0	52.0			
Approach LOS			F			
Intersection Summary						
Average Delay			15.6			
Intersection Capacity Utilization		58.7%		ICU Level of Service		B
Analysis Period (min)			15			

4: Ave 18.5 & Pistacchio
2030 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	485	400	181	68	64
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	527	435	197	74	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	632				1003	435
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	632				1003	435
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				68	88
cM capacity (veh/h)	819				231	563
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	548	435	197	143		
Volume Left	21	0	0	74		
Volume Right	0	0	197	70		
cSH	819	1700	1700	323		
Volume to Capacity	0.03	0.26	0.12	0.44		
Queue Length 95th (ft)	2	0	0	55		
Control Delay (s)	0.7	0.0	0.0	24.8		
Lane LOS	A			C		
Approach Delay (s)	0.7	0.0		24.8		
Approach LOS				C		
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		55.3%			ICU Level of Service	B
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
2030 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	15	70	37	259	75	107	110	64	17	37	57	225
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	76	40	282	82	116	120	70	18	40	62	245
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	198			116			1049	793	82	827	890	96
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			116			1049	793	82	827	890	96
tC, single (s)	4.1			4.1			7.8	6.5	6.9	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.1	4.0	3.9	3.5	4.0	3.3
p0 queue free %	99			81			0	73	98	79	73	75
cM capacity (veh/h)	1369			1472			78	256	821	192	225	960
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	133	363	116	189	18	40	307					
Volume Left	16	282	0	120	0	40	0					
Volume Right	40	0	116	0	18	0	245					
cSH	1369	1472	1700	104	821	192	579					
Volume to Capacity	0.01	0.19	0.07	1.81	0.02	0.21	0.53					
Queue Length 95th (ft)	1	18	0	381	2	19	77					
Control Delay (s)	1.0	6.6	0.0	470.1	9.5	28.7	18.0					
Lane LOS	A	A		F	A	D	C					
Approach Delay (s)	1.0	5.0		429.1		19.2						
Approach LOS				F		C						
Intersection Summary												
Average Delay			84.3									
Intersection Capacity Utilization			49.1%		ICU Level of Service				A			
Analysis Period (min)			15									



















6: Ave 18 & Road 23
2030 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	8	3	10	2	27	1	388	1	24	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	3	11	2	29	1	422	1	26	390	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	897	867	390	874	867	422	390			423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	897	867	390	874	867	422	390			423		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	97	99	96	99	95	100			97		
cM capacity (veh/h)	235	276	643	246	272	609	1036			997		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	42	424	416								
Volume Left	0	11	1	26								
Volume Right	3	29	1	0								
cSH	326	422	1036	997								
Volume to Capacity	0.04	0.10	0.00	0.03								
Queue Length 95th (ft)	3	8	0	2								
Control Delay (s)	16.4	14.5	0.0	0.8								
Lane LOS	C	B	A	A								
Approach Delay (s)	16.4	14.5	0.0	0.8								
Approach LOS	C	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization		52.9%		ICU Level of Service					A			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2030 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	250	513	0	0	1209	124	1050	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	558	0	0	1314	135	1141	7	549	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1449			558			2415	2550	558	2967	2415	1314
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1449			558			2415	2550	558	2967	2415	1314
tC, single (s)	4.3			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	36			100			0	29	0	0	100	100
cM capacity (veh/h)	422			998			11	9	522	0	12	195
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	272	558	1314	135	1148	549						
Volume Left	272	0	0	0	1141	0						
Volume Right	0	0	0	135	0	549						
cSH	422	1700	1700	1700	11	522						
Volume to Capacity	0.64	0.33	0.77	0.08	109.00	1.05						
Queue Length 95th (ft)	110	0	0	0	Err	403						
Control Delay (s)	27.7	0.0	0.0	0.0	Err	81.9						
Lane LOS	D				F	F						
Approach Delay (s)	9.1		0.0		6790.7							
Approach LOS					F							
Intersection Summary												
Average Delay			2900.5									
Intersection Capacity Utilization			146.0%		ICU Level of Service				H			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
2030 No Project AM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1584	1734	0	299	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1722	1885	0	325	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1885				3607	1885
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1885				3607	1885
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.5
p0 queue free %	100				0	0
cM capacity (veh/h)	287				5	78
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	1722	1885	325	117		
Volume Left	0	0	325	0		
Volume Right	0	0	0	117		
cSH	1700	1700	5	78		
Volume to Capacity	1.01	1.11	66.71	1.51		
Queue Length 95th (ft)	0	0	Err	239		
Control Delay (s)	0.0	0.0	Err	376.2		
Lane LOS			F	F		
Approach Delay (s)	0.0	0.0	7445.5			
Approach LOS			F			
Intersection Summary						
Average Delay			813.5			
Intersection Capacity Utilization			114.5%		ICU Level of Service	H
Analysis Period (min)			15			













10: Ave 17 & GS Blvd
2030 No Project AM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	886	61	613	960	270	82	22	431	203	15	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	963	66	666	1043	293	89	24	468	221	16	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1337			1029			3369	3648	963	3982	3567	1190
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1337			1029			3369	3648	963	3982	3567	1190
tC, single (s)	4.2			4.2			7.4	6.8	6.5	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.5	3.6	4.1	3.4
p0 queue free %	98			0			0	0	0	0	0	97
cM capacity (veh/h)	491			641			0	0	280	0	0	219
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1			
Volume Total	8	963	66	666	1337	89	24	468	243			
Volume Left	8	0	0	666	0	89	0	0	221			
Volume Right	0	0	66	0	293	0	0	468	7			
cSH	491	1700	1700	641	1700	0	0	280	0			
Volume to Capacity	0.02	0.57	0.04	1.04	0.79	Err	Err	1.67	Err			
Queue Length 95th (ft)	1	0	0	437	0	Err	Err	738	Err			
Control Delay (s)	12.5	0.0	0.0	71.5	0.0	Err	Err	350.6	Err			
Lane LOS	B			F		F	F	F	F			
Approach Delay (s)	0.1			23.8		Err			Err			
Approach LOS						F			F			
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization		109.7%				ICU Level of Service			H			
Analysis Period (min)		15										

11: Ave 17 & Road 23
2030 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	512	138	42	607	7	138	374	47	19	262	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	557	150	46	660	8	150	407	51	21	285	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1397	1085	286	1488	1061	432	288			458		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1397	1085	286	1488	1061	432	288			458		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.3			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.4			2.4		
p0 queue free %	0	0	80	0	0	99	87			98		
cM capacity (veh/h)	0	184	750	0	186	609	1178			992		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	713	713	608	309								
Volume Left	7	46	150	21								
Volume Right	150	8	51	3								
cSH	0	0	1178	992								
Volume to Capacity	Err	Err	0.13	0.02								
Queue Length 95th (ft)	Err	Err	11	2								
Control Delay (s)	Err	Err	3.2	0.8								
Lane LOS	F	F	A	A								
Approach Delay (s)	Err	Err	3.2	0.8								
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			115.0%		ICU Level of Service				H			
Analysis Period (min)			15									

12: Ellis OC & Road 26
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↘	↙		↘	↙	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frnt			0.850			0.850		0.966			0.997	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3321	0	1752	3494	0
Flt Permitted		0.828			0.721		0.950			0.950		
Satd. Flow (perm)	0	1542	1583	0	1343	1583	1719	3321	0	1752	3494	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			15			51		56			3	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	47	10	374	109	29	604	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	51	11	407	118	32	657	12
Lane Group Flow (vph)	0	11	15	0	176	51	11	525	0	32	669	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		12.7	12.7		12.7	12.7	7.1	22.3		7.6	22.6	
Actuated g/C Ratio		0.28	0.28		0.28	0.28	0.13	0.49		0.14	0.49	
v/c Ratio		0.03	0.03		0.47	0.11	0.05	0.32		0.13	0.39	
Control Delay		11.2	6.9		15.8	5.3	20.7	8.6		20.5	9.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.2	6.9		15.8	5.3	20.7	8.6		20.5	9.5	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		8.7			13.4			8.8			10.0	

12: Ellis OC & Road 26
 2030 No Project AM

10/22/2008

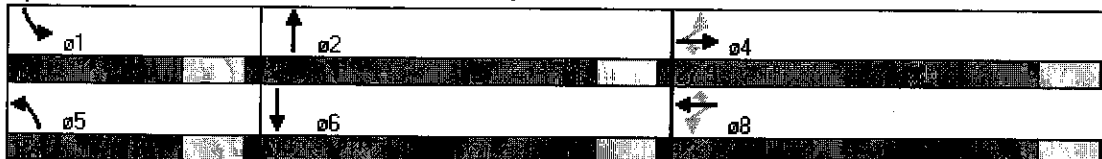
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			B	
Queue Length 50th (ft)		1	0		20	0	1	24		4	36	
Queue Length 95th (ft)		12	11		100	20	16	109		32	146	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		672	698		585	719	360	1844		368	1920	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.02		0.30	0.07	0.03	0.28		0.09	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 45.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 46.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						161		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	475	313	0	0	240	148	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	516	340	0	0	261	161	222	2	95	0	0	0
Lane Group Flow (vph)	516	340	0	0	261	161	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.44	0.16			0.42	0.39	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.1			17.4			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	46	12			44	0	31	1				
Queue Length 95th (ft)	128	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	562	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.44	0.16			0.26	0.29	0.23	0.19				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 38.5%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB off-ramp
 2030 No Project AM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						473
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	627	368	0	161	435
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	682	400	0	175	473
Lane Group Flow (vph)	0	682	400	0	175	473
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
Yellow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.44	0.26		0.12	0.32
Control Delay		13.0	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.0	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.0	2.7		4.2	
Approach LOS		B	A		A	

15: Ellis OC & SR 99 SB off-ramp
 2030 No Project AM

10/22/2008

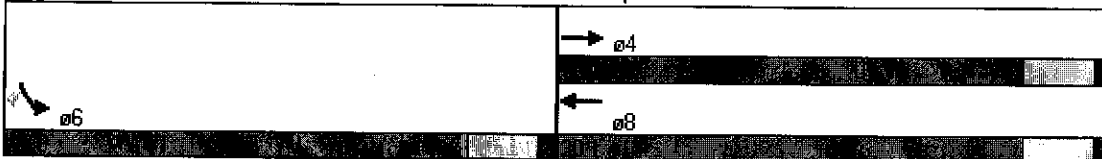
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		86	0		18	0
Queue Length 95th (ft)		125	3		34	24
Internal Link Dist (ft)		1000	630		1324	
Turn Bay Length (ft)						
Base Capacity (vph)		1539	1539		1482	1472
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.44	0.26		0.12	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 7.3
 Intersection Capacity Utilization 38.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB off-ramp



17: Ellis OC & Aviation Drive
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.926			0.899				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		129			197				48		69	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	46	122	119	439	89	181	193	251	44	121	370	566
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	133	129	477	97	197	210	273	48	132	402	615
Lane Group Flow (vph)	50	262	0	477	294	0	210	273	48	132	1017	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4			8				6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9	20.9	
Total Split (s)	14.8	22.0	0.0	35.0	42.2	0.0	19.0	68.0	68.0	25.0	74.0	0.0
Total Split (%)	9.9%	14.7%	0.0%	23.3%	28.1%	0.0%	12.7%	45.3%	45.3%	16.7%	49.3%	0.0%
Maximum Green (s)	10.3	17.1		30.5	37.3		14.5	63.1	63.1	20.1	69.1	
Yellow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	9.2	12.3		31.0	36.2		15.0	64.1	64.1	21.0	70.1	
Actuated g/C Ratio	0.06	0.09		0.21	0.25		0.10	0.44	0.44	0.15	0.49	
v/c Ratio	0.45	0.66		1.26	0.31		1.14	0.35	0.07	0.51	1.27	
Control Delay	78.5	40.2		179.7	15.9		165.1	28.5	6.5	65.5	160.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	78.5	40.2		179.7	15.9		165.1	28.5	6.5	65.5	160.6	
LOS	E	D		F	B		F	C	A	E	F	
Approach Delay		46.4			117.3			80.5		149.7		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
2030 No Project AM

10/22/2008

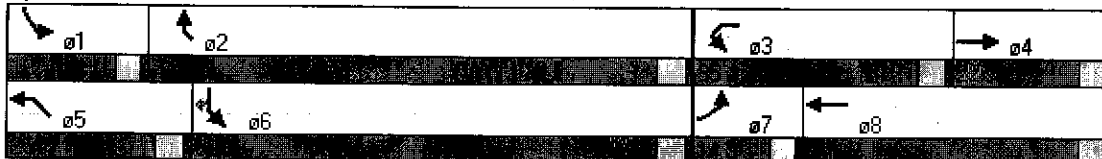
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	46	63		~559	38		~230	167	0	116	~1170	
Queue Length 95th (ft)	94	113		#816	80		#414	253	26	195	#1504	
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	129	507		380	991		184	785	729	258	803	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.39	0.52		1.26	0.30		1.14	0.35	0.07	0.51	1.27	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 144.4
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.27
 Intersection Signal Delay: 115.7
 Intersection Capacity Utilization 79.6%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service D




















~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive















18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 No Project AM

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950	0.950			
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						480			95			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	189	968	0	0	931	442	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	205	1052	0	0	1012	480	390	0	384	0	0	0
Lane Group Flow (vph)	205	1052	0	0	1012	480	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	14.1	48.5			30.4	30.4	28.5	28.5	28.5			
Actuated g/C Ratio	0.17	0.57			0.36	0.36	0.34	0.34	0.34			
v/c Ratio	0.71	0.53			0.82	0.56	0.36	0.36	0.67			
Control Delay	30.8	18.9			32.3	5.0	23.7	23.7	24.6			
Queue Delay	0.0	13.2			0.5	0.0	0.0	0.0	0.0			
Total Delay	30.8	32.0			32.8	5.0	23.7	23.7	24.6			
LOS	C	C			C	A	C	C	C			
Approach Delay		31.8			23.9			24.2				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 No Project AM

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C				
Queue Length 50th (ft)	98	277			261	0	82	82	130			
Queue Length 95th (ft)	m113	m337			#384	66	141	141	232			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	339	1981			1239	863	543	543	574			
Starvation Cap Reductn	0	921			0	0	0	0	0			
Spillback Cap Reductn	0	0			42	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.60	0.99			0.85	0.56	0.36	0.36	0.67			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 53.5 (63%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 26.8
 Intersection Capacity Utilization 81.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D













95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 No Project AM

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected			0.850									0.850
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			458									126
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	754	421	414	921	0	0	0	0	403	0	222
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	820	458	450	1001	0	0	0	0	438	0	241
Lane Group Flow (vph)	0	820	458	450	1001	0	0	0	0	0	438	241
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	28.0	28.0	28.0	56.0	0.0	0.0	0.0	0.0	29.0	29.0	29.0
Total Split (%)	0.0%	32.9%	32.9%	32.9%	65.9%	0.0%	0.0%	0.0%	0.0%	34.1%	34.1%	34.1%
Maximum Green (s)		23.4	23.4	23.4	51.4					24.5	24.5	24.5
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		24.6	24.6	23.7	52.4						24.6	24.6
Actuated g/C Ratio		0.29	0.29	0.28	0.62						0.29	0.29
v/c Ratio		0.84	0.60	0.94	0.47						0.95	0.48
Control Delay		37.9	6.3	49.5	1.9						61.8	15.3
Queue Delay		0.0	0.0	0.0	0.5						40.3	0.0
Total Delay		37.9	6.3	49.5	2.4						102.1	15.3
LOS		D	A	D	A						F	B
Approach Delay		26.6			17.0						71.3	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						E	
Queue Length 50th (ft)		217	0	106	15						227	47
Queue Length 95th (ft)		#318	71 m	#351	18						#407	114
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		978	763	485	2118						470	509
Starvation Cap Reductn		0	0	0	601						0	0
Spillback Cap Reductn		0	0	0	0						67	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.84	0.60	0.93	0.66						1.09	0.47

Intersection Summary













Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 31.4
 Intersection LOS: C
 Intersection Capacity Utilization 81.3%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
2030 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	44	1	35	0	356	38	30	296	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	48	1	38	0	387	41	33	322	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	833	815	322	795	795	408	322			428		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833	815	322	795	795	408	322			428		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	84	100	94	100			97		
cM capacity (veh/h)	264	302	719	298	310	644	1148			1046		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	87	428	354								
Volume Left	0	48	0	33								
Volume Right	0	38	41	0								
cSH	1700	390	1148	1046								
Volume to Capacity	0.00	0.22	0.00	0.03								
Queue Length 95th (ft)	0	21	0	2								
Control Delay (s)	0.0	16.9	0.0	1.1								
Lane LOS	A	C		A								
Approach Delay (s)	0.0	16.9	0.0	1.1								
Approach LOS	A	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization		51.8%		ICU Level of Service					A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 No Project AM

10/22/2008

Lane Group												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.960						0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3239	0	0	0	0	1752	1568	0
Flt Permitted	0.314									0.950		
Satd. Flow (perm)	1062	3312	0	0	3239	0	0	0	0	1752	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					125						363	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	802	577	0	0	568	203	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	872	627	0	0	617	221	0	0	0	355	0	168
Lane Group Flow (vph)	872	627	0	0	838	0	0	0	0	355	168	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	85.0	85.0	0.0	0.0	85.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0
Total Split (%)	77.3%	77.3%	0.0%	0.0%	77.3%	0.0%	0.0%	0.0%	0.0%	22.7%	22.7%	0.0%
Maximum Green (s)	80.4	80.4			80.4					20.5	20.5	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	81.0	81.0			81.0					21.0	21.0	
Actuated g/C Ratio	0.74	0.74			0.74					0.19	0.19	
v/c Ratio	1.12	0.26			0.35					1.06	0.28	
Control Delay	69.9	2.6			4.7					110.2	1.2	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	69.9	2.6			4.7					110.2	1.2	
LOS	E	A			A					F	A	
Approach Delay		41.7			4.7						75.2	

21: SR 145/Madera & SR 99 NB ramps
2030 No Project AM

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		D			A						E	
Queue Length 50th (ft)	~378	36			77					~277	0	
Queue Length 95th (ft) m#352		m35			102					#459	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	782	2439			2418					334	593	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	1.12	0.26			0.35					1.06	0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.12
 Intersection Signal Delay: 37.0 Intersection LOS: D
 Intersection Capacity Utilization 73.2% ICU Level of Service D
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15			15	15		15	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Flt Protected		0.971	0.850				0.950	0.990			0.987	0.850
Satd. Flow (prot)	0	1757	1538	0	0	0	3213	3279	0	0	3426	1553
Flt Permitted		0.971					0.950				0.987	
Satd. Flow (perm)	0	1757	1538	0	0	0	3213	3279	0	0	3426	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			597					7				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	430	278	683	0	0	0	254	948	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	467	302	742	0	0	0	276	1030	71	130	374	468
Lane Group Flow (vph)	0	769	742	0	0	0	276	1101	0	0	504	468
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	50.0	50.0	50.0	0.0	0.0	0.0	39.4	39.4	0.0	20.6	20.6	20.6
Total Split (%)	45.5%	45.5%	45.5%	0.0%	0.0%	0.0%	35.8%	35.8%	0.0%	18.7%	18.7%	18.7%
Maximum Green (s)	45.5	45.5	45.5				34.8	34.8		16.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		46.0	46.0				35.4	35.4			16.6	16.6
Actuated g/C Ratio		0.42	0.42				0.32	0.32			0.15	0.15
v/c Ratio		1.05	0.75				0.27	1.04			0.97	0.74
Control Delay		68.7	9.7				28.6	75.1			81.9	20.4
Queue Delay		90.6	1.7				0.0	0.0			0.0	2.7
Total Delay		159.3	11.4				28.6	75.1			81.9	23.1
LOS		F	B				C	E			F	C
Approach Delay		86.7						65.8			53.6	

22: AVE 14/Olive & SR 145/Madera
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F						E			D	
Queue Length 50th (ft)		~602	47				74	~441			194	69
Queue Length 95th (ft)		m#762	m173				108	#576			m#254	m91
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		735	991				1034	1060			517	632
Starvation Cap Reductn		126	117				0	0			0	24
Spillback Cap Reductn		0	0				0	0			0	81
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		1.26	0.85				0.27	1.04			0.97	0.85

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 20 (18%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 70.9
 Intersection Capacity Utilization 89.7%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E







~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 2030 No Project AM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						76
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	820	685	0	571	315
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	891	745	0	621	342
Lane Group Flow (vph)	0	891	745	0	621	342
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	45.0	45.0	0.0	65.0	65.0
Total Split (%)	0.0%	40.9%	40.9%	0.0%	59.1%	59.1%
Maximum Green (s)		40.5	40.5		60.5	60.5
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		56.7	56.7		45.3	45.3
Actuated g/C Ratio		0.52	0.52		0.41	0.41
v/c Ratio		0.49	0.41		0.90	0.52
Control Delay		20.3	16.6		46.6	19.9
Queue Delay		0.1	3.9		12.7	0.0
Total Delay		20.4	20.5		59.4	19.9
LOS		C	C		E	B
Approach Delay		20.4	20.5		45.3	

23: AVE 14/Olive & SR 99 SB off-ramp
 2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		C	C		D	
Queue Length 50th (ft)		206	127		403	136
Queue Length 95th (ft)		332	201		454	174
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1807	1807		927	863
Starvation Cap Reductn		0	955		0	0
Spillback Cap Reductn		98	0		288	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.52	0.87		0.97	0.40

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 108 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 29.7
 Intersection Capacity Utilization 61.0%
 Analysis Period (min) 15

















Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2030 No Project AM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	61	6	9	90	116	8	132	6	102	127	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	66	7	10	98	126	9	143	7	111	138	57
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	116	234	159	305								
Volume Left (vph)	43	10	9	111								
Volume Right (vph)	7	126	7	57								
Hadj (s)	0.18	-0.08	0.33	0.25								
Departure Headway (s)	5.8	5.4	5.7	5.4								
Degree Utilization, x	0.19	0.35	0.25	0.46								
Capacity (veh/h)	553	620	569	627								
Control Delay (s)	10.1	11.2	10.7	13.0								
Approach Delay (s)	10.1	11.2	10.7	13.0								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.6									
HCM Level of Service			B									
Intersection Capacity Utilization			54.7%		ICU Level of Service					A		
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
2030 No Project AM

10/22/2008

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↓
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1034	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1124	82	117	497	303	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	798	117			614	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798	117			614	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	0	91			68	
cM capacity (veh/h)	239	924			960	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	1124	82	117	497	377	
Volume Left	1124	0	0	0	303	
Volume Right	0	82	0	497	0	
cSH	239	924	1700	1700	960	
Volume to Capacity	4.70	0.09	0.07	0.29	0.32	
Queue Length 95th (ft)	Err	7	0	0	34	
Control Delay (s)	Err	9.3	0.0	0.0	9.1	
Lane LOS	F	A			A	
Approach Delay (s)	9323.4		0.0		9.1	
Approach LOS	F					
Intersection Summary						
Average Delay			5117.7			
Intersection Capacity Utilization			89.6%		ICU Level of Service	E
Analysis Period (min)			15			













26: Ave 12 & GS Blvd
2030 No Project AM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.943			0.867				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	3039	0	1656	1511	0	1687	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	3039	0	1656	1511	0	1687	1776	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			105			24				91
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1843			818			837				408
Travel Time (s)		35.9			15.9			19.0				9.3
Volume (vph)	189	360	16	19	603	373	16	3	22	1008	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1096	11	91
Lane Group Flow (vph)	205	408	0	21	1060	0	17	27	0	1096	11	91
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	15.0	38.4	0.0	10.1	33.5	0.0	9.7	20.5	0.0	51.0	61.8	61.8
Total Split (%)	12.5%	32.0%	0.0%	8.4%	27.9%	0.0%	8.1%	17.1%	0.0%	42.5%	51.5%	51.5%
Maximum Green (s)	10.4	33.8		5.5	28.9		5.5	16.3		46.8	57.6	57.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2		3.2	3.2	3.2
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	11.0	40.5		6.1	29.5		5.7	16.5		47.0	63.6	63.6
Actuated g/C Ratio	0.09	0.34		0.05	0.25		0.05	0.14		0.39	0.53	0.53
v/c Ratio	1.39	0.38		0.26	1.28		0.22	0.12		1.66	0.01	0.11
Control Delay	250.0	32.1		40.8	163.2		61.7	20.0		330.5	15.5	3.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	250.0	32.1		40.8	163.2		61.7	20.0		330.5	15.5	3.7
LOS	F	C		D	F		E	C		F	B	A
Approach Delay		105.0			160.8			36.1			302.8	

26: Ave 12 & GS Blvd
2030 No Project AM

10/22/2008

Lane Group												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	~211	117		15	~523		13	2		~1234	4	0
Queue Length 95th (ft)	#366	183		m26	m#643		38	30		#1490	15	28
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	148	1083		82	826		79	228		661	941	843
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.39	0.38		0.26	1.28		0.22	0.12		1.66	0.01	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 17 (14%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.66
 Intersection Signal Delay: 205.2
 Intersection Capacity Utilization 111.6%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H



















- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 No Project AM.

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950		0.850		
Satd. Flow (prot)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						786			69			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	198	1192	0	0	598	896	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	215	1296	0	0	650	974	432	0	283	0	0	0
Lane Group Flow (vph)	215	1296	0	0	650	974	0	432	283	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	23.0	79.0	0.0	0.0	56.0	56.0	41.0	41.0	41.0	0.0	0.0	0.0
Total Split (%)	19.2%	65.8%	0.0%	0.0%	46.7%	46.7%	34.2%	34.2%	34.2%	0.0%	0.0%	0.0%
Maximum Green (s)	18.5	74.5			51.5	51.5	36.5	36.5	36.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	19.0	76.9			53.9	53.9		35.1	35.1			
Actuated g/C Ratio	0.16	0.64			0.45	0.45		0.29	0.29			
v/c Ratio	0.82	0.61			0.42	0.87		0.93	0.61			
Control Delay	41.8	2.9			24.0	15.9		68.2	32.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	41.8	2.9			24.0	15.9		68.2	32.9			
LOS	D	A			C	B		E	C			
Approach Delay		8.5			19.1			54.2				

27: Ave 12 & SR 99 NB Ramps
2030 No Project AM

10/22/2008

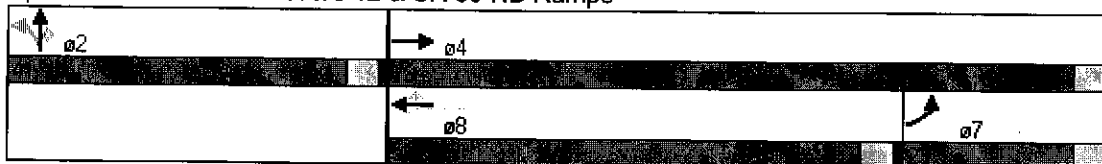
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	175	31			182	134		317	139			
Queue Length 95th (ft)	m123	m20			234	#560		#501	234			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	262	2123			1531	1118		492	488			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.82	0.61			0.42	0.87		0.88	0.58			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 96 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 21.5
 Intersection Capacity Utilization 98.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service F

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps









1: Ave 18.5 & SR 99 NB ramps
2030 No Project PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	447	135	0	0	215	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	486	147	0	0	234	28	277	0	91	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	262			147			1366	1380	147	1458	1366	248
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			147			1366	1380	147	1458	1366	248
tC, single (s)	4.3			4.2			7.3	6.7	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.7	4.2	3.5	3.5	4.0	3.3
p0 queue free %	59			100			0	100	89	100	100	100
cM capacity (veh/h)	1190			1365			77	78	855	66	88	796
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2							
Volume Total	486	147	262	277	91							
Volume Left	486	0	0	277	0							
Volume Right	0	0	28	0	91							
cSH	1190	1700	1700	77	855							
Volume to Capacity	0.41	0.09	0.15	3.58	0.11							
Queue Length 95th (ft)	51	0	0	Err	9							
Control Delay (s)	10.1	0.0	0.0	Err	9.7							
Lane LOS	B			F	A							
Approach Delay (s)	7.8		0.0	7523.8								
Approach LOS				F								
Intersection Summary												
Average Delay			2198.9									
Intersection Capacity Utilization			61.8%			ICU Level of Service			B			
Analysis Period (min)			15									












3: Ave 18.5 & Road 23
2030 No Project PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	813	343	0	137	389
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	884	373	0	149	423
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	373				1257	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	373				1257	373
tC, single (s)	4.3				6.8	6.6
tC, 2 stage (s)						
tF (s)	2.4				3.9	3.7
p0 queue free %	100				6	29
cM capacity (veh/h)	1093				158	597
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	884	373	572			
Volume Left	0	0	149			
Volume Right	0	0	423			
cSH	1700	1700	346			
Volume to Capacity	0.52	0.22	1.65			
Queue Length 95th (ft)	0	0	860			
Control Delay (s)	0.0	0.0	332.3			
Lane LOS			F			
Approach Delay (s)	0.0	0.0	332.3			
Approach LOS			F			
Intersection Summary						
Average Delay			103.9			
Intersection Capacity Utilization			81.0%	ICU Level of Service		D
Analysis Period (min)			15			

4: Ave 18.5 & Pistacchio
2030 No Project PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	665	490	224	136	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	723	533	243	148	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	776				1384	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	776				1384	533
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	92				0	88
cM capacity (veh/h)	765				136	522
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	787	533	243	209		
Volume Left	64	0	0	148		
Volume Right	0	0	243	61		
cSH	765	1700	1700	173		
Volume to Capacity	0.08	0.31	0.14	1.20		
Queue Length 95th (ft)	7	0	0	283		
Control Delay (s)	2.2	0.0	0.0	187.5		
Lane LOS	A			F		
Approach Delay (s)	2.2	0.0		187.5		
Approach LOS				F		
Intersection Summary						
Average Delay			23.1			
Intersection Capacity Utilization			85.0%		ICU Level of Service	E
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
2030 No Project PM

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	18	97	64	361	74	109	125	102	15	47	96	354
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	105	70	392	80	118	136	111	16	51	104	385
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	199			175			1482	1079	80	1116	1163	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199			175			1482	1079	80	1116	1163	140
tC, single (s)	4.1			4.1			7.6	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.0	4.0	3.8	3.5	4.0	3.3
p0 queue free %	99			72			0	28	98	17	24	58
cM capacity (veh/h)	1373			1401			14	155	859	61	138	908
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	195	473	118	247	16	51	489					
Volume Left	20	392	0	136	0	51	0					
Volume Right	70	0	118	0	16	0	385					
cSH	1373	1401	1700	24	859	61	415					
Volume to Capacity	0.01	0.28	0.07	10.23	0.02	0.83	1.18					
Queue Length 95th (ft)	1	29	0	Err	1	95	474					
Control Delay (s)	0.9	7.5	0.0	Err	9.3	179.8	132.9					
Lane LOS	A	A		F	A	F	F					
Approach Delay (s)	0.9	6.0		9379.8		137.3						
Approach LOS				F		F						
Intersection Summary												
Average Delay		1601.6										
Intersection Capacity Utilization		71.8%			ICU Level of Service				C			
Analysis Period (min)		15										




















6: Ave 18 & Road 23
2030 No Project PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	12	6	2	12	50	5	525	2	33	523	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	13	7	2	13	54	5	571	2	36	568	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1285	1225	570	1237	1225	572	571			573		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1285	1225	570	1237	1225	572	571			573		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	99	92	99	98	92	89	99			96		
cM capacity (veh/h)	110	164	505	135	169	514	927			934		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	70	578	607								
Volume Left	1	2	5	36								
Volume Right	7	54	2	2								
cSH	202	349	927	934								
Volume to Capacity	0.10	0.20	0.01	0.04								
Queue Length 95th (ft)	8	18	0	3								
Control Delay (s)	24.8	17.9	0.2	1.0								
Lane LOS	C	C	A	A								
Approach Delay (s)	24.8	17.9	0.2	1.0								
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			60.1%		ICU Level of Service				B			
Analysis Period (min)			15									







7: Ave 17 & SR 99 NB ramps
2030 No Project PM

10/22/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Volume (veh/h)	385	1233	0	0	1994	256	1800	17	1413	0	0	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	418	1340	0	0	2167	278	1957	18	1536	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	2446			1340			4345	4623	1340	5890	4345	2167	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	2446			1340			4345	4623	1340	5890	4345	2167	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	0			100			0	0	0	0	0	100	
cM capacity (veh/h)	186			514			0	0	185	0	0	60	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2							
Volume Total	418	1340	2167	278	1975	1536							
Volume Left	418	0	0	0	1957	0							
Volume Right	0	0	0	278	0	1536							
cSH	186	1700	1700	1700	0	185							
Volume to Capacity	2.24	0.79	1.27	0.16	Err	8.32							
Queue Length 95th (ft)	842	0	0	0	Err	Err							
Control Delay (s)	617.2	0.0	0.0	0.0	Err	Err							
Lane LOS	F				F	F							
Approach Delay (s)	146.9		0.0		Err								
Approach LOS					F								
Intersection Summary													
Average Delay			Err										
Intersection Capacity Utilization		236.9%			ICU Level of Service			H					
Analysis Period (min)			15										
























9: Ave 17 & SR 99 SB off-ramp
2030 No Project PM

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	3165	2894	0	506	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3440	3146	0	550	209
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3146				6586	3146
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3146				6586	3146
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	100				0	0
cM capacity (veh/h)	98				0	14
Direction, Lane #	EB 1	WB 1	SB 1	SB 2		
Volume Total	3440	3146	550	209		
Volume Left	0	0	550	0		
Volume Right	0	0	0	209		
cSH	1700	1700	0	14		
Volume to Capacity	2.02	1.85	Err	15.05		
Queue Length 95th (ft)	0	0	Err	Err		
Control Delay (s)	0.0	0.0	Err	Err		
Lane LOS			F	F		
Approach Delay (s)	0.0	0.0	Err			
Approach LOS			F			
Intersection Summary						
Average Delay		1032.9				
Intersection Capacity Utilization		201.3%		ICU Level of Service		H
Analysis Period (min)		15				













10: Ave 17 & GS Blvd
2030 No Project PM

10/22/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Volume (veh/h)	13	1987	181	682	1897	506	174	48	741	437	38	9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	14	2160	197	741	2062	550	189	52	805	475	41	10	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	2612			2357			5763	6283	2160	6839	6204	2337	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	2612			2357			5763	6283	2160	6839	6204	2337	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.6	6.3	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.1	3.4	
p0 queue free %	91			0			0	0	0	0	0	77	
cM capacity (veh/h)	161			202			0	0	60	0	0	43	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1				
Volume Total	14	2160	197	741	2612	189	52	805	526				
Volume Left	14	0	0	741	0	189	0	0	475				
Volume Right	0	0	197	0	550	0	0	805	10				
cSH	161	1700	1700	202	1700	0	0	60	0				
Volume to Capacity	0.09	1.27	0.12	3.66	1.54	Err	Err	13.53	Err				
Queue Length 95th (ft)	7	0	0	Err	0	Err	Err	Err	Err				
Control Delay (s)	29.4	0.0	0.0	1245.7	0.0	Err	Err	Err	Err				
Lane LOS	D			F		F	F	F	F				
Approach Delay (s)	0.2			275.4		Err			Err				
Approach LOS						F			F				
Intersection Summary													
Average Delay			Err										
Intersection Capacity Utilization		187.2%			ICU Level of Service				H				
Analysis Period (min)		15											

11: Ave 17 & Road 23
2030 No Project PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	772	315	107	730	59	122	392	125	9	224	277
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	839	342	116	793	64	133	426	136	10	243	301
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1634	1241	394	1935	1323	494	545				562	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1634	1241	394	1935	1323	494	545				562	
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2				4.2	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3				2.3	
p0 queue free %	0	0	48	0	0	89	86				99	
cM capacity (veh/h)	0	150	655	0	130	565	971				952	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1208	974	695	554								
Volume Left	26	116	133	10								
Volume Right	342	64	136	301								
cSH	0	0	971	952								
Volume to Capacity	Err	Err	0.14	0.01								
Queue Length 95th (ft)	Err	Err	12	1								
Control Delay (s)	Err	Err	3.3	0.3								
Lane LOS	F	F	A	A								
Approach Delay (s)	Err	Err	3.3	0.3								
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			173.8%		ICU Level of Service				H			
Analysis Period (min)			15									

12: Ellis OC & Road 26
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850				0.850		0.969		0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.752			0.705		0.950			0.950		
Satd. Flow (perm)	0	1401	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			34			127		50			7	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	117	27	780	207	186	874	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	127	29	848	225	202	950	45
Lane Group Flow (vph)	0	41	34	0	242	127	29	1073	0	202	995	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	27.9	27.9	27.9	27.9	27.9	27.9	15.9	26.2	0.0	15.9	26.2	0.0
Total Split (%)	39.9%	39.9%	39.9%	39.9%	39.9%	39.9%	22.7%	37.4%	0.0%	22.7%	37.4%	0.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	11.0	21.3		11.0	21.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)		16.7	16.7		16.7	16.7	7.5	22.5		10.9	32.8	
Actuated g/C Ratio		0.27	0.27		0.27	0.27	0.11	0.36		0.17	0.53	
v/c Ratio		0.11	0.08		0.69	0.25	0.15	0.85		0.65	0.54	
Control Delay		17.2	6.7		30.9	5.0	29.6	27.5		36.7	14.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.2	6.7		30.9	5.0	29.6	27.5		36.7	14.2	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.5			22.0			27.6			18.0	
Approach LOS		B			C			C			B	

12: Ellis OC & Road 26
 2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		12	0		83	0	10	191		72	98	
Queue Length 95th (ft)		32	17		151	32	34	#357		#167	268	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		485	570		454	631	289	1269		336	1856	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.08	0.06		0.53	0.20	0.10	0.85		0.60	0.54	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 62.3
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 22.2
 Intersection Capacity Utilization 67.4%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850	0.950	0.868				
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						217		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	781	449	0	0	378	200	276	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	849	488	0	0	411	217	300	18	130	0	0	0
Lane Group Flow (vph)	849	488	0	0	411	217	300	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.63	0.21			0.58	0.44	0.37	0.31				
Control Delay	13.5	1.3			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.5	1.3			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.8			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	153	6			85	0	55	6				
Queue Length 95th (ft)	236	15			118	48	89	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	559	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.63	0.21			0.46	0.39	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 53.0%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB ramps
2030 No Project PM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘↘	↙↙
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Fit						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Fit Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						356
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1003	572	0	227	704
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1090	622	0	247	765
Lane Group Flow (vph)	0	1090	622	0	247	765
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.8	37.8	0.0	32.2	32.2
Total Split (%)	0.0%	54.0%	54.0%	0.0%	46.0%	46.0%
Maximum Green (s)		32.9	32.9		27.7	27.7
Yellow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.8	33.8		28.2	28.2
Actuated g/C Ratio		0.48	0.48		0.40	0.40
v/c Ratio		0.64	0.36		0.18	0.57
Control Delay		15.7	1.1		13.9	10.2
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		15.7	1.1		13.9	10.2
LOS		B	A		B	B
Approach Delay		15.7	1.1		11.1	
Approach LOS		B	A		B	

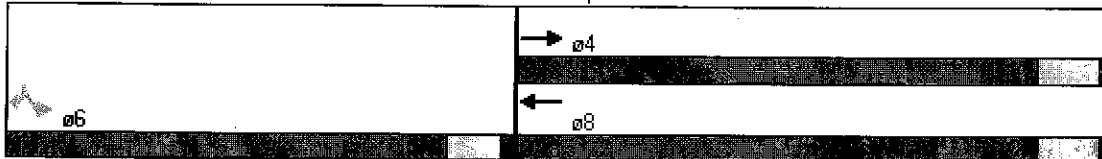
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		173	0		34	68
Queue Length 95th (ft)		235	6		56	123
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1709	1709		1383	1335
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.64	0.36		0.18	0.57

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 10.6
 Intersection Capacity Utilization 53.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps



17: Ellis OC & Aviation Drive
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt		0.927			0.902				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		131			251				45		74	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			1080			1293		1356		
Travel Time (s)		18.2			18.4			22.0		23.1		
Volume (vph)	53	170	161	799	121	231	382	602	58	175	590	1004
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	185	175	868	132	251	415	654	63	190	641	1091
Lane Group Flow (vph)	58	360	0	868	383	0	415	654	63	190	1732	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6			2
Detector Phases	7	4		3	8		1	6	6	5		2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0		4.0
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9		20.9
Total Split (s)	16.5	24.0	0.0	34.0	41.5	0.0	21.0	68.9	68.9	23.1	71.0	0.0
Total Split (%)	11.0%	16.0%	0.0%	22.7%	27.7%	0.0%	14.0%	45.9%	45.9%	15.4%	47.3%	0.0%
Maximum Green (s)	12.0	19.1		29.5	36.6		16.5	64.0	64.0	18.2	66.1	
Yellow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	10.3	16.2		30.0	38.3		17.0	64.9	64.9	19.1	67.0	
Actuated g/C Ratio	0.07	0.11		0.21	0.26		0.12	0.44	0.44	0.13	0.46	
v/c Ratio	0.48	0.75		2.39	0.38		2.01	0.83	0.09	0.82	2.26	
Control Delay	78.7	49.9		658.0	16.4		505.1	47.2	10.0	89.4	594.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	78.7	49.9		658.0	16.4		505.1	47.2	10.0	89.4	594.3	
LOS	E	D		F	B		F	D	B	F	F	
Approach Delay		53.9			461.6			213.0		544.3		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	54	113		~1363	52		~620	547	10	180	~2665	
Queue Length 95th (ft)	104	171		#1659	102		#853	#771	40	#321	#3002	
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	147	551		363	1032		206	786	728	231	765	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.39	0.65		2.39	0.37		2.01	0.83	0.09	0.82	2.26	

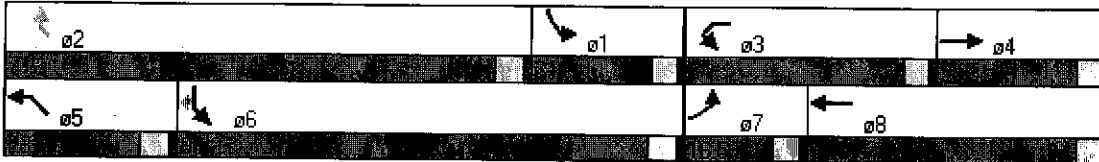
Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 146.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 2.39
 Intersection Signal Delay: 399.6
 Intersection Capacity Utilization 122.8%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						689			15			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	294	1642	0	0	1458	763	522	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	320	1785	0	0	1585	829	567	7	807	0	0	0
Lane Group Flow (vph)	320	1785	0	0	1585	829	284	290	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	20.6	52.5	0.0	0.0	31.9	31.9	32.5	32.5	32.5	0.0	0.0	0.0
Total Split (%)	24.2%	61.8%	0.0%	0.0%	37.5%	37.5%	38.2%	38.2%	38.2%	0.0%	0.0%	0.0%
Maximum Green (s)	16.0	47.9			27.3	27.3	28.0	28.0	28.0			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effect Green (s)	16.6	48.5			27.9	27.9	28.5	28.5	28.5			
Actuated g/C Ratio	0.20	0.57			0.33	0.33	0.34	0.34	0.34			
v/c Ratio	0.94	0.89			1.36	0.84	0.50	0.51	1.49			
Control Delay	37.3	18.3			196.5	14.6	26.4	26.6	256.5			
Queue Delay	0.0	189.8			155.3	0.0	0.0	0.0	0.0			
Total Delay	37.3	208.1			351.8	14.6	26.4	26.6	256.5			
LOS	D	F			F	B	C	C	F			
Approach Delay		182.1			236.0			160.9				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 No Project PM

10/22/2008

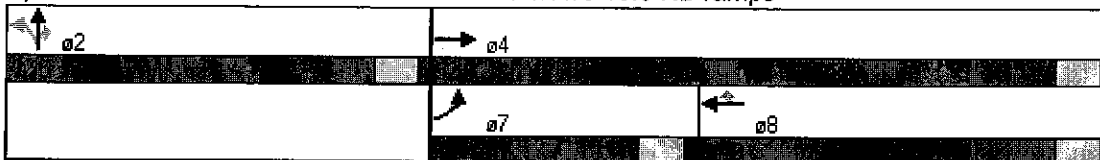
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F				
Queue Length 50th (ft)	174	523			~594	55	126	129	~606			
Queue Length 95th (ft)	m138	m344			#728	#327	205	209	#828			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	342	2000			1162	982	564	565	541			
Starvation Cap Reductn	0	746			0	0	0	0	0			
Spillback Cap Reductn	0	0			235	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.94	1.42			1.71	0.84	0.50	0.51	1.49			

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.49
 Intersection Signal Delay: 199.2
 Intersection Capacity Utilization 178.7%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected			0.850									0.850
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			716									13
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1197	702	290	1690	0	0	0	0	739	9	311
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1301	763	315	1837	0	0	0	0	803	10	338
Lane Group Flow (vph)	0	1301	763	315	1837	0	0	0	0	0	813	338
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	31.9	31.9	20.6	52.5	0.0	0.0	0.0	0.0	32.5	32.5	32.5
Total Split (%)	0.0%	37.5%	37.5%	24.2%	61.8%	0.0%	0.0%	0.0%	0.0%	38.2%	38.2%	38.2%
Maximum Green (s)		27.3	27.3	16.0	47.9					28.0	28.0	28.0
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		28.0	28.0	16.5	48.5						28.5	28.5
Actuated g/C Ratio		0.33	0.33	0.19	0.57						0.34	0.34
v/c Ratio		1.12	0.76	0.92	0.91						1.43	0.66
Control Delay		93.2	8.6	33.0	11.2						231.6	30.3
Queue Delay		45.7	0.0	0.0	22.6						314.6	0.0
Total Delay		138.9	8.6	33.0	33.8						546.2	30.3
LOS		F	A	C	C						F	C
Approach Delay		90.7			33.7						394.7	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			C						F	
Queue Length 50th (ft)		~426	17	125	549						~596	146
Queue Length 95th (ft)		#555	137	m109	m358						#813	241
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1166	1002	346	2019						567	515
Starvation Cap Reductn		0	0	0	258						0	0
Spillback Cap Reductn		100	0	0	0						186	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		1.22	0.76	0.91	1.04						2.13	0.66

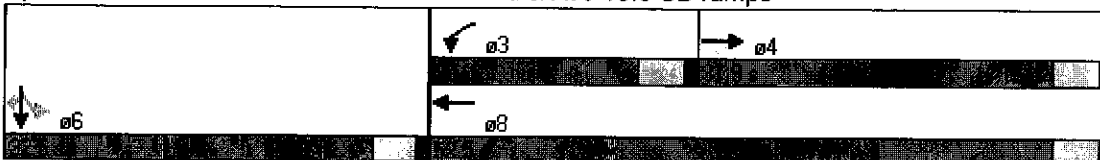
Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 35.5 (42%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.43
 Intersection Signal Delay: 133.0
 Intersection Capacity Utilization 178.7%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H













~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
2030 No Project PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	56	1	51	0	455	92	53	471	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	61	1	55	0	495	100	58	512	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1228	1222	512	1173	1172	545	512			595		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1228	1222	512	1173	1172	545	512			595		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	100	61	99	90	100			94		
cM capacity (veh/h)	132	168	562	157	178	533	1014			917		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	117	595	570								
Volume Left	0	61	0	58								
Volume Right	1	55	100	0								
cSH	259	236	1014	917								
Volume to Capacity	0.01	0.50	0.00	0.06								
Queue Length 95th (ft)	1	63	0	5								
Control Delay (s)	19.0	34.4	0.0	1.7								
Lane LOS	C	D		A								
Approach Delay (s)	19.0	34.4	0.0	1.7								
Approach LOS	C	D										
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization		80.2%		ICU Level of Service					D			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 No Project PM

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.959							0.853
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3394	0	0	0	0	1770	1589	0
Flt Permitted	0.190									0.950		
Satd. Flow (perm)	680	3505	0	0	3394	0	0	0	0	1770	1589	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					131						168	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	1172	806	0	0	835	316	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1274	876	0	0	908	343	0	0	0	397	3	168
Lane Group Flow (vph)	1274	876	0	0	1251	0	0	0	0	397	171	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	94.0	94.0	0.0	0.0	94.0	0.0	0.0	0.0	0.0	26.0	26.0	0.0
Total Split (%)	78.3%	78.3%	0.0%	0.0%	78.3%	0.0%	0.0%	0.0%	0.0%	21.7%	21.7%	0.0%
Maximum Green (s)	89.4	89.4			89.4					21.5	21.5	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	90.0	90.0			90.0					22.0	22.0	
Actuated g/C Ratio	0.75	0.75			0.75					0.18	0.18	
v/c Ratio	2.50	0.33			0.49					1.22	0.40	
Control Delay	693.1	6.5			5.9					166.0	9.6	
Queue Delay	0.0	0.6			0.0					0.0	0.0	
Total Delay	693.1	7.1			5.9					166.0	9.6	
LOS	F	A			A					F	A	
Approach Delay		413.6			5.9						118.9	

21: SR 145/Madera & SR 99 NB ramps
 2030 No Project PM

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		F			A						F	
Queue Length 50th (ft)	~837	92			151					~378	2	
Queue Length 95th (ft) m#567		m68			188					#575	62	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	510	2629			2578					325	429	
Starvation Cap Reductn	0	1245			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	2.50	0.63			0.49					1.22	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 90 (75%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.50
 Intersection Signal Delay: 242.9
 Intersection Capacity Utilization 96.8%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖↗	↕↖			↕↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.998				0.850
Flt Protected		0.971					0.950				0.984	
Satd. Flow (prot)	0	1774	1553	0	0	0	3433	3532	0	0	3449	1568
Flt Permitted		0.971					0.950				0.984	
Satd. Flow (perm)	0	1774	1553	0	0	0	3433	3532	0	0	3449	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			667					1				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	540	358	1120	0	0	0	343	1434	24	214	459	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	587	389	1217	0	0	0	373	1559	26	233	499	573
Lane Group Flow (vph)	0	976	1217	0	0	0	373	1585	0	0	732	573
Turn Type	Perm		Perm				Split			Split		Perm
Protected Phases		4					2	2		6	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	50.0	50.0	50.0	0.0	0.0	0.0	45.0	45.0	0.0	25.0	25.0	25.0
Total Split (%)	41.7%	41.7%	41.7%	0.0%	0.0%	0.0%	37.5%	37.5%	0.0%	20.8%	20.8%	20.8%
Maximum Green (s)	45.5	45.5	45.5				40.4	40.4		20.4	20.4	20.4
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				C-Max	C-Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)		46.0	46.0				41.0	41.0			21.0	21.0
Actuated g/C Ratio		0.38	0.38				0.34	0.34			0.18	0.18
v/c Ratio		1.44	1.21				0.32	1.31			1.21	0.77
Control Delay		230.3	117.4				30.1	180.7			149.3	11.9
Queue Delay		342.9	102.6				0.0	0.0			0.0	106.9
Total Delay		573.3	219.9				30.1	180.7			149.3	118.8
LOS		F	F				C	F			F	F
Approach Delay		377.2						152.0			135.9	

22: AVe 14/Olive & SR 145/Madera
 2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F						F			F	
Queue Length 50th (ft)		~1016	~1005				109	~837			~358	57
Queue Length 95th (ft)		m#1032	m#1026				150	#980			m#411	m77
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)		680	1007				1173	1207			604	747
Starvation Cap Reductn		236	161				0	0			0	0
Spillback Cap Reductn		0	0				0	0			0	281
Storage Cap Reductn		0	0				0	0			0	0
Reduced v/c Ratio		2.20	1.44				0.32	1.31			1.21	1.23

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 23 (19%), Referenced to phase 2:NBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.44
 Intersection Signal Delay: 238.7
 Intersection Capacity Utilization 118.0%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H







~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

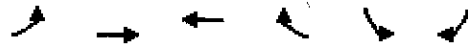
Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
2030 No Project PM

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1671	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1671	1495
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						28
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1107	870	0	911	383
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1203	946	0	990	416
Lane Group Flow (vph)	0	1203	946	0	990	416
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	46.0	46.0	0.0	74.0	74.0
Total Split (%)	0.0%	38.3%	38.3%	0.0%	61.7%	61.7%
Maximum Green (s)		41.5	41.5		69.5	69.5
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		42.0	42.0		70.0	70.0
Actuated g/C Ratio		0.35	0.35		0.58	0.58
v/c Ratio		0.97	0.76		1.02	0.47
Control Delay		58.2	29.9		58.5	15.4
Queue Delay		96.0	164.0		148.3	0.0
Total Delay		154.2	193.9		206.8	15.4
LOS		F	F		F	B
Approach Delay		154.2	193.9		150.2	



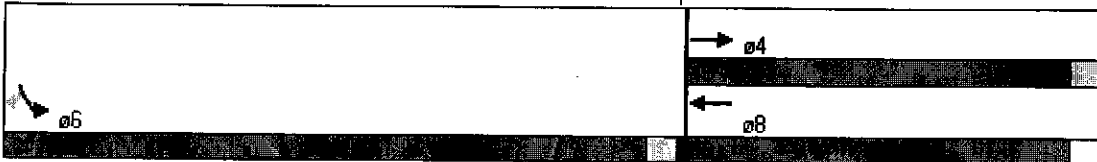
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		F	F		F	
Queue Length 50th (ft)		480	224		~772	163
Queue Length 95th (ft)		#631	286		#1062	244
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1239	1239		975	884
Starvation Cap Reductn		0	544		0	0
Spillback Cap Reductn		258	0		251	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		1.23	1.36		1.37	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 163.2
 Intersection Capacity Utilization 87.7%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service E













~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2030 No Project PM

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	107	77	12	10	26	127	5	201	17	140	185	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	116	84	13	11	28	138	5	218	18	152	201	78
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	213	177	242	432								
Volume Left (vph)	116	11	5	152								
Volume Right (vph)	13	138	18	78								
Hadj (s)	0.12	-0.29	0.15	0.23								
Departure Headway (s)	6.5	6.2	6.2	5.9								
Degree Utilization, x	0.38	0.30	0.42	0.71								
Capacity (veh/h)	491	497	531	588								
Control Delay (s)	13.5	11.9	13.5	21.9								
Approach Delay (s)	13.5	11.9	13.5	21.9								
Approach LOS	B	B	B	C								
Intersection Summary												
Delay			16.6									
HCM Level of Service			C									
Intersection Capacity Utilization			67.5%		ICU Level of Service					C		
Analysis Period (min)			15									

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↓
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1346	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1463	153	124	633	241	208
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			408			
pX, platoon unblocked						
vC, conflicting volume	814	124			757	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	814	124			757	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	83			71	
cM capacity (veh/h)	245	919			845	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	1463	153	124	633	449	
Volume Left	1463	0	0	0	241	
Volume Right	0	153	0	633	0	
cSH	245	919	1700	1700	845	
Volume to Capacity	5.96	0.17	0.07	0.37	0.29	
Queue Length 95th (ft)	Err	15	0	0	29	
Control Delay (s)	Err	9.7	0.0	0.0	7.5	
Lane LOS	F	A			A	
Approach Delay (s)	9051.8		0.0		7.5	
Approach LOS	F					
Intersection Summary						
Average Delay		5186.1				
Intersection Capacity Utilization		110.2%		ICU Level of Service		H
Analysis Period (min)		15				

26: Ave 12 & GS Blvd
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.939			0.872				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3309	0	1687	3168	0	1752	1609	0	1719	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	3168	0	1752	1609	0	1719	1810	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			126			104				114
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1404	28	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1526	30	114
Lane Group Flow (vph)	261	446	0	21	1179	0	47	122	0	1526	30	114
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	15.0	35.6	0.0	9.9	30.5	0.0	12.8	20.5	0.0	54.0	61.7	61.7
Total Split (%)	12.5%	29.7%	0.0%	8.3%	25.4%	0.0%	10.7%	17.1%	0.0%	45.0%	51.4%	51.4%
Maximum Green (s)	10.4	31.0		5.3	25.9		8.3	16.0		49.5	57.2	57.2
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	11.0	37.5		5.9	26.5		8.0	16.5		50.0	60.5	60.5
Actuated g/C Ratio	0.09	0.31		0.05	0.22		0.07	0.14		0.42	0.50	0.50
v/c Ratio	1.71	0.43		0.25	1.48		0.40	0.39		2.13	0.03	0.14
Control Delay	377.2	34.8		42.3	246.8		63.8	16.3		536.4	16.6	3.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	377.2	34.8		42.3	246.8		63.8	16.3		536.4	16.6	3.5
LOS	F	C		D	F		E	B		F	B	A
Approach Delay		161.2			243.2			29.5			490.7	

26: Ave 12 & GS Blvd
2030 No Project PM

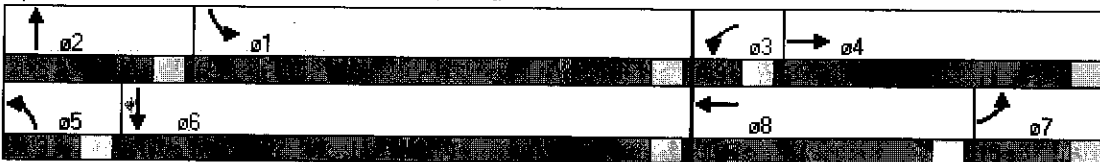
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			C			F	
Queue Length 50th (ft)	~297	134		17	~642		35	12		~1882	12	0
Queue Length 95th (ft)	#467	205		m27	m#693		76	69		#2147	29	31
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	153	1039		83	798		128	311		716	912	832
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.71	0.43		0.25	1.48		0.37	0.39		2.13	0.03	0.14

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 26 (22%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.13
 Intersection Signal Delay: 328.4 Intersection LOS: F
 Intersection Capacity Utilization 139.7% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.953				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						616			44			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	361	1555	0	0	714	1142	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	392	1690	0	0	776	1241	424	2	392	0	0	0
Lane Group Flow (vph)	392	1690	0	0	776	1241	0	426	392	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	27.0	89.0	0.0	0.0	62.0	62.0	31.0	31.0	31.0	0.0	0.0	0.0
Total Split (%)	22.5%	74.2%	0.0%	0.0%	51.7%	51.7%	25.8%	25.8%	25.8%	0.0%	0.0%	0.0%
Maximum Green (s)	22.5	84.5			57.5	57.5	26.5	26.5	26.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effect Green (s)	23.0	85.0			58.0	58.0		27.0	27.0			
Actuated g/C Ratio	0.19	0.71			0.48	0.48		0.22	0.22			
v/c Ratio	1.18	0.69			0.46	1.16		1.12	1.05			
Control Delay	120.4	1.8			21.8	100.0		125.2	100.0			
Queue Delay	0.0	0.4			0.0	0.0		0.0	0.0			
Total Delay	120.4	2.3			21.8	100.0		125.2	100.0			
LOS	F	A			C	F		F	F			
Approach Delay		24.5			69.9			113.1				

27: Ave 12 & SR 99 NB Ramps
2030 No Project PM

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			F				
Queue Length 50th (ft)	~375	32			204	~878		~380	~303			
Queue Length 95th (ft)	m201	m26			257	#1142		#581	#501			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	333	2459			1678	1069		381	374			
Starvation Cap Reductn	0	314			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	1.18	0.79			0.46	1.16		1.12	1.05			

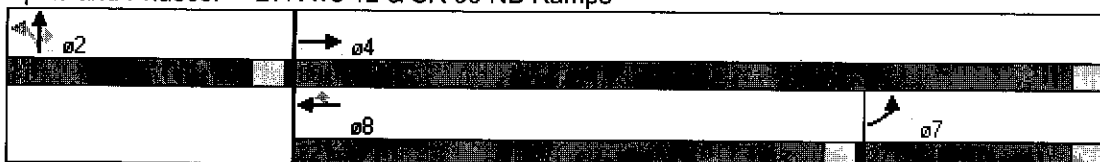
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 96 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 57.9
 Intersection Capacity Utilization 122.4%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 25

2030 NO PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A/B/C

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99-NB RAMPS

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

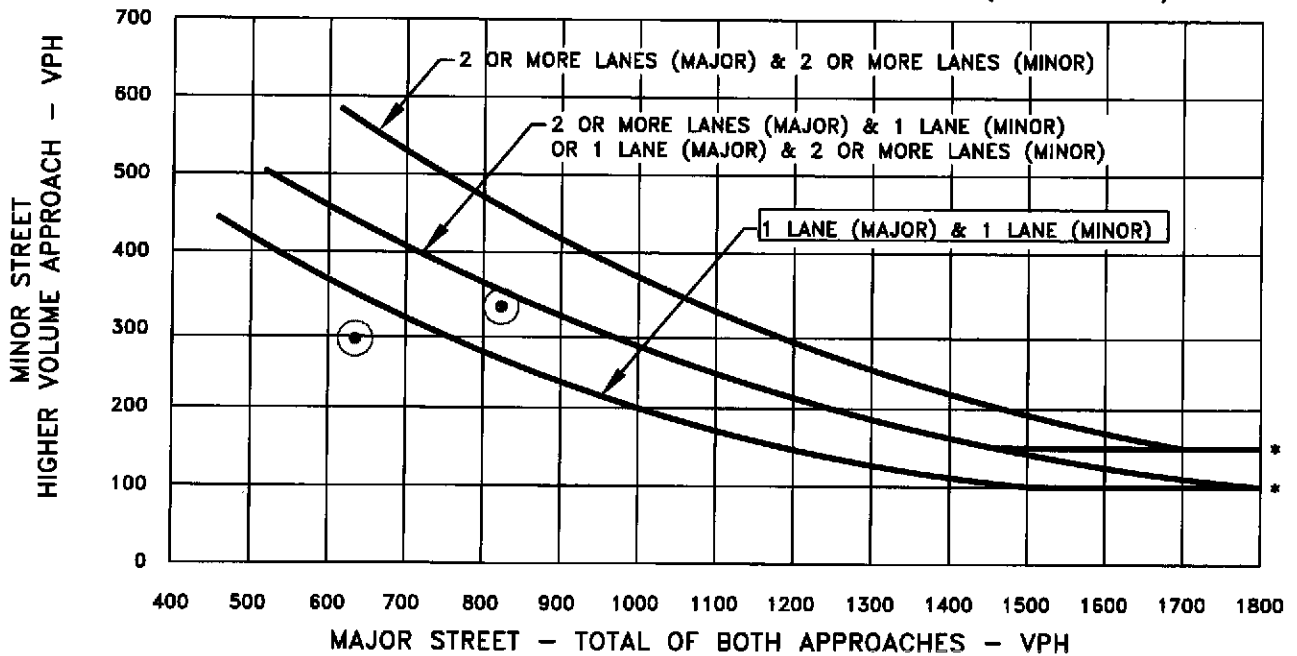
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		635	823	
Highest Approaches - Minor Street	✓		291	339	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB OFF RAMP/ ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

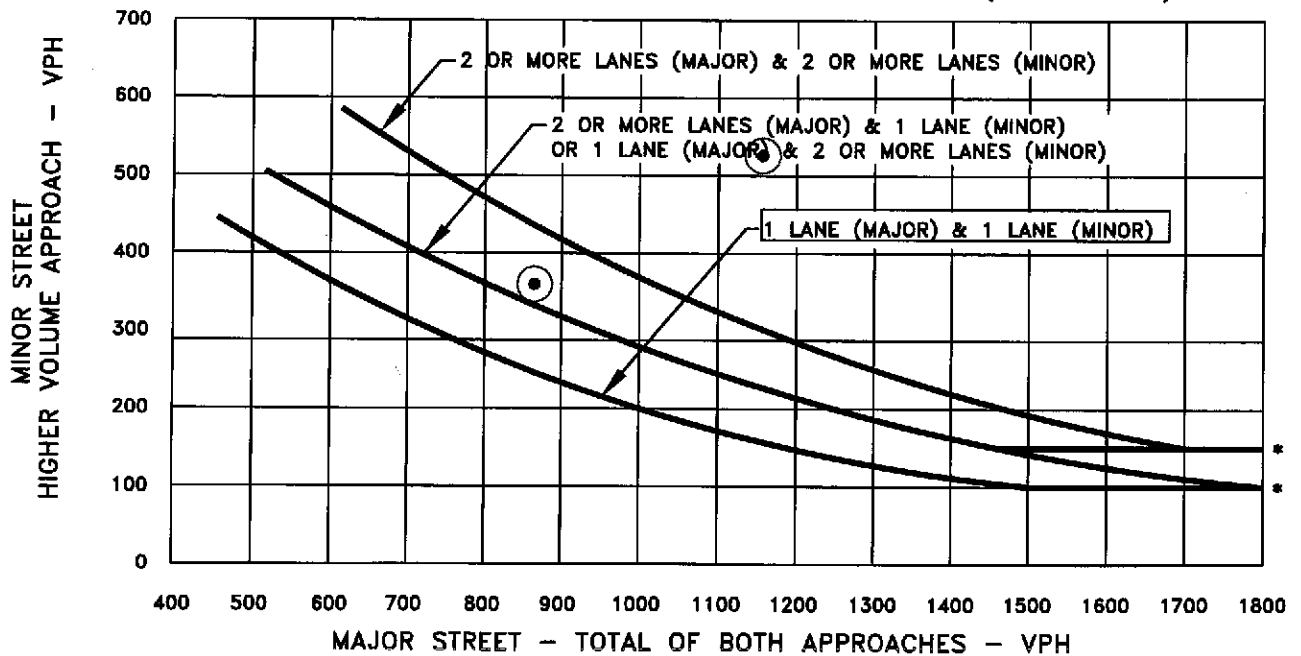
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	865	1156	
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	371	526	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

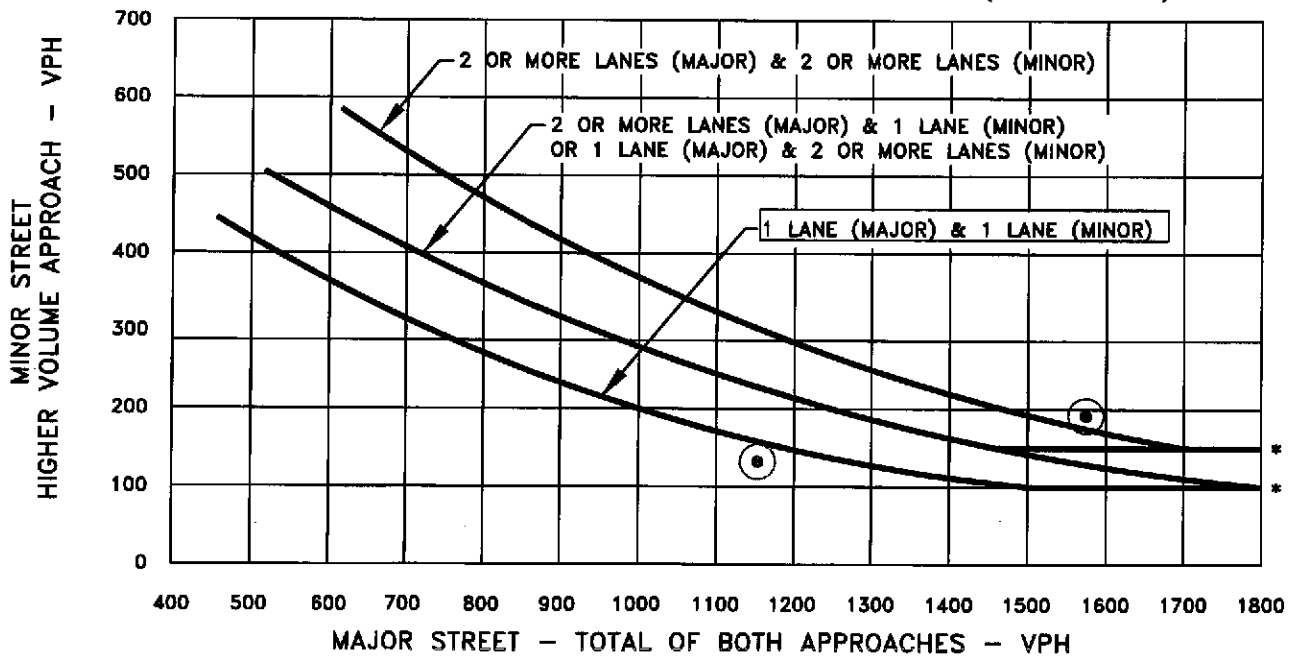
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1153	1574	
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	132	192	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

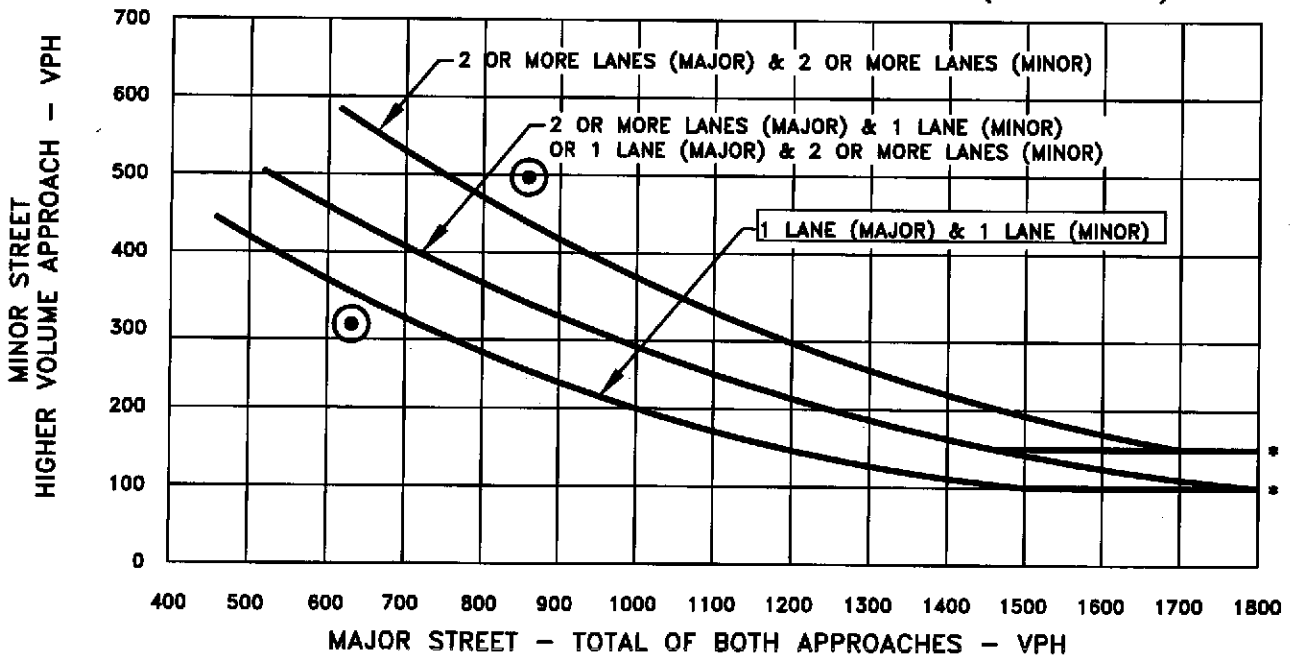
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour	
			AM	PM PEAK
Both Approaches - Major Street	✓		631	859
Highest Approaches - Minor Street	✓		319	497

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

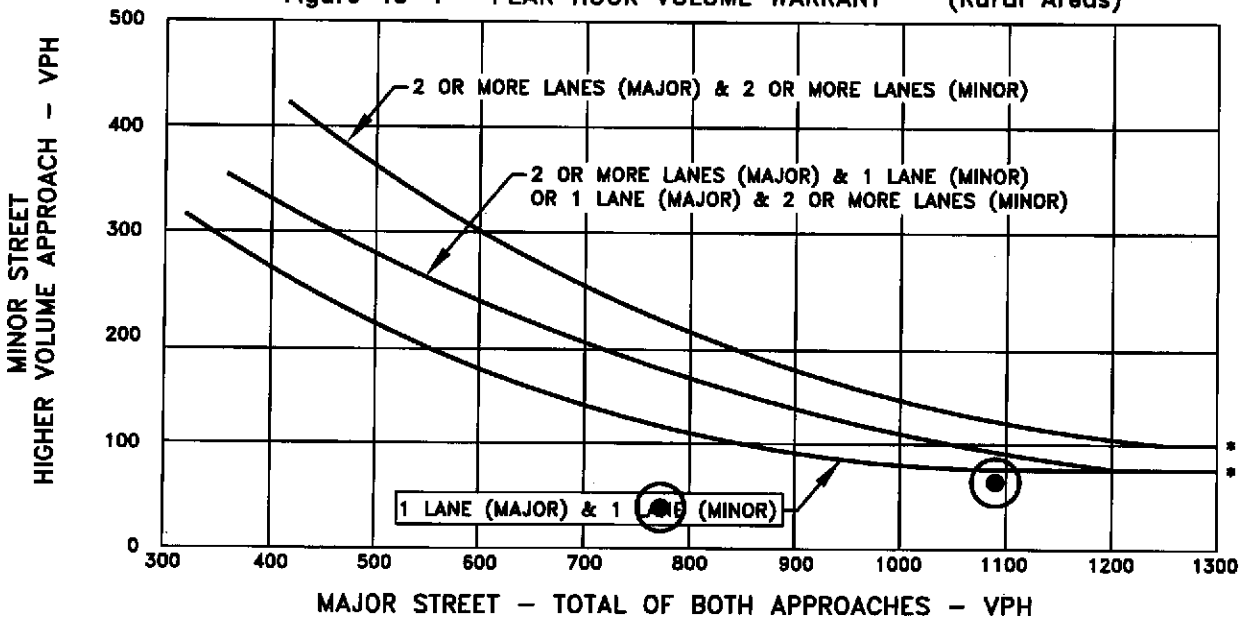
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
Both Approaches - Major Street	✓		773	1090			
Highest Approaches - Minor Street	✓		39	64			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 NB RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ----- or

RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

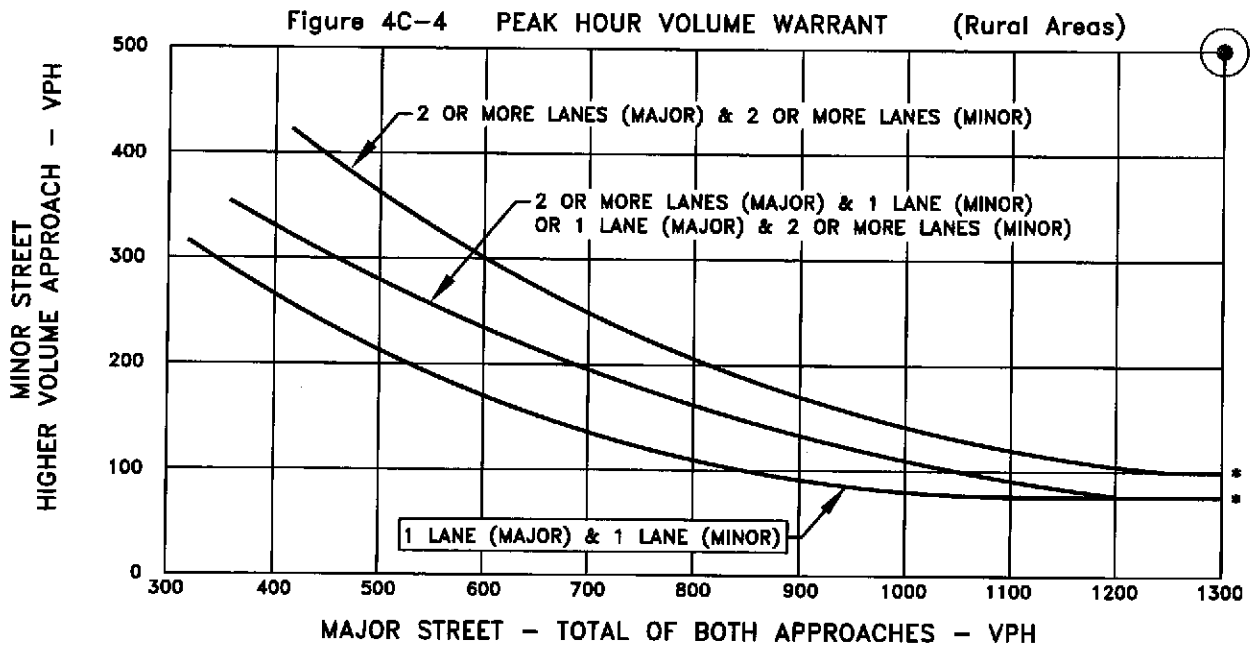
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		2096	3868		
Highest Approaches - Minor Street	✓		1561	3230		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: SR-99 SB OFF RAMP

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

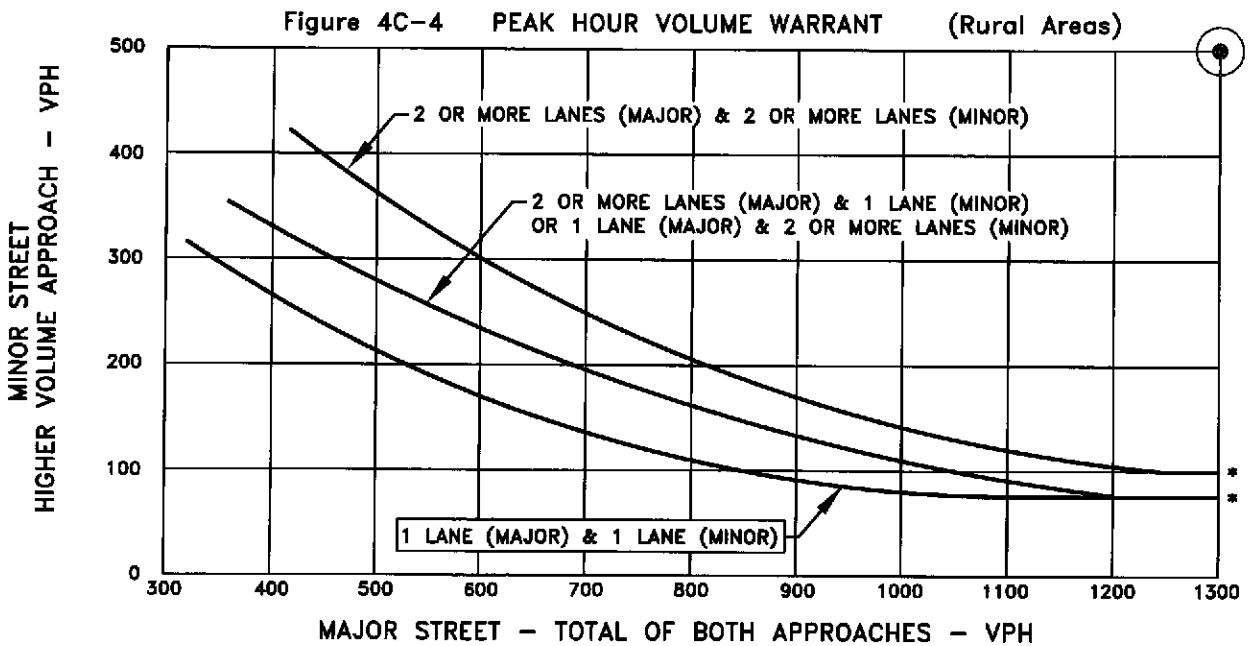
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		Hour		Hour	
			AM PEAK	PM PEAK				
Both Approaches - Major Street	✓		3318	6059				
Highest Approaches - Minor Street	✓		407	698				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: AIRPORT ROAD/ GOLDEN STATE

Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ----- or

RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

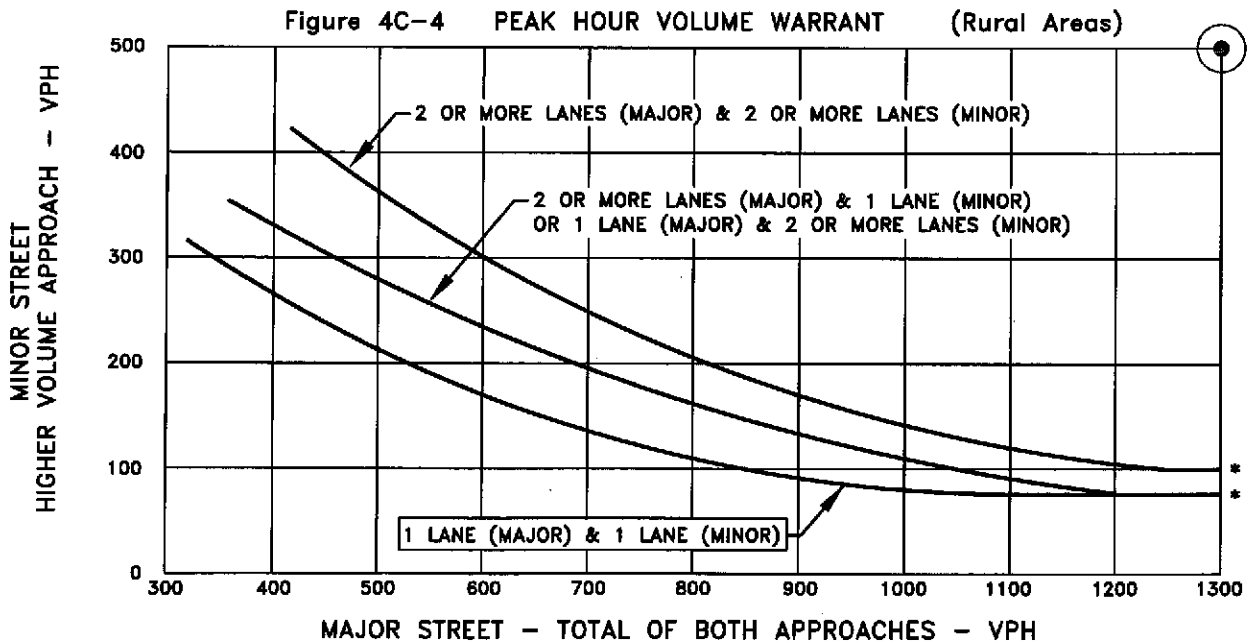
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		2797	5266		
Highest Approaches - Minor Street	✓		535	963		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 17

Critical Approach Speed 45 mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

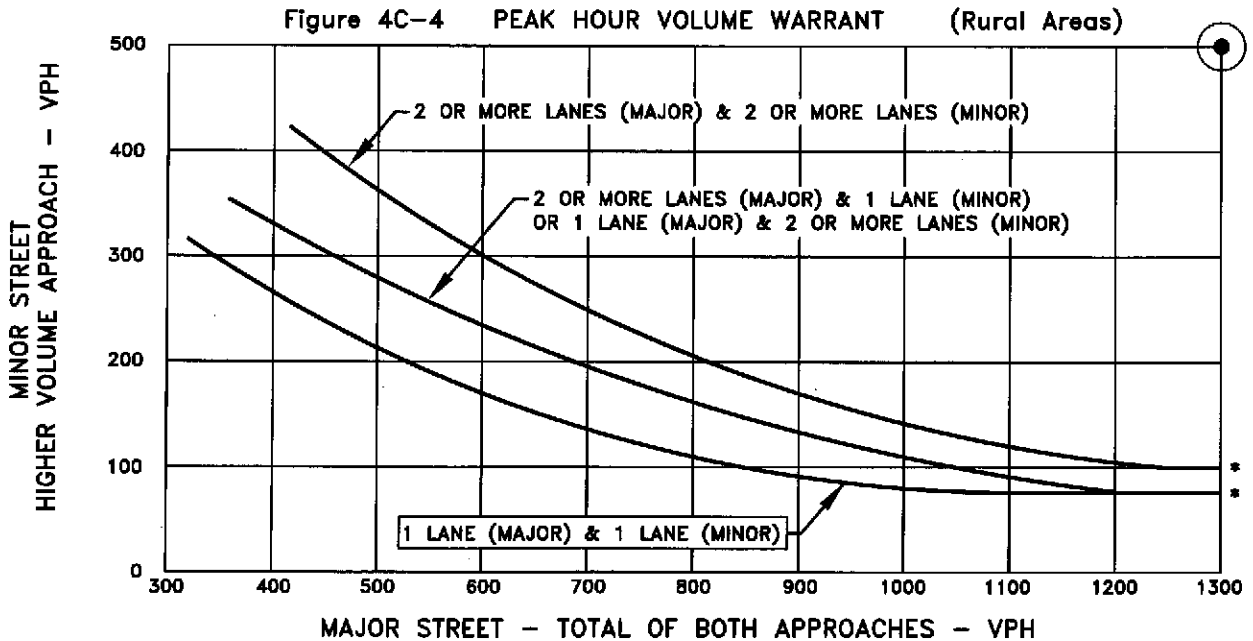
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		1312	2007				
Highest Approaches - Minor Street	✓		559	639				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

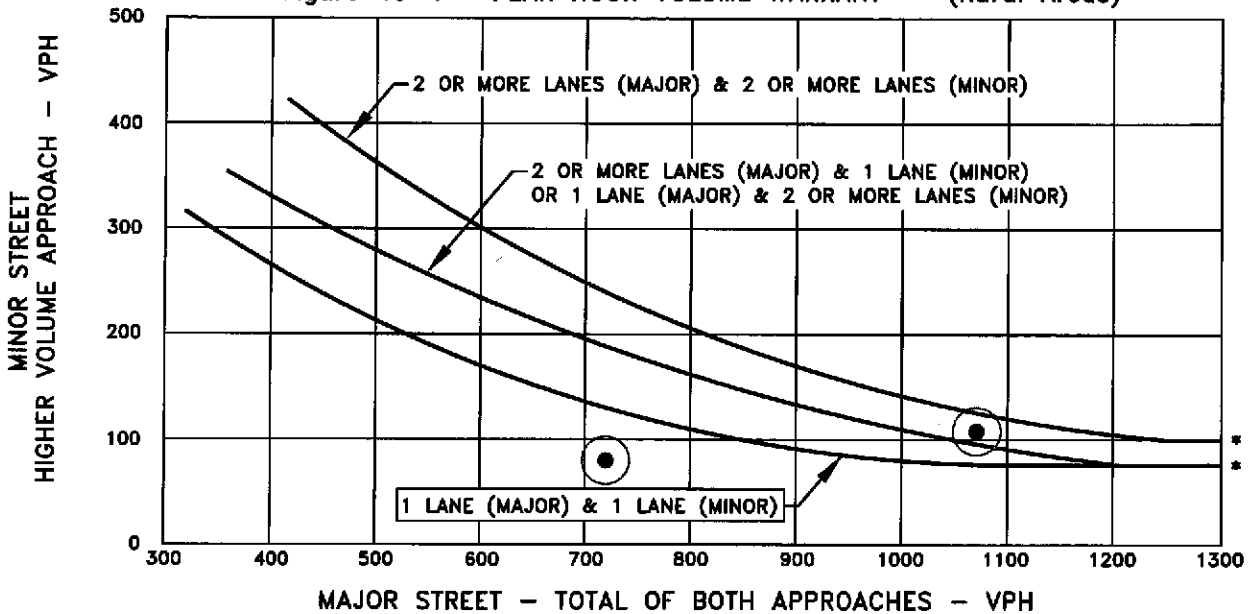
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	✓		720	1071			
Highest Approaches - Minor Street	✓		80	108			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 NO PROJECT

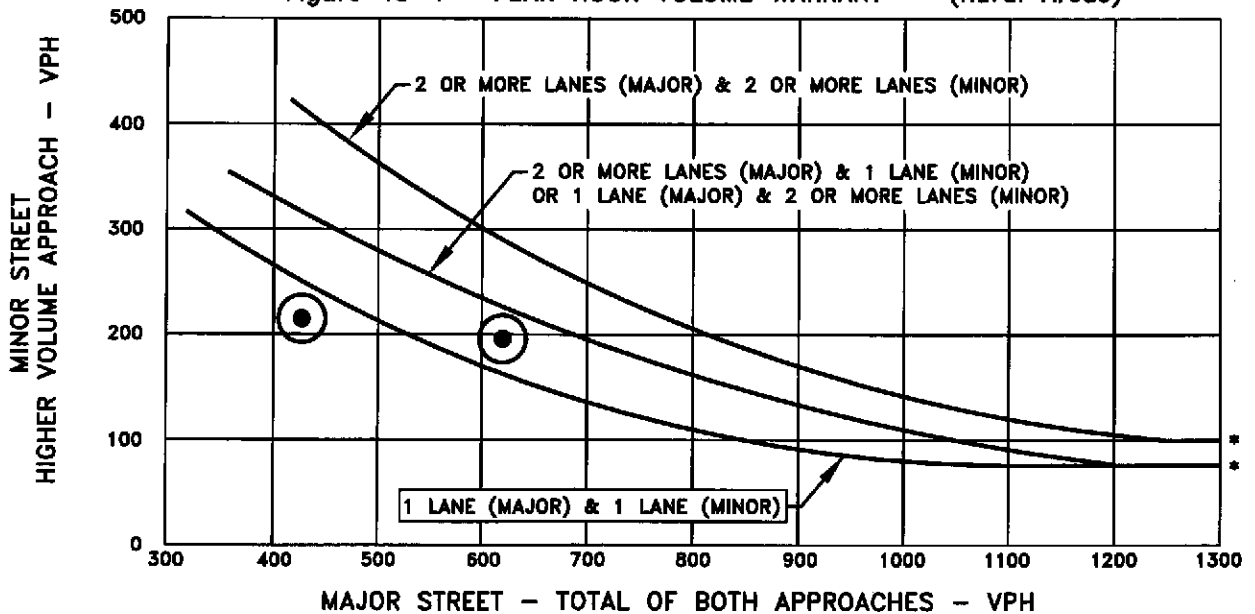
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		427	620		
Highest Approaches - Minor Street	✓		215	196		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 12

Critical Approach Speed 35 mph

MINOR STREET: SR 99 SB RAMPS/ GOLDEN STATE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

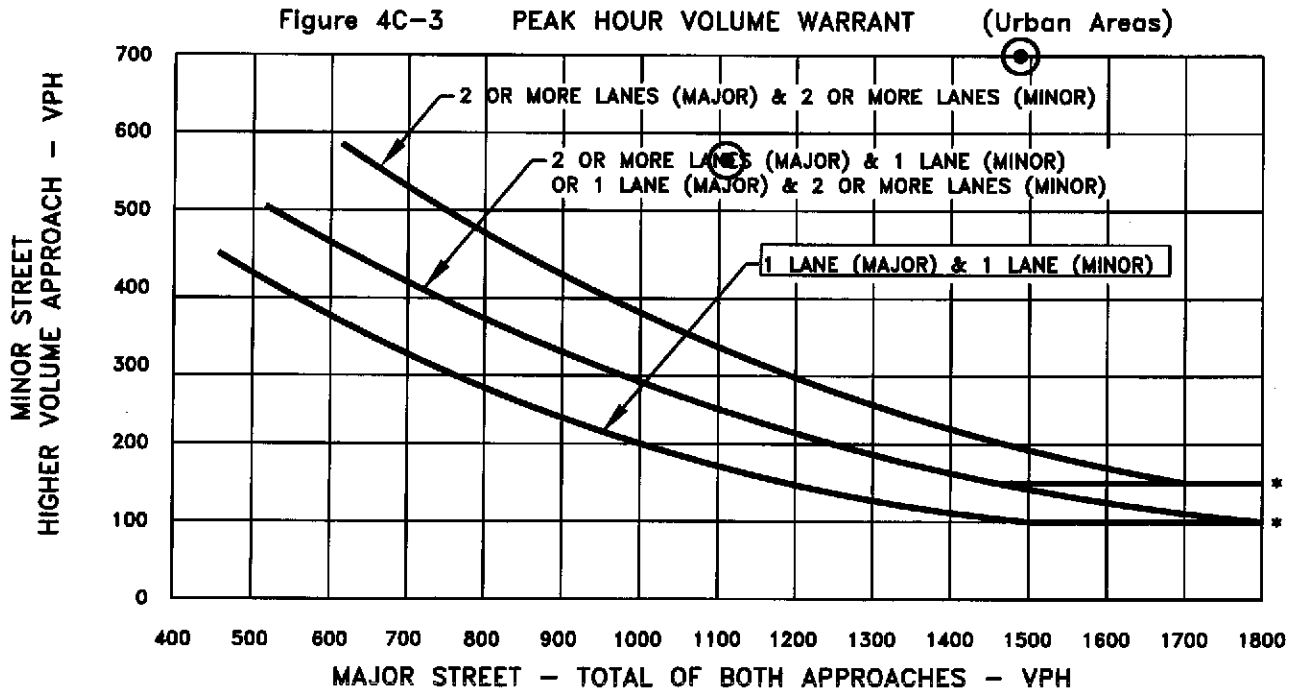
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		1109	1487	
Highest Approaches - Minor Street	✓		565	696	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

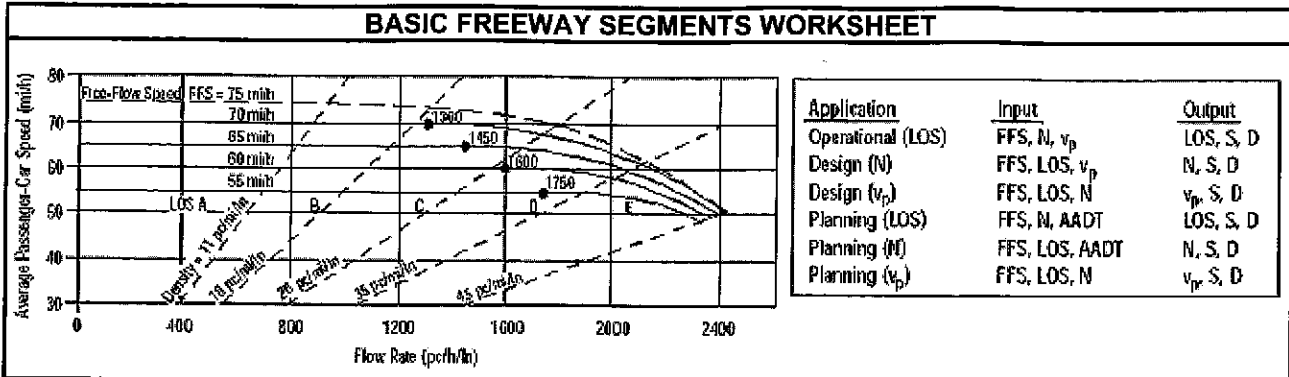
The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 26

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

FREEWAY LEVEL OF SERVICE CALCULATIONS



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4241	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

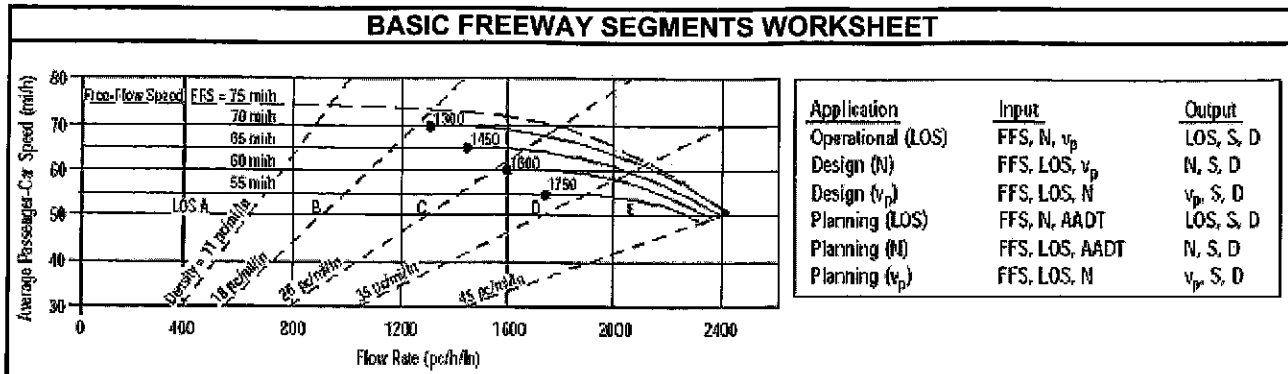
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (1 + P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1806 pc/h/ln	Design LOS	
S	67.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.6 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different density and speed conditions. Key points on the curves are labeled with flow rates: 1300, 1450, 1600, and 1750. Density curves are labeled as 21 pc/mi/ln, 18 pc/mi/ln, 15 pc/mi/ln, 12 pc/mi/ln, and 9 pc/mi/ln. Speed curves are labeled as 75 mi/h, 70 mi/h, 65 mi/h, 60 mi/h, and 55 mi/h. A horizontal line for LOS A is drawn at approximately 55 mi/h.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2030 Project Alt A PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper. (LOS)		<input checked="" type="checkbox"/> Des. (N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4943	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			% RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00		E_R																			
E_T	1.5		$f_{HV} = 1 / [P_T (E_T - 1) + P_R (E_R - 1)]$																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	2105	pc/h/ln	Design LOS																			
S	62.6	mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
$D = v_p / S$	33.6	pc/mi/ln	S																			
LOS	D		$D = v_p / S$																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A AM	Analysis Year	2030

Project Description 04-837.2 Northfork Casino Alt A

Oper. (LOS) Des. (N) Planning Data

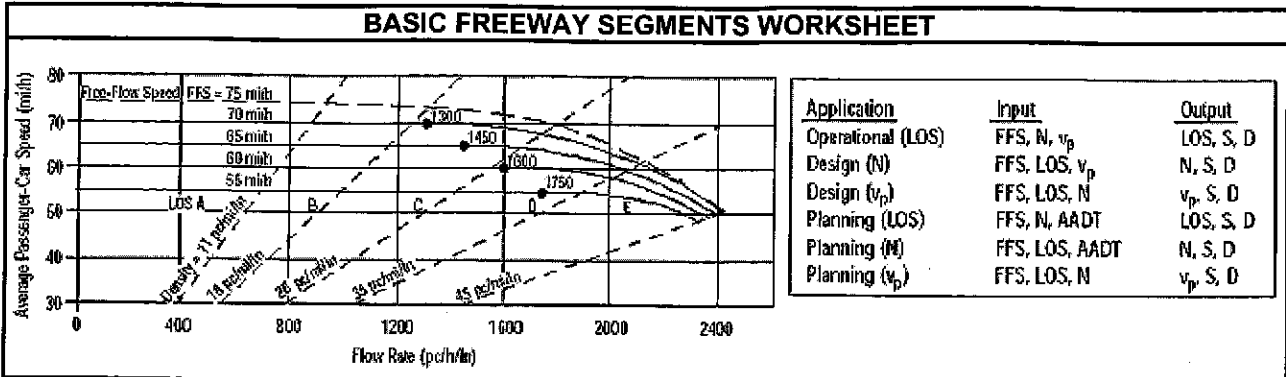
Flow Inputs			
Volume, V	3912	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV})	1666 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV})	pc/h
S	69.0 mi/h	f _p	
D = v _p / S	24.1 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

<input checked="" type="checkbox"/> Oper. (LOS)	<input type="checkbox"/> Des. (N)	<input type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	5502	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

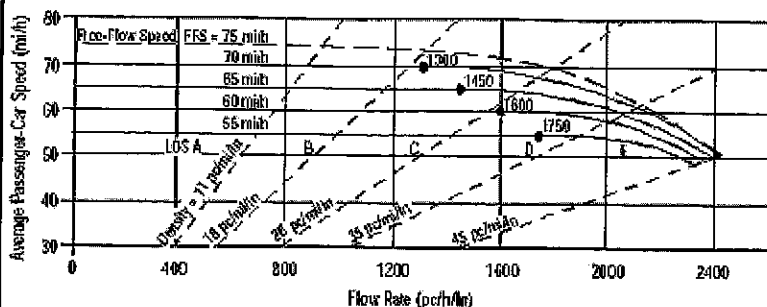
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV})	2343 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV})	pc/h
S	55.5 mi/h	f _p	
D = v _p / S	42.2 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

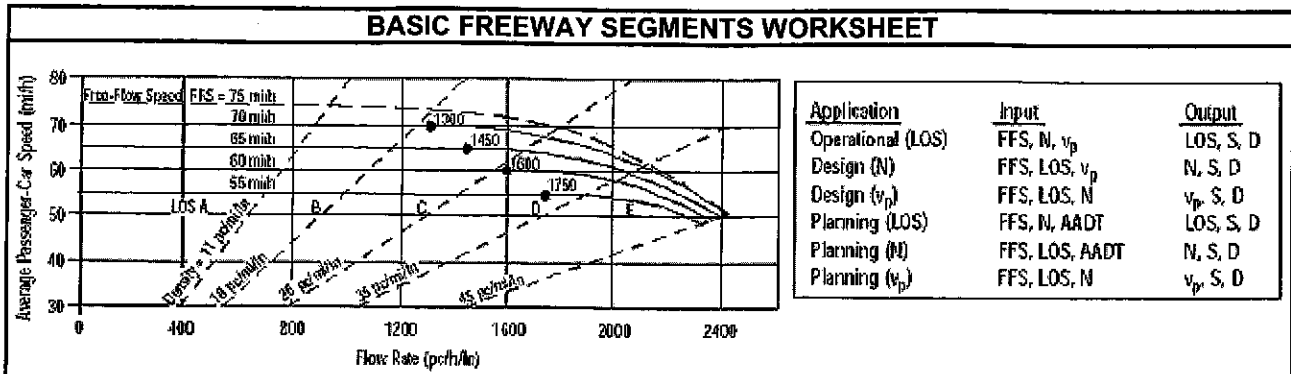
Flow Inputs			
Volume, V	4210	veh/h	Peak-Hour Factor, PHF
AAADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AAADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AAADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [1 + P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1792 pc/h/ln	Design LOS	
S	67.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.4 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs

Volume, V	4752	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

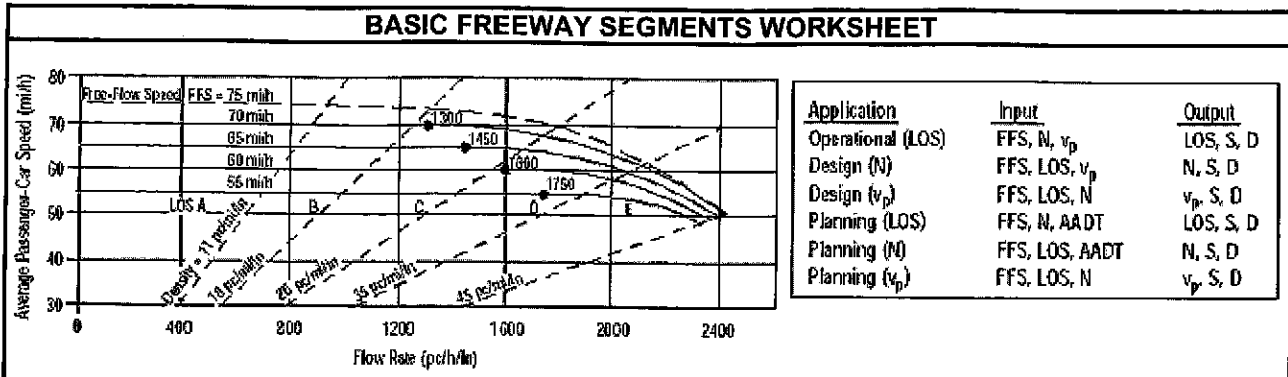
Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs	Calc Speed Adj and FFS		
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	Design LOS
f_p	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$
S	f_p
$D = v_p / S$	S
LOS	$D = v_p / S$
	Required Number of Lanes, N

Glossary	Factor Location		
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

<input checked="" type="checkbox"/> Oper.(LOS)	<input checked="" type="checkbox"/> Des.(N)	<input checked="" type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	3830	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

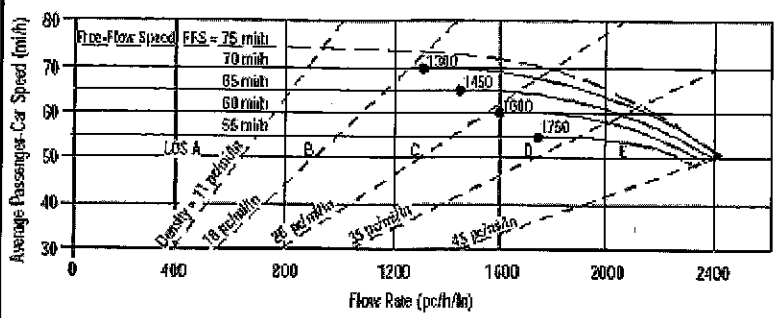
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T + (E _T - 1) * P _R * (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 /mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1631 pc/h/ln	Design LOS	
S	69.3 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	23.5 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper. (LOS) Des. (N) Planning Data

Flow Inputs				
Volume, V	5409	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	% Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			% RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length %
Driver type adjustment	1.00		Up/Down %	

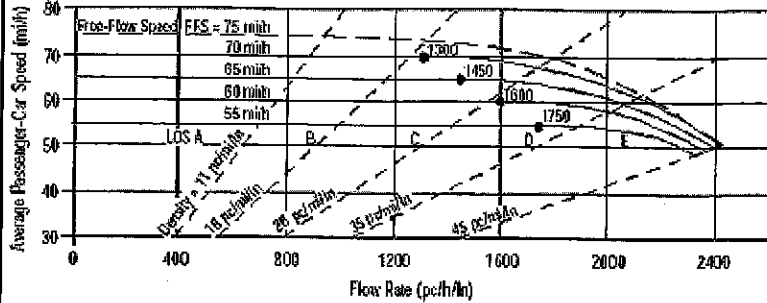
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2303 pc/h/ln	Design LOS	
S	56.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	40.5 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper. (LOS)
 Des. (N)
 Planning Data

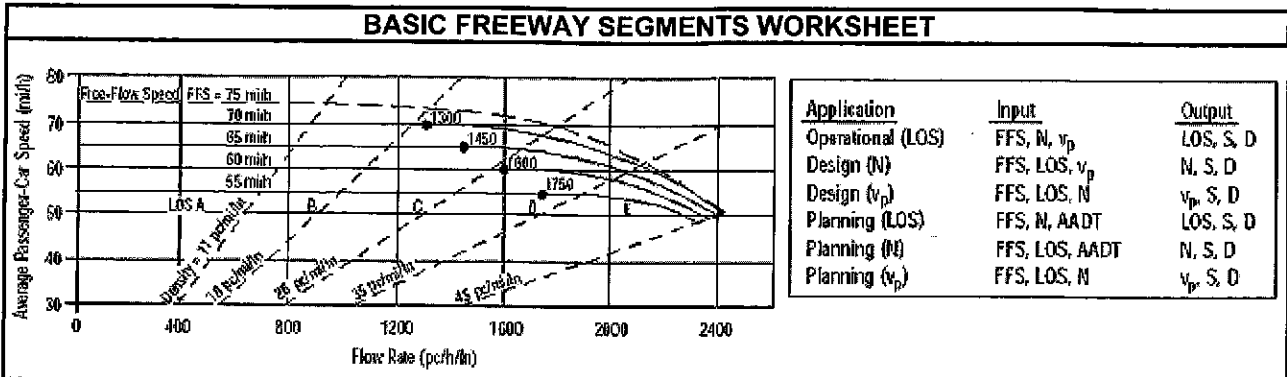
Flow Inputs			
Volume, V	5525	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [1 + P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2352 pc/h/ln	Design LOS	
S	55.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	42.6 pc/mi/ln	f _p	
LOS	E	S	mi/h
		D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7308	veh/h	Peak-Hour Factor, PHF
AAADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AAADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

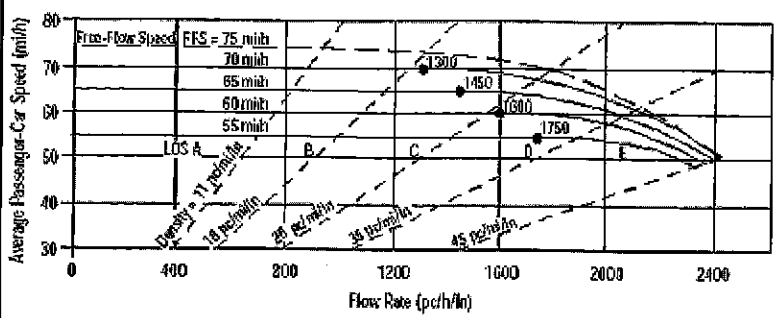
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T + (E _T - 1) * P _R * (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	3111 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	mi/h	f _p	
D = v _p / S	pc/mi/ln	S	mi/h
LOS	F	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper. (LOS)
 Des. (N)
 Planning Data

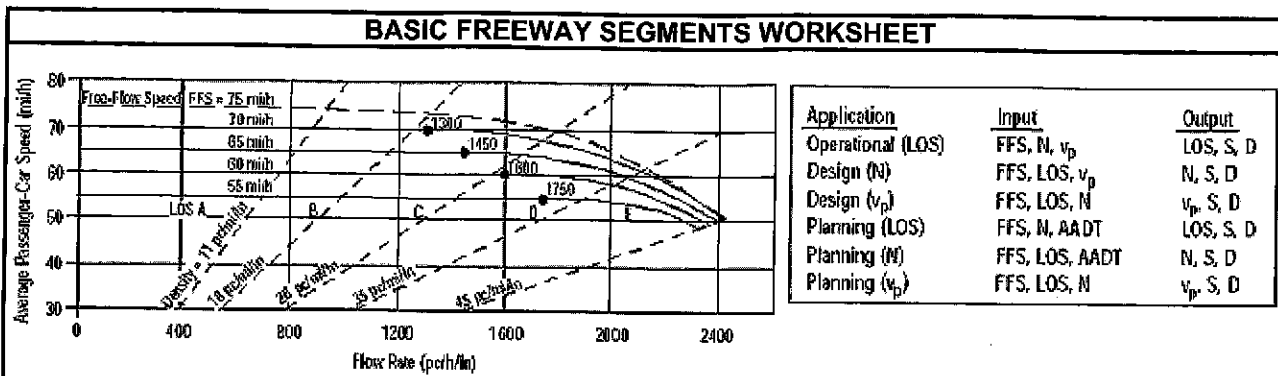
Flow Inputs			
Volume, V	4622	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1968 pc/h/ln	Design LOS	
S	65.4 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	30.1 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt A PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7630	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P_T
Peak-Hr Prop. of AADT, K			%RVs, P_R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T + (E_T - 1) P_R + (E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	3249 pc/h/ln	Design LOS	
S	mi/h	$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	pc/mi/ln	S	mi/h
LOS	F	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 27

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖		↖	↗				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.981			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1271	1338	0	0	1566	0	1388	1253	0	0	0	0
Flt Permitted	0.617						0.950					
Satd. Flow (perm)	826	1338	0	0	1566	0	1388	1253	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)					24			66				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	348	99	0	0	179	29	227	3	61	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	378	108	0	0	195	32	247	3	66	0	0	0
Lane Group Flow (vph)	378	108	0	0	227	0	247	69	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.4	39.4	0.0	0.0	39.4	0.0	20.6	20.6	0.0	0.0	0.0	0.0
Total Split (%)	65.7%	65.7%	0.0%	0.0%	65.7%	0.0%	34.3%	34.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	34.8	34.8			34.8		16.0	16.0				
ℳlow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	37.5	37.5			37.5		14.5	14.5				
Actuated g/C Ratio	0.62	0.62			0.62		0.24	0.24				
v/c Ratio	0.73	0.13			0.23		0.74	0.20				
Control Delay	11.7	3.4			5.7		34.7	7.0				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	11.7	3.4			5.7		34.7	7.0				
LOS	B	A			A		C	A				
Approach Delay		9.9			5.7			28.6				

1: Ave 18.5 & SR 99 NB ramps
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	26	7			30		78	1				
Queue Length 95th (ft)	m#56	m12			59		#164	26				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	516	835			987		384	394				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.73	0.13			0.23		0.64	0.18				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 53.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23
2030 Project AM Alternative A

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	
Trailing Detector (ft)		0	0		0	
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt					0.901	
Flt Protected					0.987	
Satd. Flow (prot)	0	1418	1545	0	1242	0
Flt Permitted					0.987	
Satd. Flow (perm)	0	1418	1545	0	1242	0
Right Turn on Red				s		s
Satd. Flow (RTOR)					244	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	582	303	0	107	296
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	23%	23%	36%	36%
Adj. Flow (vph)	0	633	329	0	116	322
Lane Group Flow (vph)	0	633	329	0	438	0
Turn Type						
Protected Phases		4	8			
Permitted Phases					6	
Detector Phases		4	8		6	
Minimum Initial (s)		4.0	4.0		4.0	
Minimum Split (s)		20.6	20.6		21.3	
Total Split (s)	0.0	37.0	37.0	0.0	23.0	0.0
Total Split (%)	0.0%	61.7%	61.7%	0.0%	38.3%	0.0%
Maximum Green (s)		32.4	32.4		17.7	
Yellow Time (s)		3.6	3.6		4.3	
All-Red Time (s)		1.0	1.0		1.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	
Recall Mode		C-Max	C-Max		Min	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effct Green (s)		36.2	36.2		15.8	
Actuated g/C Ratio		0.60	0.60		0.26	
v/c Ratio		0.74	0.35		0.86	
Control Delay		17.5	4.7		27.9	
Queue Delay		0.0	0.0		0.0	
Total Delay		17.5	4.7		27.9	
LOS		B	A		C	
Approach Delay		17.5	4.7		27.9	



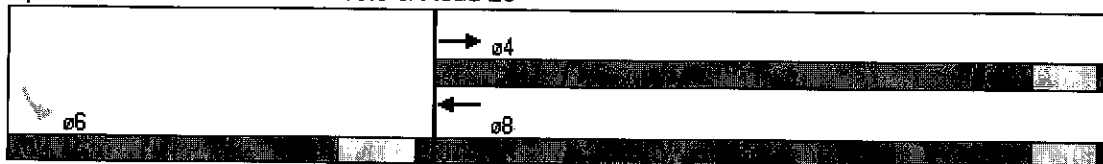
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		167	24		57	
Queue Length 95th (ft)		#365	m54		#209	
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		856	932		560	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.74	0.35		0.78	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 17.8
 Intersection Capacity Utilization 61.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B












95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 2030 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	499	438	181	68	64
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	542	476	197	74	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	673				1060	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	671				1060	473
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				65	87
cM capacity (veh/h)	785				211	531
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	563	476	197	143		
Volume Left	21	0	0	74		
Volume Right	0	0	197	70		
cSH	785	1700	1700	298		
Volume to Capacity	0.03	0.28	0.12	0.48		
Queue Length 95th (ft)	2	0	0	62		
Control Delay (s)	0.7	0.0	0.0	27.8		
Lane LOS	A			D		
Approach Delay (s)	0.7	0.0		27.8		
Approach LOS				D		
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization		56.0%		ICU Level of Service	B	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
2030 Project AM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	15	70	40	297	75	107	110	71	17	39	61	239
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	76	43	323	82	116	120	77	18	42	66	260
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage (veh)												
Upstream signal (ft)					978							
pX, platoon unblocked												
vC, conflicting volume	198			120			1151	879	82	915	974	98
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			120			1151	879	82	915	974	98
tC, single (s)	4.1			4.1			7.8	6.5	6.9	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.1	4.0	3.9	3.5	4.0	3.3
p0 queue free %	99			78			0	65	98	72	66	73
cM capacity (veh/h)	1369			1468			58	221	821	151	194	958
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	136	404	116	197	18	42	326					
Volume Left	16	323	0	120	0	42	0					
Volume Right	43	0	116	0	18	0	260					
cSH	1369	1468	1700	82	821	151	532					
Volume to Capacity	0.01	0.22	0.07	2.40	0.02	0.28	0.61					
Queue Length 95th (ft)	1	21	0	459	2	27	102					
Control Delay (s)	1.0	6.9	0.0	748.8	9.5	38.0	21.9					
Lane LOS	A	A		F	A	E	C					
Approach Delay (s)	1.0	5.3		685.3		23.7						
Approach LOS				F		C						
Intersection Summary												
Average Delay			128.3									
Intersection Capacity Utilization			52.3%	ICU Level of Service				A				
Analysis Period (min)			15									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	8	3	12	2	47	1	388	4	72	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	3	13	2	51	1	422	4	78	390	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1025	975	390	980	973	424	390			426		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1025	975	390	980	973	424	390			426		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	96	99	93	99	92	100			92		
cM capacity (veh/h)	177	225	643	198	222	607	1036			994		
Direction, Lane #:	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	66	427	468								
Volume Left	0	13	1	78								
Volume Right	3	51	4	0								
cSH	274	415	1036	994								
Volume to Capacity	0.04	0.16	0.00	0.08								
Queue Length 95th (ft)	3	14	0	6								
Control Delay (s)	18.8	15.3	0.0	2.3								
Lane LOS	C	C	A	A								
Approach Delay (s)	18.8	15.3	0.0	2.3								
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			63.9%		ICU Level of Service				B			
Analysis Period (min)			15									













7: Ave 17 & SR 99 NB ramps
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950	0.953			
Satd. Flow (prot)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						117			481			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	250	538	0	0	1252	124	1252	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	272	585	0	0	1361	135	1361	7	549	0	0	0
Lane Group Flow (vph)	272	585	0	0	1361	135	681	687	549	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	19.0	59.0	0.0	0.0	40.0	40.0	41.0	41.0	41.0	0.0	0.0	0.0
Total Split (%)	19.0%	59.0%	0.0%	0.0%	40.0%	40.0%	41.0%	41.0%	41.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	53.7			34.7	34.7	36.4	36.4	36.4			
Yellow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	15.0	55.0			36.0	36.0	37.0	37.0	37.0			
Actuated g/C Ratio	0.15	0.55			0.36	0.36	0.37	0.37	0.37			
v/c Ratio	1.18	0.35			1.10	0.21	1.14	1.14	0.42			
Control Delay	135.8	8.3			89.0	6.6	111.9	114.1	4.6			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	135.8	8.3			89.0	6.6	111.9	114.1	4.6			
LOS	F	A			F	A	F	F	A			
Approach Delay		48.8			81.5			82.0				

7: Ave 17 & SR 99 NB ramps
 2030 Project AM Alternative A

10/22/2008

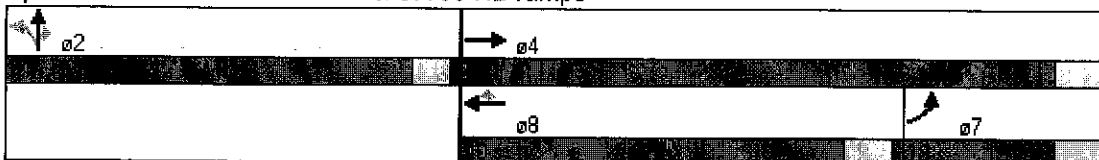
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			F			F				
Queue Length 50th (ft)	208	57			521	7	535	543	15			
Queue Length 95th (ft) m#263		m78			#655	47	#766	#773	53			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	230	1682			1238	629	599	601	1295			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.18	0.35			1.10	0.21	1.14	1.14	0.42			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 5 (5%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 75.1
 Intersection Capacity Utilization 93.3%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service F







~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 2030 Project AM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3112	3438	0	1480	1324
Flt Permitted					0.950	
Satd. Flow (perm)	0	3112	3438	0	1480	1324
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						13
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1699	1979	0	299	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	1847	2151	0	325	117
Lane Group Flow (vph)	0	1847	2151	0	325	117
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	71.0	71.0	0.0	29.0	29.0
Total Split (%)	0.0%	71.0%	71.0%	0.0%	29.0%	29.0%
Maximum Green (s)		65.7	65.7		24.4	24.4
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		67.9	67.9		24.1	24.1
Actuated g/C Ratio		0.68	0.68		0.24	0.24
v/c Ratio		0.87	0.92		0.91	0.36
Control Delay		7.7	5.5		67.8	31.0
Queue Delay		25.1	4.7		0.0	0.1
Total Delay		32.8	10.3		67.8	31.1
LOS		C	B		E	C
Approach Delay		32.8	10.3		58.1	

9: Ave 17 & SR 99 SB off-ramp
 2030 Project AM Alternative A

10/22/2008



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		C	B		E	
Queue Length 50th (ft)		98	278		200	54
Queue Length 95th (ft)		m77	m156		#358	106
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2114	2335		370	341
Starvation Cap Reductn		351	0		0	0
Spillback Cap Reductn		0	146		0	18
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		1.05	0.98		0.88	0.36

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 88 (88%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 77.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Flt		0.990				0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3249	0	1626	3252	1455	1433	1508	1282	3155	1672	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1641	3249	0	1626	3252	1455	1433	1508	1282	3155	1672	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		7				560			468		7	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	8	886	61	613	960	515	82	85	431	318	36	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	9	963	66	666	1043	560	89	92	468	346	39	7
Lane Group Flow (vph)	9	1029	0	666	1043	560	89	92	468	346	46	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.3	21.3		9.3	21.3	21.3	8.6	20.6	20.6	8.6	20.6	
Total Split (s)	9.3	31.4	0.0	35.0	57.1	57.1	11.2	20.6	20.6	13.0	22.4	0.0
Total Split (%)	9.3%	31.4%	0.0%	35.0%	57.1%	57.1%	11.2%	20.6%	20.6%	13.0%	22.4%	0.0%
Maximum Green (s)	4.0	26.1		29.7	51.8	51.8	6.6	16.0	16.0	8.4	17.8	
Yellow Time (s)	4.3	4.3		4.3	4.3	4.3	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.3	27.4		31.0	60.5	60.5	17.2	12.3	12.3	13.3	8.4	
Actuated g/C Ratio	0.05	0.27		0.31	0.60	0.60	0.17	0.12	0.12	0.13	0.08	
v/c Ratio	0.10	1.15		1.32	0.53	0.51	0.36	0.50	0.82	0.82	0.31	
Control Delay	47.9	114.6		177.6	4.8	1.4	42.4	49.2	17.1	61.7	42.9	
Queue Delay	0.0	0.0		0.0	0.6	0.9	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.9	114.6		177.6	5.4	2.3	42.4	49.2	17.1	61.7	42.9	
LOS	D	F		F	A	A	D	D	B	E	D	
Approach Delay		114.0			55.2			25.1			59.5	

10: Ave 17 & GS Blvd
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			C			E	
Queue Length 50th (ft)	6	408		566	88	15	50	56	0	111	24	
Queue Length 95th (ft)	22	#538		m#654	m133	m17	102	102	#128	#230	58	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	87	895		504	1969	1101	247	250	603	420	313	
Starvation Cap Reductn	0	0		0	497	275	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.10	1.15		1.32	0.71	0.68	0.36	0.37	0.78	0.82	0.15	

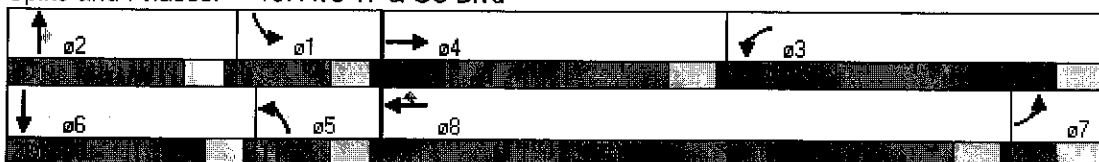
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 7 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 65.1
 Intersection Capacity Utilization 86.1%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service E

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt		0.972			0.998			0.989			0.995	
Flt Protected		0.998			0.997			0.988			0.997	
Satd. Flow (prot)	0	1789	0	0	1734	0	0	1547	0	0	1508	0
Flt Permitted		0.963			0.913			0.818			0.950	
Satd. Flow (perm)	0	1727	0	0	1588	0	0	1281	0	0	1437	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		23			1			8			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	27	512	138	42	607	7	138	392	47	19	270	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	29	557	150	46	660	8	150	426	51	21	293	13
Lane Group Flow (vph)	0	736	0	0	714	0	0	627	0	0	327	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	34.0	34.0	0.0	34.0	34.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0
Total Split (%)	48.6%	48.6%	0.0%	48.6%	48.6%	0.0%	51.4%	51.4%	0.0%	51.4%	51.4%	0.0%
Maximum Green (s)	28.7	28.7		28.7	28.7		30.7	30.7		30.7	30.7	
Flow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			32.0			32.0	
Actuated g/C Ratio		0.43			0.43			0.46			0.46	
v/c Ratio		0.98			1.05			1.06			0.50	
Control Delay		49.6			71.0			77.1			16.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		49.6			71.0			77.1			16.4	
LOS		D			E			E			B	
Approach Delay		49.6			71.0			77.1			16.4	

11: Ave 17 & Road 23
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			E			B	
Queue Length 50th (ft)		292			343			304			93	
Queue Length 95th (ft)		#525			#544			#495			162	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		753			681			590			659	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.98			1.05			1.06			0.50	

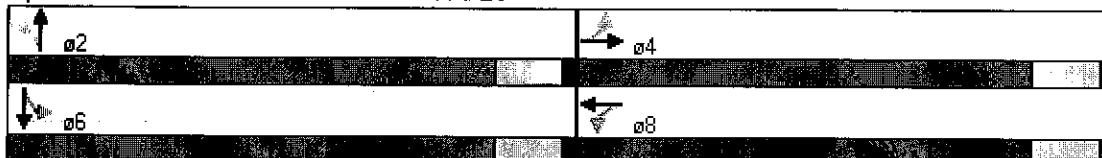
Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 58.6
 Intersection Capacity Utilization 105.8%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service G

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Flt			0.850			0.850		0.967			0.997	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3325	0	1752	3494	0
Flt Permitted		0.815			0.721		0.950			0.950		
Satd. Flow (perm)	0	1518	1583	0	1343	1583	1719	3325	0	1752	3494	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			15			57		72			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	52	10	382	109	31	608	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	57	11	415	118	34	661	12
Lane Group Flow (vph)	0	11	15	0	176	57	11	533	0	34	673	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	21.9	21.9	21.9	21.9	21.9	21.9	9.9	22.7	0.0	10.4	23.2	0.0
Total Split (%)	39.8%	39.8%	39.8%	39.8%	39.8%	39.8%	18.0%	41.3%	0.0%	18.9%	42.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	5.0	17.8		5.5	18.3	
Flow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		13.0	13.0		13.2	13.2	6.3	25.4		6.8	27.7	
Actuated g/C Ratio		0.25	0.25		0.26	0.26	0.11	0.52		0.12	0.57	
v/c Ratio		0.03	0.04		0.51	0.13	0.06	0.30		0.16	0.34	
Control Delay		11.9	7.2		17.6	5.3	22.3	8.9		21.2	8.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.9	7.2		17.6	5.3	22.3	8.9		21.2	8.5	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		9.2			14.6			9.1			9.1	

12: Ellis OC & Road 26
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1	0		21	0	1	23		4	36	
Queue Length 95th (ft)		11	10		90	19	15	96		32	134	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		522	554		462	582	190	1855		217	2049	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.03		0.38	0.10	0.06	0.29		0.16	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 55

Actuated Cycle Length: 49

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 9.9

Intersection Capacity Utilization 46.1%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)						165		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	485	315	0	0	240	152	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	527	342	0	0	261	165	222	2	95	0	0	0
Lane Group Flow (vph)	527	342	0	0	261	165	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
ℳlow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.45	0.17			0.42	0.40	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.2			17.3			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	47	12			44	0	31	1				
Queue Length 95th (ft)	131	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	564	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.45	0.17			0.26	0.29	0.23	0.19				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 39.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB off-ramp
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						478
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	637	368	0	163	440
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	692	400	0	177	478
Lane Group Flow (vph)	0	692	400	0	177	478
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
ℳlow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.45	0.26		0.12	0.32
Control Delay		13.1	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.1	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.1	2.7		4.2	
Approach LOS		B	A		A	

15: Ellis OC & SR 99 SB off-ramp
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		87	0		18	0
Queue Length 95th (ft)		127	3		34	24
Internal Link Dist (ft)		1000	630		1324	
Turn Bay Length (ft)						
Base Capacity (vph)		1539	1539		1482	1475
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.26		0.12	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 39.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB off-ramp



17: Ellis OC & Aviation Drive
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.926			0.899				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		129			197				48		65	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	47	122	119	444	89	181	193	259	44	121	401	576
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	133	129	483	97	197	210	282	48	132	436	626
Lane Group Flow (vph)	51	262	0	483	294	0	210	282	48	132	1062	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4			8				6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9	20.9	
Total Split (s)	14.9	23.0	0.0	34.0	42.1	0.0	18.0	68.0	68.0	25.0	75.0	0.0
Total Split (%)	9.9%	15.3%	0.0%	22.7%	28.1%	0.0%	12.0%	45.3%	45.3%	16.7%	50.0%	0.0%
Maximum Green (s)	10.4	18.1		29.5	37.2		13.5	63.1	63.1	20.1	70.1	
ℳlow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	9.3	12.2		30.0	35.1		14.0	64.0	64.0	21.0	71.0	
Actuated g/C Ratio	0.06	0.09		0.21	0.24		0.10	0.45	0.45	0.15	0.50	
v/c Ratio	0.45	0.66		1.30	0.32		1.21	0.36	0.07	0.51	1.30	
Control Delay	77.7	39.9		198.8	16.1		189.8	28.2	6.4	64.8	173.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	77.7	39.9		198.8	16.1		189.8	28.2	6.4	64.8	173.9	
LOS	E	D		F	B		F	C	A	E	F	
Approach Delay		46.1			129.7			89.1		161.9		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	46	63		576	38		239	171	0	115	4239	
Queue Length 95th (ft)	95	112		#833	80		#422	259	26	193	#1573	
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	131	528		371	986		173	791	734	259	817	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.39	0.50		1.30	0.30		1.21	0.36	0.07	0.51	1.30	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 143.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.30
 Intersection Signal Delay: 126.3
 Intersection Capacity Utilization 82.1%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service E

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950	0.950			
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						533			102			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35				35			30			30
Link Distance (ft)		391				1686			1254			906
Travel Time (s)		7.6				32.8			28.5			20.6
Volume (vph)	197	988	0	0	931	490	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	214	1074	0	0	1012	533	390	0	384	0	0	0
Lane Group Flow (vph)	214	1074	0	0	1012	533	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	19.0	52.0	0.0	0.0	33.0	33.0	28.0	28.0	28.0	0.0	0.0	0.0
Total Split (%)	23.8%	65.0%	0.0%	0.0%	41.3%	41.3%	35.0%	35.0%	35.0%	0.0%	0.0%	0.0%
Maximum Green (s)	14.4	47.4			28.4	28.4	23.5	23.5	23.5			
Flow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.5	48.0			30.5	30.5	24.0	24.0	24.0			
Actuated g/C Ratio	0.17	0.60			0.38	0.38	0.30	0.30	0.30			
v/c Ratio	0.73	0.52			0.76	0.58	0.40	0.40	0.73			
Control Delay	44.7	0.7			26.8	4.7	25.4	25.4	27.6			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	44.7	0.9			26.8	4.7	25.4	25.4	27.6			
LOS	D	A			C	A	C	C	C			
Approach Delay		8.2			19.2			26.5				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 Project AM Alternative A

10/22/2008

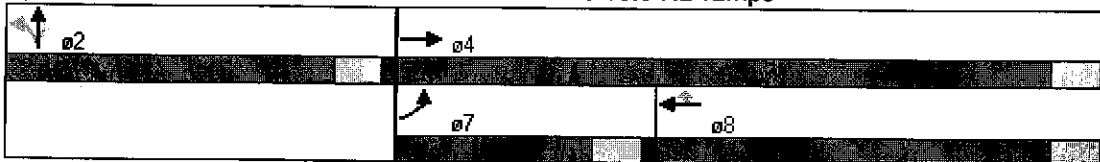
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	95	1			235	0	81	81	125			
Queue Length 95th (ft)	m106	m5			312	62	142	142	#239			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	326	2083			1323	922	485	485	529			
Starvation Cap Reductn	0	256			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.66	0.59			0.76	0.58	0.40	0.40	0.73			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 32 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 16.8
 Intersection Capacity Utilization 82.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			⊗s			⊗s		⊗s			⊗s	
Satd. Flow (RTOR)			458									120
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	762	421	414	921	0	0	0	0	423	0	227
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	828	458	450	1001	0	0	0	0	460	0	247
Lane Group Flow (vph)	0	828	458	450	1001	0	0	0	0	0	460	247
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	26.0	26.0	26.0	52.0	0.0	0.0	0.0	0.0	28.0	28.0	28.0
Total Split (%)	0.0%	32.5%	32.5%	32.5%	65.0%	0.0%	0.0%	0.0%	0.0%	35.0%	35.0%	35.0%
Maximum Green (s)		21.4	21.4	21.4	47.4					23.5	23.5	23.5
Flow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		⊗s	⊗s	⊗s								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		22.0	22.0	22.0	48.0						24.0	24.0
Actuated g/C Ratio		0.28	0.28	0.28	0.60						0.30	0.30
v/c Ratio		0.89	0.61	0.95	0.49						0.96	0.48
Control Delay		41.7	6.5	46.9	3.3						62.4	15.2
Queue Delay		0.0	0.0	0.0	0.3						0.0	0.0
Total Delay		41.7	6.5	46.9	3.6						62.4	15.2
LOS		D	A	D	A						E	B
Approach Delay		29.2			17.1						45.9	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 Project AM Alternative A

10/22/2008

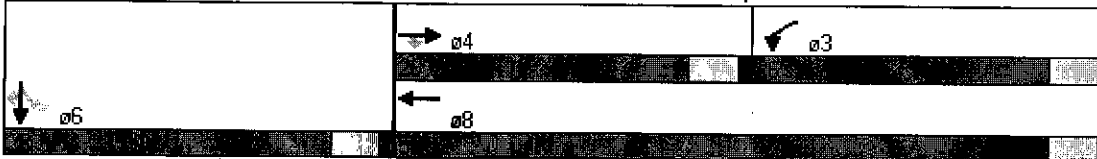
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						D	
Queue Length 50th (ft)		208	0	197	21						224	48
Queue Length 95th (ft)		#315	71 m	#378	54						#409	115
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		928	747	473	2063						479	513
Starvation Cap Reductn		0	0	0	474						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.89	0.61	0.95	0.63						0.96	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 32 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 27.5
 Intersection Capacity Utilization 82.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E













95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
2030 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	44	1	35	0	374	38	30	304	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	48	1	38	0	407	41	33	330	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	861	843	330	823	823	427	330			448		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	861	843	330	823	823	427	330			448		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	83	100	94	100			97		
cM capacity (veh/h)	252	291	711	285	299	627	1140			1028		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	87	448	363								
Volume Left	0	48	0	33								
Volume Right	0	38	41	0								
cSH	1700	375	1140	1028								
Volume to Capacity	0.00	0.23	0.00	0.03								
Queue Length 95th (ft)	0	22	0	2								
Control Delay (s)	0.0	17.5	0.0	1.1								
Lane LOS	A	C		A								
Approach Delay (s)	0.0	17.5	0.0	1.1								
Approach LOS	A	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			52.2%		ICU Level of Service				A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 Project AM Alternative A

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.950				0.959					0.950	0.850	
Satd. Flow (prot)	3213	3312	0	0	3236	0	0	0	0	1752	1568	0
Fit Permitted	0.312									0.950		
Satd. Flow (perm)	1055	3312	0	0	3236	0	0	0	0	1752	1568	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)					153						353	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	836	580	0	0	568	211	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	909	630	0	0	617	229	0	0	0	355	0	168
Lane Group Flow (vph)	909	630	0	0	846	0	0	0	0	355	168	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	69.0	69.0	0.0	0.0	69.0	0.0	0.0	0.0	0.0	21.0	21.0	0.0
Total Split (%)	76.7%	76.7%	0.0%	0.0%	76.7%	0.0%	0.0%	0.0%	0.0%	23.3%	23.3%	0.0%
Maximum Green (s)	64.4	64.4			64.4					16.5	16.5	
ℳlow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	65.0	65.0			65.0					17.0	17.0	
Actuated g/C Ratio	0.72	0.72			0.72					0.19	0.19	
v/c Ratio	1.19	0.26			0.36					1.07	0.29	
Control Delay	115.2	3.7			4.2					107.2	1.2	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	115.2	3.7			4.2					107.2	1.2	
LOS	F	A			A					F	A	
Approach Delay		69.6			4.2						73.2	

21: SR 145/Madera & SR 99 NB ramps
 2030 Project AM Alternative A

10/22/2008

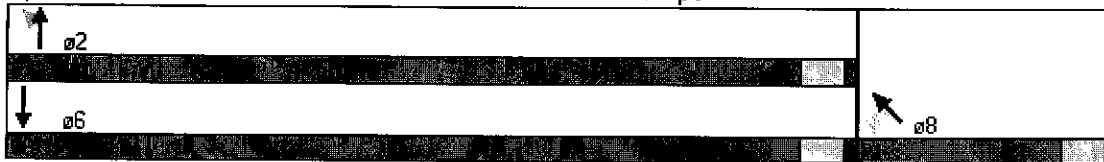
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		E			A						E	
Queue Length 50th (ft)	331	47			61					227	0	
Queue Length 95th (ft)	#452	76			85					#395	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	762	2392			2380					331	583	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	1.19	0.26			0.36					1.07	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 8 (9%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.19
 Intersection Signal Delay: 51.2
 Intersection Capacity Utilization 74.4%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.991				0.850
Flt Protected	0.950						0.950				0.987	
Satd. Flow (prot)	1719	1810	1538	0	0	0	3213	3282	0	0	3426	1553
Flt Permitted	0.950						0.950				0.572	
Satd. Flow (perm)	1719	1810	1538	0	0	0	3213	3282	0	0	1986	1553
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			545					11				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	434	278	695	0	0	0	254	981	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	472	302	755	0	0	0	276	1066	71	130	374	468
Lane Group Flow (vph)	472	302	755	0	0	0	276	1137	0	0	504	468
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	38.4	38.4	38.4	0.0	0.0	0.0	20.6	51.6	0.0	31.0	31.0	31.0
Total Split (%)	42.7%	42.7%	42.7%	0.0%	0.0%	0.0%	22.9%	57.3%	0.0%	34.4%	34.4%	34.4%
Maximum Green (s)	33.9	33.9	33.9				16.0	47.0		26.4	26.4	26.4
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	34.4	34.4	34.4				16.6	47.6			27.0	27.0
Actuated g/C Ratio	0.38	0.38	0.38				0.18	0.53			0.30	0.30
v/c Ratio	0.72	0.44	0.82				0.47	0.65		0.95d	0.59	
Control Delay	28.6	22.0	15.9				35.7	17.3			34.5	4.2
Queue Delay	25.9	5.3	0.6				0.1	0.0			0.0	0.1
Total Delay	54.5	27.4	16.5				35.8	17.3			34.5	4.3
LOS	D	C	B				D	B			C	A
Approach Delay		30.4						20.9			20.0	

22: Ave 14/Olive & SR 145/Madera
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			B	
Queue Length 50th (ft)	173	105	97				72	228			135	27
Queue Length 95th (ft)	310	m166	#399				111	297			m180	m43
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	657	692	925				593	1741			596	794
Starvation Cap Reductn	194	321	29				0	0			0	19
Spillback Cap Reductn	0	0	0				29	0			0	4
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	1.02	0.81	0.84				0.49	0.65			0.85	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 39 (43%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 76.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 22: Ave 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 2030 Project AM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						124
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	824	685	0	583	319
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	896	745	0	634	347
Lane Group Flow (vph)	0	896	745	0	634	347
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	44.7	44.7	0.0	45.3	45.3
Total Split (%)	0.0%	49.7%	49.7%	0.0%	50.3%	50.3%
Maximum Green (s)		40.2	40.2		40.8	40.8
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		58.1	58.1		23.9	23.9
Actuated g/C Ratio		0.65	0.65		0.27	0.27
v/c Ratio		0.40	0.33		0.74	0.71
Control Delay		9.1	3.4		35.1	26.6
Queue Delay		0.1	0.2		0.0	0.0
Total Delay		9.2	3.6		35.1	26.6
LOS		A	A		D	C
Approach Delay		9.2	3.6		32.1	

23: AVE 14/Olive & SR 99 SB off-ramp
 2030 Project AM Alternative A

10/22/2008

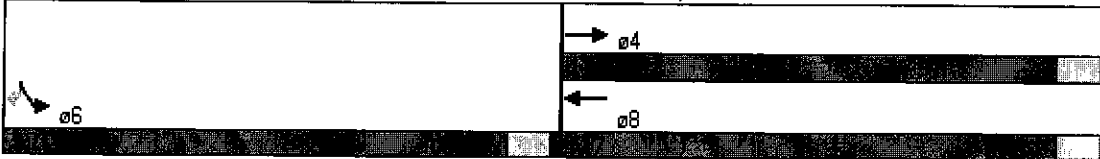
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		110	30		172	116
Queue Length 95th (ft)		198	52		197	185
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2264	2264		1488	753
Starvation Cap Reductn		0	779		0	0
Spillback Cap Reductn		371	0		8	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.47	0.50		0.43	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 16.2
 Intersection Capacity Utilization 46.1%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 2030 Project AM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	43	61	6	9	90	117	8	140	6	103	130	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	66	7	10	98	127	9	152	7	112	141	58
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	120	235	167	311								
Volume Left (vph)	47	10	9	112								
Volume Right (vph)	7	127	7	58								
Hadj (s)	0.18	-0.08	0.33	0.25								
Departure Headway (s)	5.9	5.4	5.8	5.5								
Degree Utilization, x	0.20	0.35	0.27	0.47								
Capacity (veh/h)	546	612	566	623								
Control Delay (s)	10.3	11.3	10.9	13.3								
Approach Delay (s)	10.3	11.3	10.9	13.3								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.8									
HCM Level of Service			B									
Intersection Capacity Utilization			55.6%		ICU Level of Service					B		
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
2030 Project AM Alternative A

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Flt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.672	
Satd. Flow (perm)	3303	1524	1696	1442	1240	1845
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		82		497		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	791		408			1104
Travel Time (s)	18.0		9.3			25.1
Volume (vph)	1043	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	1134	82	117	497	303	74
Lane Group Flow (vph)	1134	82	117	497	303	74
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	63.8	56.2	56.2	56.2	56.2	56.2
Total Split (%)	53.2%	46.8%	46.8%	46.8%	46.8%	46.8%
Maximum Green (s)	59.3	51.7	51.7	51.7	51.7	51.7
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	77.2	34.8	34.8	34.8	34.8	34.8
Actuated g/C Ratio	0.64	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.53	0.16	0.24	0.64	0.84	0.14
Control Delay	15.0	5.4	35.1	10.6	59.2	28.4
Queue Delay	0.1	0.0	0.0	1.6	0.0	0.0
Total Delay	15.1	5.4	35.1	12.2	59.2	28.4
LOS	B	A	D	B	E	C
Approach Delay	14.5		16.5			53.1

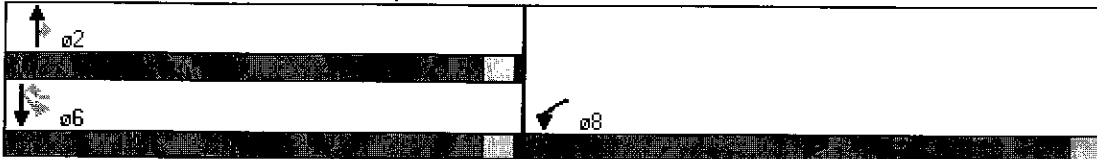
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			D
Queue Length 50th (ft)	213	0	69	68	227	44
Queue Length 95th (ft)	431	28	m14	m0	255	61
Internal Link Dist (ft)	711		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2140	715	745	912	544	811
Starvation Cap Reductn	0	0	0	244	0	0
Spillback Cap Reductn	187	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.11	0.16	0.74	0.56	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 64 (53%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 21.7
 Intersection Capacity Utilization 58.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.994			0.943			0.867				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	3039	0	1656	1511	0	3273	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	3039	0	1656	1511	0	3273	1776	1509
Right Turn on Red			⊘s			⊘s			⊘s		⊘s	
Satd. Flow (RTOR)		4			114			24				91
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	189	360	16	19	603	373	16	3	22	1017	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1105	11	91
Lane Group Flow (vph)	205	408	0	21	1060	0	17	27	0	1105	11	91
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	18.0	48.4	0.0	10.1	40.5	0.0	9.7	20.5	0.0	41.0	51.8	51.8
Total Split (%)	15.0%	40.3%	0.0%	8.4%	33.8%	0.0%	8.1%	17.1%	0.0%	34.2%	43.2%	43.2%
Maximum Green (s)	13.4	43.8		5.5	35.9		5.5	16.3		36.8	47.6	47.6
⊘flow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2		3.2	3.2	3.2
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	⊘s	⊘s		⊘s	⊘s		⊘s	⊘s		⊘s	⊘s	⊘s
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effect Green (s)	14.0	50.5		6.1	36.5		5.7	16.5		37.0	53.6	53.6
Actuated g/C Ratio	0.12	0.42		0.05	0.30		0.05	0.14		0.31	0.45	0.45
v/c Ratio	1.09	0.30		0.26	1.06		0.22	0.12		1.10	0.01	0.13
Control Delay	141.2	24.5		43.1	70.4		61.7	20.0		88.4	10.3	2.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		7.8	0.0	0.0
Total Delay	141.2	24.5		43.1	70.4		61.7	20.0		96.2	10.3	2.6
LOS	F	C		D	E		E	C		F	B	A
Approach Delay		63.5			69.9			36.1			88.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			D			F	
Queue Length 50th (ft)	479	100		13	414		13	2		501	4	16
Queue Length 95th (ft)	#334	160		m27	m#549		38	30		#612	m3	5
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	188	1349		82	1004		79	228		1009	793	724
Starvation Cap Reductn	0	0		0	0		0	0		17	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.09	0.30		0.26	1.06		0.22	0.12		1.11	0.01	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 11 (9%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 75.6
 Intersection Capacity Utilization 84.8%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E



















~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 Project AM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950				
Satd. Flow (prot)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)						785			70			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	198	1201	0	0	598	920	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	215	1305	0	0	650	1000	432	0	283	0	0	0
Lane Group Flow (vph)	215	1305	0	0	650	1000	0	432	283	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	22.0	80.0	0.0	0.0	58.0	58.0	40.0	40.0	40.0	0.0	0.0	0.0
Total Split (%)	18.3%	66.7%	0.0%	0.0%	48.3%	48.3%	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%
Maximum Green (s)	17.5	75.5			53.5	53.5	35.5	35.5	35.5			
ℳlow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	18.0	77.4			55.4	55.4		34.6	34.6			
Actuated g/C Ratio	0.15	0.64			0.46	0.46		0.29	0.29			
v/c Ratio	0.87	0.61			0.41	0.89		0.94	0.61			
Control Delay	59.0	3.2			22.9	17.5		70.7	33.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	59.0	3.2			22.9	17.5		70.7	33.4			
LOS	E	A			C	B		E	C			
Approach Delay		11.1			19.6			55.9				

27: Ave 12 & SR 99 NB Ramps
 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			E				
Queue Length 50th (ft)	176	30			176	166		321	140			
Queue Length 95th (ft)	m186	m32			226	#606		#512	236			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	248	2135			1572	1126		479	478			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.87	0.61			0.41	0.89		0.90	0.59			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 94 (78%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 22.9
 Intersection Capacity Utilization 99.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service F

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50					50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt					0.986			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1467	1545	0	0	1643	0	1504	1346	0	0	0	0
Flt Permitted	0.588						0.950					
Satd. Flow (perm)	908	1545	0	0	1643	0	1504	1346	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					17			786				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	478	140	0	0	222	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	520	152	0	0	241	28	277	0	91	0	0	0
Lane Group Flow (vph)	520	152	0	0	269	0	277	91	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.4	39.4	0.0	0.0	39.4	0.0	20.6	20.6	0.0	0.0	0.0	0.0
Total Split (%)	65.7%	65.7%	0.0%	0.0%	65.7%	0.0%	34.3%	34.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	34.8	34.8			34.8		16.0	16.0				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	37.2	37.2			37.2		14.8	14.8				
Actuated g/C Ratio	0.62	0.62			0.62		0.25	0.25				
v/c Ratio	0.92	0.16			0.26		0.75	0.10				
Control Delay	11.3	1.2			6.1		34.3	0.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	11.3	1.2			6.1		34.3	0.2				
LOS	B	A			A		C	A				
Approach Delay		9.0			6.1			25.9				

1: Ave 18.5 & SR 99 NB ramps
 2030 Project PM Alternative A

10/22/2008

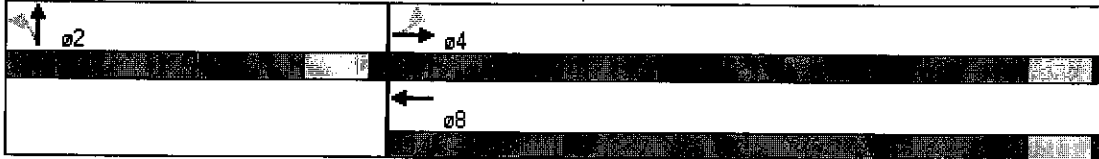
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	20	5			39		88	0				
Queue Length 95th (ft)	m18	m5			71		#181	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	563	958			1025		416	941				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.92	0.16			0.26		0.67	0.10				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 63.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B













95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps









2: Ave 18.5 & SB Ramps
2030 Project PM Alternative A

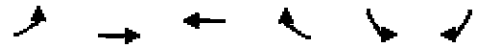
10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	618	368	0	369	108	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	672	400	0	401	117	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		223			717							
pX, platoon unblocked				0.55			0.55	0.55	0.55	0.55	0.55	
vC, conflicting volume	518			1072			1073	1190	672	1073	1473	401
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	518			1131			1133	1348	400	1133	1864	401
tC, single (s)	4.3			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	953			304			99	83	358	99	40	653
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	672	400	401	117								
Volume Left	0	0	0	0								
Volume Right	0	400	0	117								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.40	0.24	0.24	0.07								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		35.9%			ICU Level of Service				A			
Analysis Period (min)			15									

3: Ave 18.5 & Road 23
2030 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	
Trailing Detector (ft)		0	0		0	
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt					0.898	
Flt Protected					0.988	
Satd. Flow (prot)	0	1583	1597	0	1204	0
Flt Permitted					0.988	
Satd. Flow (perm)	0	1583	1597	0	1204	0
Right Turn on Red				rs		rs
Satd. Flow (RTOR)					277	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	849	350	0	137	429
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	19%	19%	40%	40%
Adj. Flow (vph)	0	923	380	0	149	466
Lane Group Flow (vph)	0	923	380	0	615	0
Turn Type						
Protected Phases		4	8			
Permitted Phases					6	
Detector Phases		4	8		6	
Minimum Initial (s)		4.0	4.0		4.0	
Minimum Split (s)		20.6	20.6		20.6	
Total Split (s)	0.0	36.6	36.6	0.0	23.4	0.0
Total Split (%)	0.0%	61.0%	61.0%	0.0%	39.0%	0.0%
Maximum Green (s)		32.0	32.0		18.8	
Yellow Time (s)		3.6	3.6		3.6	
All-Red Time (s)		1.0	1.0		1.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	
Recall Mode		C-Max	C-Max		Min	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effct Green (s)		32.6	32.6		19.4	
Actuated g/C Ratio		0.54	0.54		0.32	
v/c Ratio		1.07	0.44		1.07	
Control Delay		70.2	8.7		72.0	
Queue Delay		0.0	0.0		0.0	
Total Delay		70.2	8.7		72.0	
LOS		E	A		E	
Approach Delay		70.2	8.7		72.0	



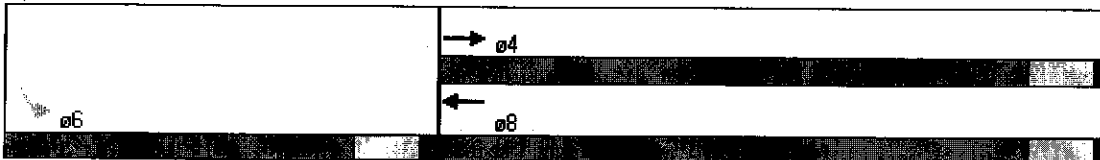
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		E	A		E	
Queue Length 50th (ft)		384	59		477	
Queue Length 95th (ft)		#583	m89		#357	
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		860	868		577	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		1.07	0.44		1.07	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 58.6
 Intersection Capacity Utilization 85.4%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
2030 Project PM Alternative A

10/22/2008

	↖	→	←	↗	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	701	537	224	136	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	762	584	243	148	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	827				1474	584
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	819				1498	563
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	91				0	87
cM capacity (veh/h)	702				109	478
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	826	584	243	209		
Volume Left	64	0	0	148		
Volume Right	0	0	243	61		
cSH	702	1700	1700	141		
Volume to Capacity	0.09	0.34	0.14	1.48		
Queue Length 95th (ft)	8	0	0	352		
Control Delay (s)	2.5	0.0	0.0	309.6		
Lane LOS	A			F		
Approach Delay (s)	2.5	0.0		309.6		
Approach LOS				F		
Intersection Summary						
Average Delay			35.8			
Intersection Capacity Utilization			89.4%		ICU Level of Service	E
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
2030 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	18	97	67	408	74	109	125	111	15	49	109	390
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	105	73	443	80	118	136	121	16	53	118	424
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage (veh)												
Upstream signal (ft)					978							
pX, platoon unblocked												
vC, conflicting volume	199			178			1632	1185	80	1225	1267	142
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199			178			1632	1185	80	1225	1267	142
tC, single (s)	4.1			4.1			7.6	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.0	4.0	3.8	3.5	4.0	3.3
p0 queue free %	99			68			0	5	98	0	0	53
cM capacity (veh/h)	1373			1398			0	127	859	19	114	906
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	198	524	118	257	16	53	542					
Volume Left	20	443	0	136	0	53	0					
Volume Right	73	0	118	0	16	0	424					
cSH	1373	1398	1700	0	859	19	359					
Volume to Capacity	0.01	0.32	0.07	Err	0.02	2.85	1.51					
Queue Length 95th (ft)	1	34	0	Err	1	178	744					
Control Delay (s)	0.9	7.9	0.0	Err	9.3	1263.1	271.6					
Lane LOS	A	A		F	A	F	F					
Approach Delay (s)	0.9	6.4		Err		360.3						
Approach LOS				F		F						
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization				77.6%		ICU Level of Service			D			
Analysis Period (min)				15								

6: Ave 18 & Road 23
 2030 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	12	6	5	12	101	5	525	6	92	523	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	13	7	5	13	110	5	571	7	100	568	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1471	1358	570	1367	1355	574	571			577		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1471	1358	570	1367	1355	574	571			577		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	98	90	99	95	90	79	99			89		
cM capacity (veh/h)	67	127	505	102	131	513	927			931		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	128	583	671								
Volume Left	1	5	5	100								
Volume Right	7	110	7	2								
cSH	156	349	927	931								
Volume to Capacity	0.13	0.37	0.01	0.11								
Queue Length 95th (ft)	11	41	0	9								
Control Delay (s)	31.5	21.2	0.2	2.7								
Lane LOS	D	C	A	A								
Approach Delay (s)	31.5	21.2	0.2	2.7								
Approach LOS	D	C										
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			79.7%		ICU Level of Service				D			
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.950	0.953			
Satd. Flow (prot)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						149			56			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	385	1300	0	0	2052	256	2047	17	1413	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	418	1413	0	0	2230	278	2225	18	1536	0	0	0
Lane Group Flow (vph)	418	1413	0	0	2230	278	1113	1130	1536	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	17.0	58.0	0.0	0.0	41.0	41.0	42.0	42.0	42.0	0.0	0.0	0.0
Total Split (%)	17.0%	58.0%	0.0%	0.0%	41.0%	41.0%	42.0%	42.0%	42.0%	0.0%	0.0%	0.0%
Maximum Green (s)	12.5	53.5			36.5	36.5	37.5	37.5	37.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.0	54.0			37.0	37.0	38.0	38.0	38.0			
Actuated g/C Ratio	0.13	0.54			0.37	0.37	0.38	0.38	0.38			
v/c Ratio	1.87	0.76			1.70	0.41	1.78	1.80	1.43			
Control Delay	420.6	13.4			345.3	12.4	379.9	389.2	226.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	420.6	13.4			345.3	12.4	379.9	389.2	226.5			
LOS	F	B			F	B	F	F	F			
Approach Delay		106.3			308.4			320.3				

7: Ave 17 & SR 99 NB ramps
2030 Project PM Alternative A

10/22/2008

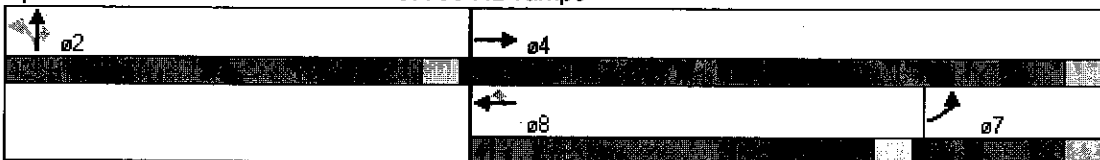
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F				
Queue Length 50th (ft)	411	250			4106	56	4123	4145	751			
Queue Length 95th (ft) m#229		m122			#1243	124	#1383	#1406	#901			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	223	1857			1309	680	627	629	1073			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.87	0.76			1.70	0.41	1.78	1.80	1.43			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 4 (4%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.87
 Intersection Signal Delay: 268.4
 Intersection Capacity Utilization 145.2%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps









8: Ave 17 & SR 99 SB on-ramp
2030 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1595	2262	0	3199	900	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1734	2459	0	3477	978	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		213			717							
pX, platoon unblocked	0.64			0.36			0.54	0.54	0.36	0.54	0.54	0.64
vC, conflicting volume	4455			4192			3472	6189	867	4344	7670	1739
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5832			8072			2730	7755	0	4342	10493	1592
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	5			0			5	0	394	0	0	63
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3						
Volume Total	867	867	2459	1739	1739	978						
Volume Left	0	0	0	0	0	0						
Volume Right	0	0	2459	0	0	978						
cSH	1700	1700	1700	1700	1700	1700						
Volume to Capacity	0.51	0.51	1.45	1.02	1.02	0.58						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		143.4%									H	
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
2030 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3471	3471	0	1687	1509
Flt Permitted					0.950	
Satd. Flow (perm)	0	3471	3471	0	1687	1509
Right Turn on Red				xs		xs
Satd. Flow (RTOR)						1
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	3440	3199	0	506	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	3739	3477	0	550	209
Lane Group Flow (vph)	0	3739	3477	0	550	209
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	71.0	71.0	0.0	29.0	29.0
Total Split (%)	0.0%	71.0%	71.0%	0.0%	29.0%	29.0%
Maximum Green (s)		65.7	65.7		24.4	24.4
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		67.0	67.0		25.0	25.0
Actuated g/C Ratio		0.67	0.67		0.25	0.25
v/c Ratio		1.61	1.49		1.30	0.55
Control Delay		290.5	239.1		185.8	39.0
Queue Delay		132.4	46.3		0.0	0.0
Total Delay		423.0	285.5		185.8	39.0
LOS		F	F		F	D
Approach Delay		423.0	285.5		145.4	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		F	F		F	
Queue Length 50th (ft)	1876	1639			452	116
Queue Length 95th (ft)	m109	m269			#657	192
Internal Link Dist (ft)	380	133			1161	
Turn Bay Length (ft)						
Base Capacity (vph)	2326	2326			422	378
Starvation Cap Reductn	360	0			0	0
Spillback Cap Reductn	0	150			0	0
Storage Cap Reductn	0	0			0	0
Reduced v/c Ratio	1.90	1.60			1.30	0.55

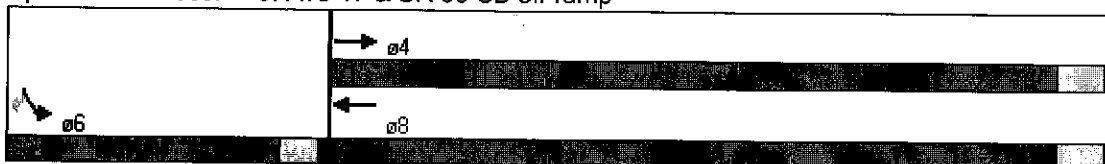
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 89 (89%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.61
 Intersection Signal Delay: 336.6
 Intersection Capacity Utilization 129.8%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frnt		0.987				0.850			0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3426	0	1719	3438	1538	1752	1845	1568	3099	1660	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3426	0	1719	3438	1538	1752	1845	1568	3099	1660	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		10				613			230		4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	14	1987	181	682	1897	811	174	125	741	712	103	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	15	2160	197	741	2062	882	189	136	805	774	112	11
Lane Group Flow (vph)	15	2357	0	741	2062	882	189	136	805	774	123	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5	8.5	20.5	
Total Split (s)	8.5	39.0	0.0	21.0	51.5	51.5	18.5	25.0	25.0	15.0	21.5	0.0
Total Split (%)	8.5%	39.0%	0.0%	21.0%	51.5%	51.5%	18.5%	25.0%	25.0%	15.0%	21.5%	0.0%
Maximum Green (s)	4.0	34.5		16.5	47.0	47.0	14.0	20.5	20.5	10.5	17.0	
ℳlow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	4.5	35.0		17.0	52.6	52.6	19.3	21.0	21.0	11.0	12.7	
Actuated g/C Ratio	0.04	0.35		0.17	0.53	0.53	0.19	0.21	0.21	0.11	0.13	
v/c Ratio	0.19	1.95		2.54	1.14	0.80	0.56	0.35	1.58	2.27	0.57	
Control Delay	51.9	455.9		711.7	80.6	3.8	45.5	36.8	290.9	604.1	49.7	
Queue Delay	0.0	92.7		0.0	110.2	22.5	0.0	0.0	413.2	100.8	0.0	
Total Delay	51.9	548.7		711.7	190.7	26.3	45.5	36.8	704.1	704.9	49.7	
LOS	D	F		F	F	C	D	D	F	F	D	
Approach Delay		545.5			256.2			513.6			615.0	

10: Ave 17 & GS Blvd
 2030 Project PM Alternative A

10/22/2008

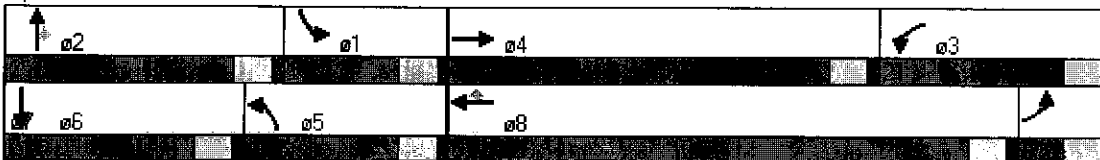
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	9	4245		798	762	15	110	74	615	414	72	
Queue Length 95th (ft)	31	#1385		m#499	m310	m12	#221	131	#849	#531	124	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	78	1206		292	1808	1099	338	387	511	341	294	
Starvation Cap Reductn	0	0		0	322	241	0	0	0	0	0	
Spillback Cap Reductn	0	115		0	0	0	0	0	378	341	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	2.16		2.54	1.39	1.03	0.56	0.35	6.05	774.00	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 4 (4%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.54
 Intersection Signal Delay: 416.9
 Intersection Capacity Utilization 138.7%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.963			0.991			0.974			0.927	
Flt Protected		0.998			0.994			0.991			0.999	
Satd. Flow (prot)	0	1790	0	0	1749	0	0	1623	0	0	1543	0
Flt Permitted		0.920			0.627			0.625			0.988	
Satd. Flow (perm)	0	1650	0	0	1103	0	0	1024	0	0	1526	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		31			6			16			79	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	50	772	315	107	730	59	122	414	125	9	243	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	54	839	342	116	793	64	133	450	136	10	264	326
Lane Group Flow (vph)	0	1235	0	0	973	0	0	719	0	0	600	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	50.0	50.0	0.0	50.0	50.0	0.0	40.0	40.0	0.0	40.0	40.0	0.0
Total Split (%)	55.6%	55.6%	0.0%	55.6%	55.6%	0.0%	44.4%	44.4%	0.0%	44.4%	44.4%	0.0%
Maximum Green (s)	44.7	44.7		44.7	44.7		34.7	34.7		34.7	34.7	
ℳlow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		46.0			46.0			36.0			36.0	
Actuated g/C Ratio		0.51			0.51			0.40			0.40	
v/c Ratio		1.44			1.72			1.72			0.91	
Control Delay		227.3			351.6			355.6			42.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		227.3			351.6			355.6			42.8	
LOS		F			F			F			D	
Approach Delay		227.3			351.6			355.6			42.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			D	
Queue Length 50th (ft)		964			834			611			281	
Queue Length 95th (ft)		#1216			#1072			#830			#501	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		858			567			419			658	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.44			1.72			1.72			0.91	

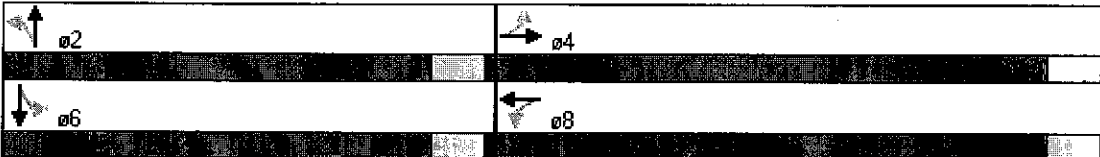
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.72
 Intersection Signal Delay: 256.4
 Intersection Capacity Utilization 161.6%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.969			0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.734			0.705		0.950			0.950		
Satd. Flow (perm)	0	1367	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red												
Satd. Flow (RTOR)			34			134		62			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	123	27	790	207	192	885	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	134	29	859	225	209	962	45
Lane Group Flow (vph)	0	41	34	0	242	134	29	1084	0	209	1007	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	26.1	0.0	13.0	30.2	0.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	34.8%	34.8%	14.8%	43.5%	0.0%	21.7%	50.3%	0.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.0	21.2		8.1	25.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		14.6	14.6		14.6	14.6	4.9	21.5		9.0	31.1	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.08	0.38		0.16	0.54	
v/c Ratio		0.12	0.08		0.72	0.27	0.21	0.82		0.75	0.52	
Control Delay		17.1	7.1		33.5	5.4	30.4	22.1		44.3	11.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.1	7.1		33.5	5.4	30.4	22.1		44.3	11.1	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.6			23.5			22.3			16.8	
Approach LOS		B			C			C			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		11	0		77	0	10	172		74	96	
Queue Length 95th (ft)		31	17		#164	34	32	#280		#172	200	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		390	476		375	547	140	1355		281	1919	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.11	0.07		0.65	0.24	0.21	0.80		0.74	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 57.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 19.8
 Intersection Capacity Utilization 68.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850		0.868				
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Flt Permitted	0.950					0.950						
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						223		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	791	452	0	0	378	205	276	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	860	491	0	0	411	223	300	18	130	0	0	0
Lane Group Flow (vph)	860	491	0	0	411	223	300	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.64	0.21			0.58	0.45	0.37	0.31				
Control Delay	13.4	1.2			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.4	1.2			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.7			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	157	6			85	0	55	6				
Queue Length 95th (ft)	239	14			118	48	89	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	563	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.64	0.21			0.46	0.40	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 53.6%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB ramps
2030 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frnt						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Fit Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				Ⓢ		Ⓢ
Satd. Flow (RTOR)						351
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1013	572	0	230	715
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1101	622	0	250	777
Lane Group Flow (vph)	0	1101	622	0	250	777
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.5	37.5	0.0	32.5	32.5
Total Split (%)	0.0%	53.6%	53.6%	0.0%	46.4%	46.4%
Maximum Green (s)		32.6	32.6		28.0	28.0
Flow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.5	33.5		28.5	28.5
Actuated g/C Ratio		0.48	0.48		0.41	0.41
v/c Ratio		0.65	0.37		0.18	0.58
Control Delay		16.1	1.2		13.7	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.1	1.2		13.7	10.3
LOS		B	A		B	B
Approach Delay		16.1	1.2		11.2	
Approach LOS		B	A		B	

15: Ellis OC & SR 99 SB ramps
 2030 Project PM Alternative A

10/22/2008



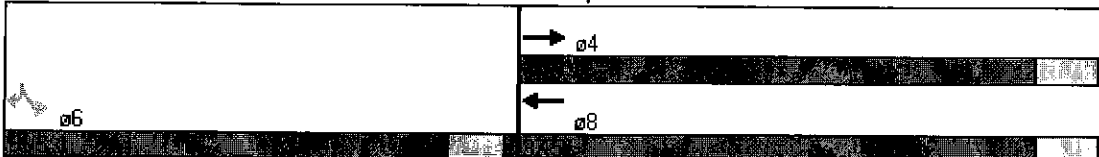
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		177	0		34	71
Queue Length 95th (ft)		241	7		56	127
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1694	1694		1398	1343
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.37		0.18	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 53.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps



17: Ellis OC & Aviation Drive
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.927			0.902				0.850		0.850	
Fit Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Fit Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Right Turn on Red			∅s			∅s			∅s		∅s	
Satd. Flow (RTOR)		131			251				43		70	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			1080			1293		1356		
Travel Time (s)		18.2			18.4			22.0		23.1		
Volume (vph)	54	170	161	809	121	231	382	631	58	175	628	1014
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	185	175	879	132	251	415	686	63	190	683	1102
Lane Group Flow (vph)	59	360	0	879	383	0	415	686	63	190	1785	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6			2
Detector Phases	7	4		3	8		1	6	6	5		2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0		4.0
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9		20.9
Total Split (s)	16.6	24.0	0.0	34.0	41.4	0.0	21.0	68.9	68.9	23.1	71.0	0.0
Total Split (%)	11.1%	16.0%	0.0%	22.7%	27.6%	0.0%	14.0%	45.9%	45.9%	15.4%	47.3%	0.0%
Maximum Green (s)	12.1	19.1		29.5	36.5		16.5	64.0	64.0	18.2	66.1	
∅low Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	∅s	∅s		∅s	∅s		∅s	∅s	∅s	∅s		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	10.3	16.2		30.0	38.2		17.0	64.9	64.9	19.1	67.0	
Actuated g/C Ratio	0.07	0.11		0.21	0.26		0.12	0.44	0.44	0.13	0.46	
v/c Ratio	0.48	0.75		2.42	0.38		2.01	0.87	0.09	0.82	2.34	
Control Delay	78.8	49.9		671.3	16.4		505.1	50.9	10.5	89.4	627.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	78.8	49.9		671.3	16.4		505.1	50.9	10.5	89.4	627.6	
LOS	E	D		F	B		F	D	B	F	F	
Approach Delay		54.0			472.6			210.6		575.8		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	55	113		4385	52		620	591	11	180	2776	
Queue Length 95th (ft)	106	171		#1682	102		#853	#860	41	#321	#3116	
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	148	551		363	1031		206	786	726	231	763	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.40	0.65		2.42	0.37		2.01	0.87	0.09	0.82	2.34	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 146.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 2.42
 Intersection Signal Delay: 415.2
 Intersection Capacity Utilization 125.8%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

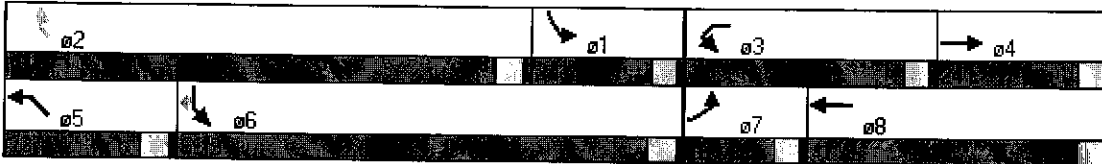
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	305	1687	0	0	1458	825	522	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	332	1834	0	0	1585	897	567	7	807	0	0	0
Lane Group Flow (vph)	332	1834	0	0	1585	897	284	290	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	14.0	47.0	0.0	0.0	33.0	33.0	33.0	33.0	33.0	0.0	0.0	0.0
Total Split (%)	17.5%	58.8%	0.0%	0.0%	41.3%	41.3%	41.3%	41.3%	41.3%	0.0%	0.0%	0.0%
Maximum Green (s)	9.4	42.4			28.4	28.4	28.5	28.5	28.5			
Flow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	10.0	43.0			29.0	29.0	29.0	29.0	29.0			
Actuated g/C Ratio	0.12	0.54			0.36	0.36	0.36	0.36	0.36			
v/c Ratio	1.52	0.97			1.24	0.82	0.47	0.47	1.39			
Control Delay	260.2	15.2			138.9	10.9	22.7	22.8	211.7			
Queue Delay	0.0	21.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	260.2	36.1			138.9	10.9	22.7	22.8	211.7			
LOS	F	D			F	B	C	C	F			
Approach Delay		70.5			92.6			133.1				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			F			F				
Queue Length 50th (ft)	232	211			524	30	112	114	549			
Queue Length 95th (ft) m#171		m175			#656	#224	186	190	#766			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	219	1884			1283	1089	609	611	580			
Starvation Cap Reductn	0	137			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.52	1.05			1.24	0.82	0.47	0.47	1.39			

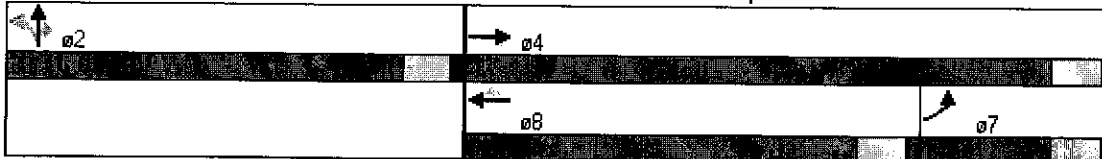
Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 79 (99%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.52
 Intersection Signal Delay: 93.9
 Intersection Capacity Utilization 185.1%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			763									8
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		30
Link Distance (ft)		1214			391			1434		886		
Travel Time (s)		23.6			7.6			32.6		20.1		
Volume (vph)	0	1208	702	290	1690	0	0	0	0	784	9	324
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1313	763	315	1837	0	0	0	0	852	10	352
Lane Group Flow (vph)	0	1313	763	315	1837	0	0	0	0	0	862	352
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	30.0	30.0	15.0	45.0	0.0	0.0	0.0	0.0	35.0	35.0	35.0
Total Split (%)	0.0%	37.5%	37.5%	18.8%	56.3%	0.0%	0.0%	0.0%	0.0%	43.8%	43.8%	43.8%
Maximum Green (s)		25.4	25.4	10.4	40.4					30.5	30.5	30.5
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		26.0	26.0	11.0	41.0						31.0	31.0
Actuated g/C Ratio		0.32	0.32	0.14	0.51						0.39	0.39
v/c Ratio		1.14	0.74	1.30	1.01						1.31	0.60
Control Delay		102.2	6.9	174.9	20.2						177.3	24.2
Queue Delay		0.0	0.0	0.0	24.0						0.0	0.0
Total Delay		102.2	6.9	174.9	44.2						177.3	24.2
LOS		F	A	F	D						F	C
Approach Delay		67.2			63.3						132.9	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 Project PM Alternative A

10/22/2008

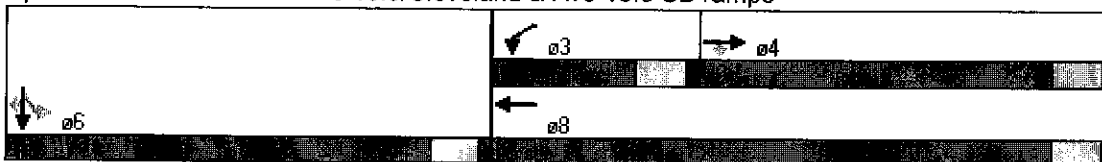
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E						F	
Queue Length 50th (ft)		410	0	213	489					564	134	
Queue Length 95th (ft)		#537	88	m#207	m137						#781	221
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1150	1030	243	1814						656	590
Starvation Cap Reductn		0	0	0	109						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		1.14	0.74	1.30	1.08						1.31	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 8 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.31
 Intersection Signal Delay: 80.3
 Intersection Capacity Utilization 185.1%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H













~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2030 Project PM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	56	1	51	0	477	92	53	490	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	61	1	55	0	518	100	58	533	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1272	1266	533	1218	1216	568	533			618		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1272	1266	533	1218	1216	568	533			618		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	100	58	99	89	100			94		
cM capacity (veh/h)	122	158	547	147	167	516	996			897		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	117	618	590								
Volume Left	0	61	0	58								
Volume Right	1	55	100	0								
cSH	245	222	996	897								
Volume to Capacity	0.01	0.53	0.00	0.06								
Queue Length 95th (ft)	1	70	0	5								
Control Delay (s)	19.8	38.1	0.0	1.7								
Lane LOS	C	E		A								
Approach Delay (s)	19.8	38.1	0.0	1.7								
Approach LOS	C	E										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization		82.4%		ICU Level of Service					E			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 Project PM Alternative A

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950				0.958					0.950	0.853	
Satd. Flow (prot)	3400	3505	0	0	3391	0	0	0	0	1770	1589	0
Flt Permitted	0.187									0.950		
Satd. Flow (perm)	669	3505	0	0	3391	0	0	0	0	1770	1589	0
Right Turn on Red			rs			rs			rs		rs	
Satd. Flow (RTOR)					136						168	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	1213	810	0	0	838	326	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1318	880	0	0	911	354	0	0	0	397	3	168
Lane Group Flow (vph)	1318	880	0	0	1265	0	0	0	0	397	171	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	94.0	94.0	0.0	0.0	94.0	0.0	0.0	0.0	0.0	26.0	26.0	0.0
Total Split (%)	78.3%	78.3%	0.0%	0.0%	78.3%	0.0%	0.0%	0.0%	0.0%	21.7%	21.7%	0.0%
Maximum Green (s)	89.4	89.4			89.4					21.5	21.5	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	90.0	90.0			90.0					22.0	22.0	
Actuated g/C Ratio	0.75	0.75			0.75					0.18	0.18	
v/c Ratio	2.63	0.33			0.49					1.22	0.40	
Control Delay	749.5	2.3			5.9					166.0	9.6	
Queue Delay	0.0	0.5			0.0					0.0	0.0	
Total Delay	749.5	2.8			5.9					166.0	9.6	
LOS	F	A			A					F	A	
Approach Delay		450.5			5.9						118.9	

21: SR 145/Madera & SR 99 NB ramps
 2030 Project PM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		F			A						F	
Queue Length 50th (ft)	901	37			153					378	2	
Queue Length 95th (ft) m#947		m55			191					#575	62	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	502	2629			2577					325	429	
Starvation Cap Reductn	0	1194			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	2.63	0.61			0.49					1.22	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.63
 Intersection Signal Delay: 264.3
 Intersection Capacity Utilization 98.4%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service F




















~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
2030 Project PM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.998				0.850
Flt Protected	0.950						0.950				0.984	
Satd. Flow (prot)	1736	1827	1553	0	0	0	3433	3532	0	0	3449	1568
Flt Permitted	0.950						0.950				0.567	
Satd. Flow (perm)	1736	1827	1553	0	0	0	3433	3532	0	0	1987	1568
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			423					2				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	545	358	1146	0	0	0	343	1474	24	214	462	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	592	389	1246	0	0	0	373	1602	26	233	502	573
Lane Group Flow (vph)	592	389	1246	0	0	0	373	1628	0	0	735	573
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	60.4	60.4	60.4	0.0	0.0	0.0	20.6	59.6	0.0	39.0	39.0	39.0
Total Split (%)	50.3%	50.3%	50.3%	0.0%	0.0%	0.0%	17.2%	49.7%	0.0%	32.5%	32.5%	32.5%
Maximum Green (s)	55.9	55.9	55.9				16.0	55.0		34.4	34.4	34.4
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead
Lead-Lag Optimize?							ℳs			ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	56.4	56.4	56.4				16.6	55.6			35.0	35.0
Actuated g/C Ratio	0.47	0.47	0.47				0.14	0.46			0.29	0.29
v/c Ratio	0.73	0.45	1.31				0.79	0.99		3.82dl		0.66
Control Delay	29.9	23.2	164.9				62.7	53.2			159.6	3.7
Queue Delay	105.6	36.9	8.7				0.0	0.0			0.0	0.2
Total Delay	135.5	60.1	173.6				62.7	53.2			159.6	3.9
LOS	F	E	F				E	D			F	A
Approach Delay		143.6						54.9			91.4	

22: AVe 14/Olive & SR 145/Madera
 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F						D			F	
Queue Length 50th (ft)	331	177	4237				145	644			382	23
Queue Length 95th (ft)	m489	m247	#1505				#211	#828			m#426	m32
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	816	859	954				475	1638			580	863
Starvation Cap Reductn	333	486	14				0	0			0	18
Spillback Cap Reductn	0	0	0				0	0			0	30
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	1.23	1.04	1.33				0.79	0.99			1.27	0.69

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 55 (46%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.31
 Intersection Signal Delay: 99.2
 Intersection Capacity Utilization 100.7%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service G

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.
- dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 2030 Project PM Alternative A

10/22/2008

	↖	→	←	↙	↘	↗
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						77
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1112	870	0	937	392
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1209	946	0	1018	426
Lane Group Flow (vph)	0	1209	946	0	1018	426
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	61.0	61.0	0.0	59.0	59.0
Total Split (%)	0.0%	50.8%	50.8%	0.0%	49.2%	49.2%
Maximum Green (s)		56.5	56.5		54.5	54.5
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		66.7	66.7		45.3	45.3
Actuated g/C Ratio		0.56	0.56		0.38	0.38
v/c Ratio		0.61	0.48		0.83	0.70
Control Delay		21.0	7.2		40.0	31.0
Queue Delay		0.9	0.8		0.0	0.0
Total Delay		21.9	7.9		40.0	31.0
LOS		C	A		D	C
Approach Delay		21.9	7.9		37.3	

23: AVE 14/Olive & SR 99 SB off-ramp
 2030 Project PM Alternative A

10/22/2008



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		C	A		D	
Queue Length 50th (ft)		321	74		362	227
Queue Length 95th (ft)		465	117		389	303
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1967	1967		1486	727
Starvation Cap Reductn		0	643		0	0
Spillback Cap Reductn		448	0		12	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.80	0.71		0.69	0.59

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 64.1%
 Analysis Period (min) 15













Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2030 Project PM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	110	77	12	10	26	129	5	211	17	142	193	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	84	13	11	28	140	5	229	18	154	210	82
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	216	179	253	446								
Volume Left (vph)	120	11	5	154								
Volume Right (vph)	13	140	18	82								
Hadj (s)	0.13	-0.29	0.15	0.23								
Departure Headway (s)	6.6	6.3	6.3	6.0								
Degree Utilization, x	0.40	0.32	0.44	0.74								
Capacity (veh/h)	482	486	524	583								
Control Delay (s)	13.9	12.2	14.1	24.1								
Approach Delay (s)	13.9	12.2	14.1	24.1								
Approach LOS	B	B	B	C								

Intersection Summary

Delay		17.8		
HCM Level of Service		C		
Intersection Capacity Utilization	69.1%		ICU Level of Service	C
Analysis Period (min)	15			

25: SB Ramps & GS Blvd
 2030 Project PM Alternative A

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↖	↖	↑	↗	↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.652	
Satd. Flow (perm)	3335	1538	1759	1495	1191	1827
Right Turn on Red		R/s		R/s		
Satd. Flow (RTOR)		103		633		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	806		408			1104
Travel Time (s)	18.3		9.3			25.1
Volume (vph)	1368	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	1487	153	124	633	241	208
Lane Group Flow (vph)	1487	153	124	633	241	208
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	72.5	47.5	47.5	47.5	47.5	47.5
Total Split (%)	60.4%	39.6%	39.6%	39.6%	39.6%	39.6%
Maximum Green (s)	68.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	82.6	29.4	29.4	29.4	29.4	29.4
Actuated g/C Ratio	0.69	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.65	0.34	0.29	0.75	0.83	0.46
Control Delay	14.0	13.6	46.4	16.5	64.0	40.2
Queue Delay	0.7	0.0	0.0	7.3	0.0	0.0
Total Delay	14.7	13.6	46.4	23.8	64.0	40.2
LOS	B	B	D	C	E	D
Approach Delay	14.6		27.5			52.9

25: SB Ramps & GS Blvd
 2030 Project PM Alternative A

10/22/2008

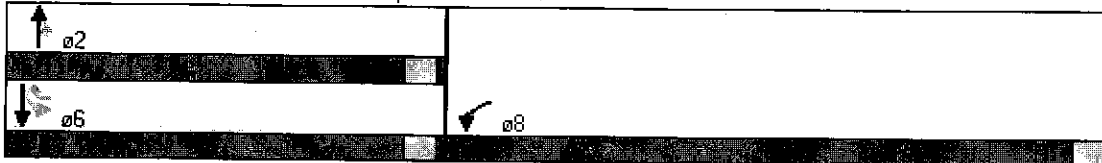
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		C			D
Queue Length 50th (ft)	291	31	84	303	180	140
Queue Length 95th (ft)	532	73	m37	m93	236	179
Internal Link Dist (ft)	726		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2295	623	638	945	432	662
Starvation Cap Reductn	0	0	0	265	0	0
Spillback Cap Reductn	444	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.25	0.19	0.93	0.56	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 62 (52%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 24.1
 Intersection Capacity Utilization 64.7%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Flt Protected	0.950	0.990		0.950	0.939		0.950	0.872		0.950		0.850
Satd. Flow (prot)	1671	3309	0	1687	3168	0	1752	1609	0	3335	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	3168	0	1752	1609	0	3335	1810	1538
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		6			137			104				114
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1426	28	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1550	30	114
Lane Group Flow (vph)	261	446	0	21	1179	0	47	122	0	1550	30	114
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	18.0	45.6	0.0	9.9	37.5	0.0	12.8	20.5	0.0	44.0	51.7	51.7
Total Split (%)	15.0%	38.0%	0.0%	8.3%	31.3%	0.0%	10.7%	17.1%	0.0%	36.7%	43.1%	43.1%
Maximum Green (s)	13.4	41.0		5.3	32.9		8.3	16.0		39.5	47.2	47.2
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lead		Lag	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	14.0	45.6		5.9	33.5		8.0	16.5		40.0	50.5	50.5
Actuated g/C Ratio	0.12	0.38		0.05	0.28		0.07	0.14		0.33	0.42	0.42
v/c Ratio	1.34	0.35		0.25	1.20		0.40	0.39		1.39	0.04	0.16
Control Delay	223.7	28.2		69.9	128.7		63.8	16.3		212.1	14.6	3.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		16.7	0.0	0.0
Total Delay	223.7	28.2		69.9	128.7		63.8	16.3		228.8	14.6	3.2
LOS	F	C		E	F		E	B		F	B	A
Approach Delay		100.3			127.7			29.5			209.9	

26: Ave 12 & GS Blvd
 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			C			F	
Queue Length 50th (ft)	264	134		18	503		35	12		835	15	19
Queue Length 95th (ft)	#433	181		m30	m#554		76	69		#971	m12	m10
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	195	1260		83	983		128	311		1112	761	713
Starvation Cap Reductn	0	0		0	0		0	0		29	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.34	0.35		0.25	1.20		0.37	0.39		1.43	0.04	0.16

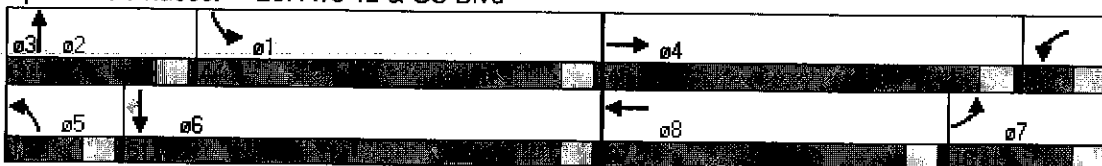
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 16 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 155.1
 Intersection Capacity Utilization 102.6%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service G

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950					0.850			0.850			
Satd. Flow (prot)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						614			44			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		30
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	361	1577	0	0	714	1172	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	392	1714	0	0	776	1274	424	2	392	0	0	0
Lane Group Flow (vph)	392	1714	0	0	776	1274	0	426	392	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	26.0	90.0	0.0	0.0	64.0	64.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	21.7%	75.0%	0.0%	0.0%	53.3%	53.3%	25.0%	25.0%	25.0%	0.0%	0.0%	0.0%
Maximum Green (s)	21.5	85.5			59.5	59.5	25.5	25.5	25.5			
Flow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	22.0	86.0			60.0	60.0		26.0	26.0			
Actuated g/C Ratio	0.18	0.72			0.50	0.50		0.22	0.22			
v/c Ratio	1.23	0.69			0.45	1.18		1.16	1.09			
Control Delay	142.5	3.7			20.4	105.9		140.6	112.0			
Queue Delay	0.0	0.5			0.0	0.0		0.0	0.0			
Total Delay	142.5	4.1			20.4	105.9		140.6	112.0			
LOS	F	A			C	F		F	F			
Approach Delay		29.9			73.5			126.9				

27: Ave 12 & SR 99 NB Ramps
 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			F				
Queue Length 50th (ft)	387	60			197	930		391	313			
Queue Length 95th (ft)	m#305	m26			248	#1195		#593	#511			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	318	2488			1736	1084		367	361			
Starvation Cap Reductn	0	326			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	1.23	0.79			0.45	1.18		1.16	1.09			

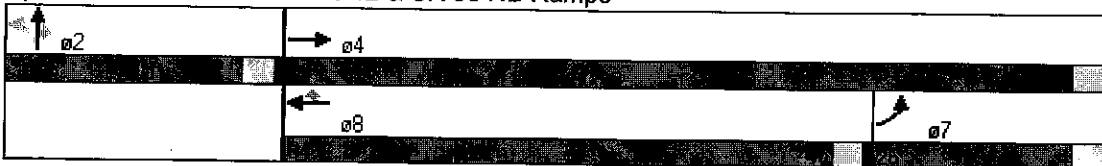
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 95 (79%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.23
 Intersection Signal Delay: 63.8
 Intersection Capacity Utilization 124.3%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 28

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE A

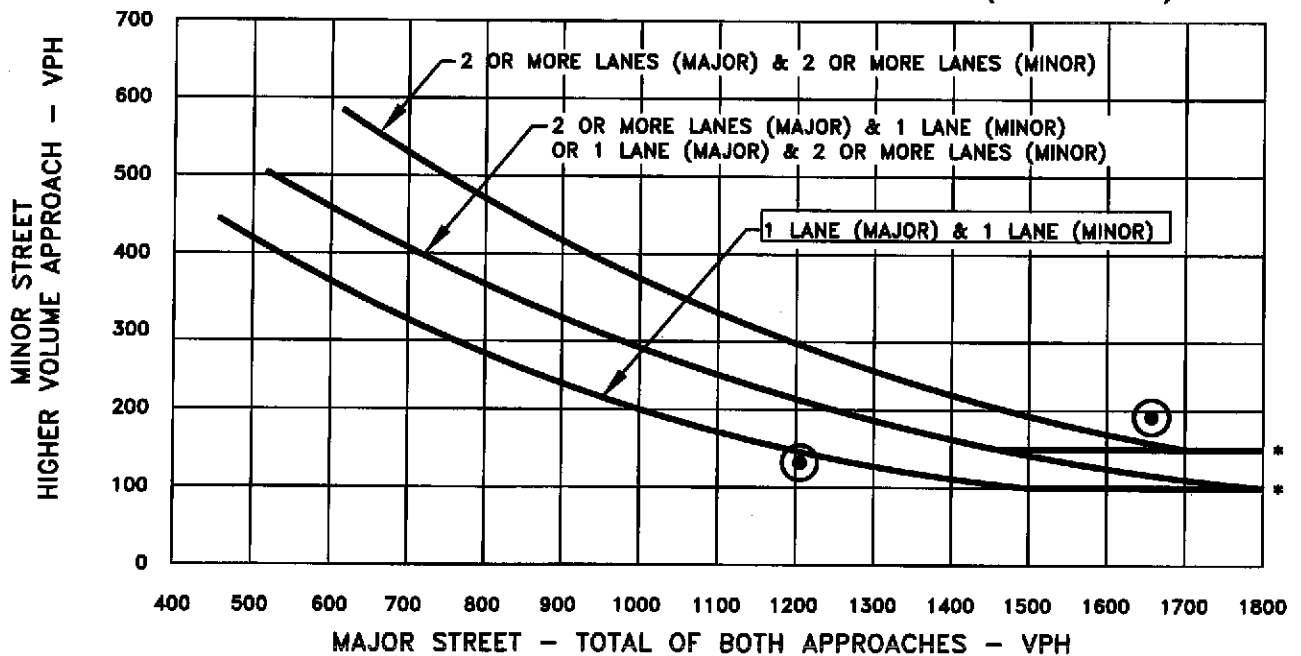
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		1205	1657	
Highest Approaches - Minor Street	✓		132	192	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE A

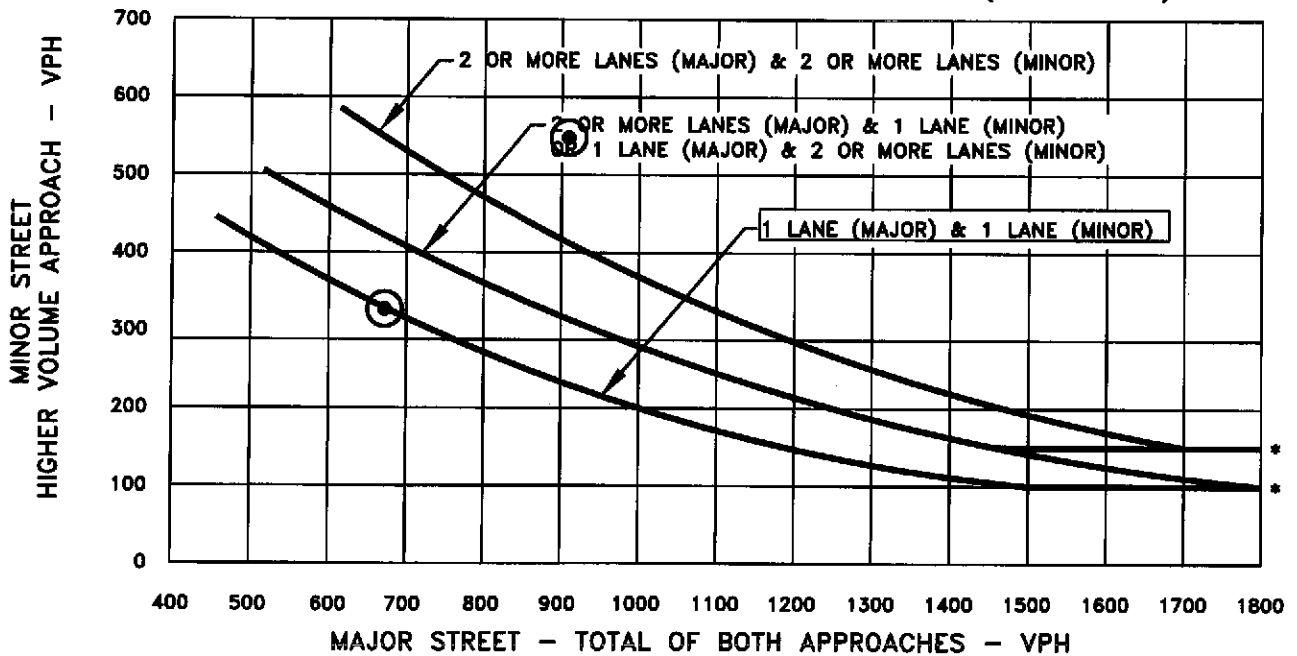
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		672	909	
Highest Approaches - Minor Street	✓		339	548	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

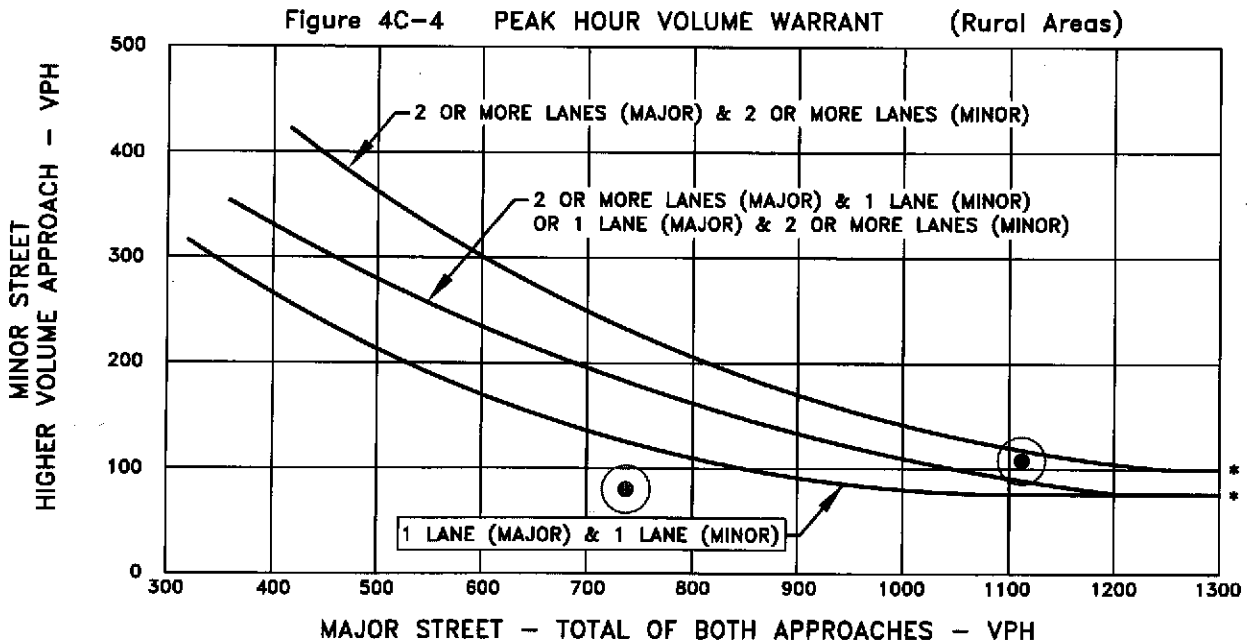
CONDITION: 2030 PROJECT - ALTERNATIVE A

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		746	1112		
Highest Approaches - Minor Street	✓		80	108		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE A

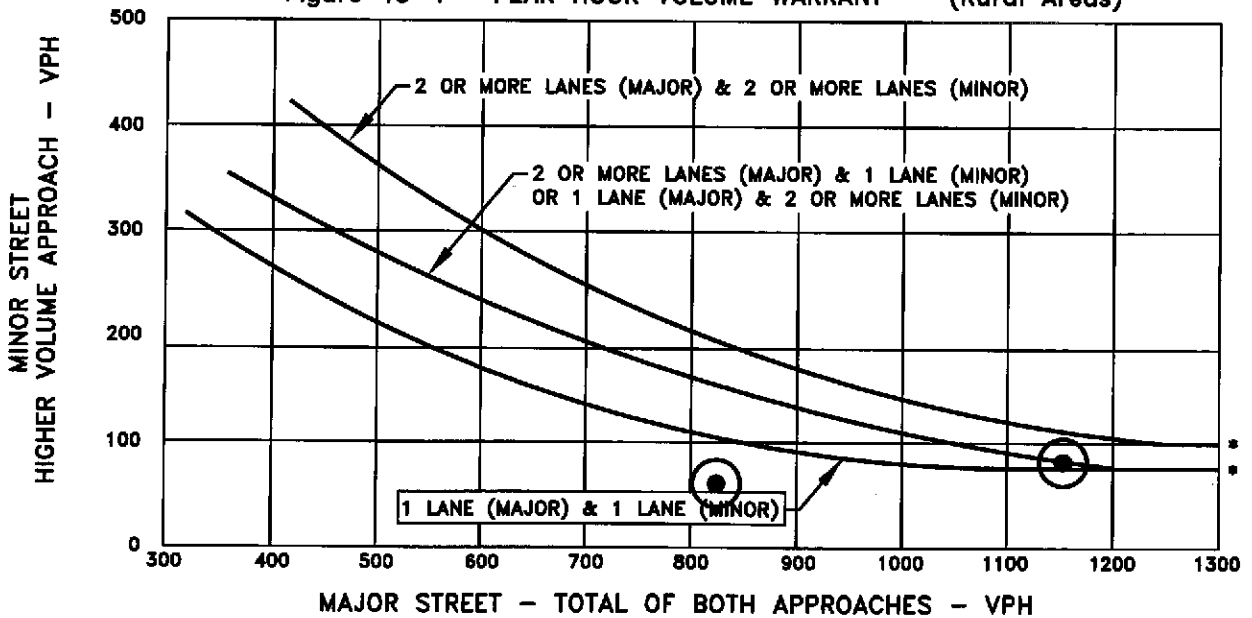
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		824	1153				
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		61	118				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE A

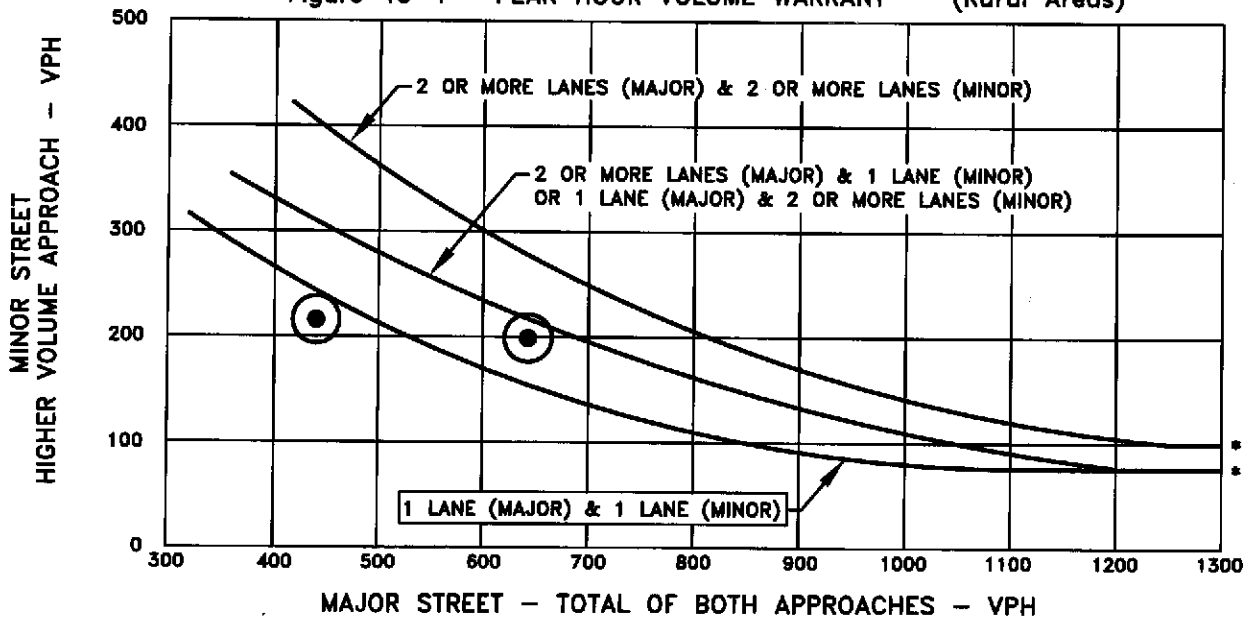
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	440	643		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	216	199		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

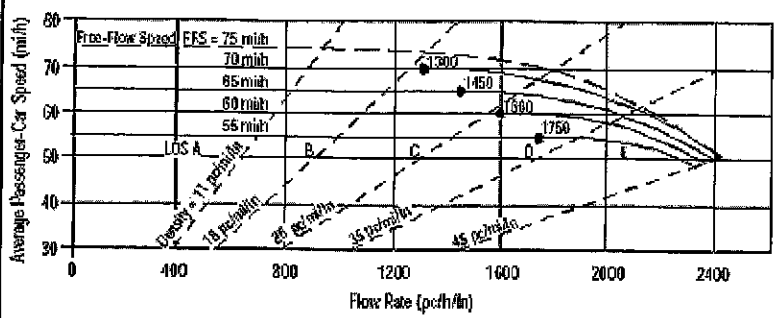
ATTACHMENT VI – C - 29

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	7/19/06	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper. (LOS)
 Des. (N)
 Planning Data

Flow Inputs			
Volume, V	4243	veh/h	Peak-Hour Factor, PHF
AAADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AAADT, K			% RVs, P _R
Peak-Hr Direction Prop., D			General Terrain:
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

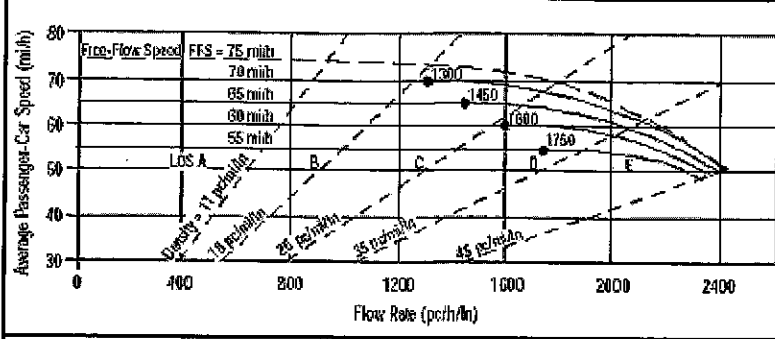
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1806 pc/h/ln	Design LOS	
S	67.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.6 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt b			

<input checked="" type="checkbox"/> Oper.(LOS)	<input checked="" type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	4998	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length %
Driver type adjustment	1.00		Up/Down %

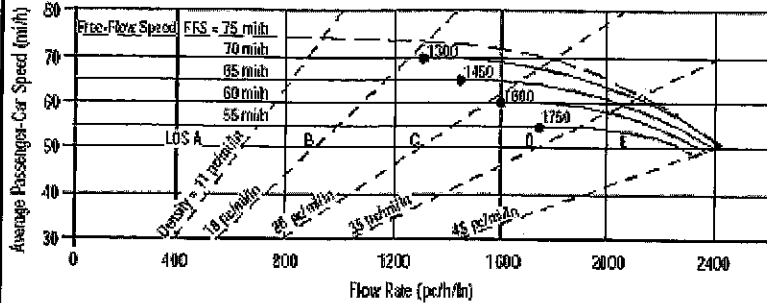
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2128 pc/h/ln	Design LOS	
S	62.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	34.3 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper. (LOS) Des. (N) Planning Data

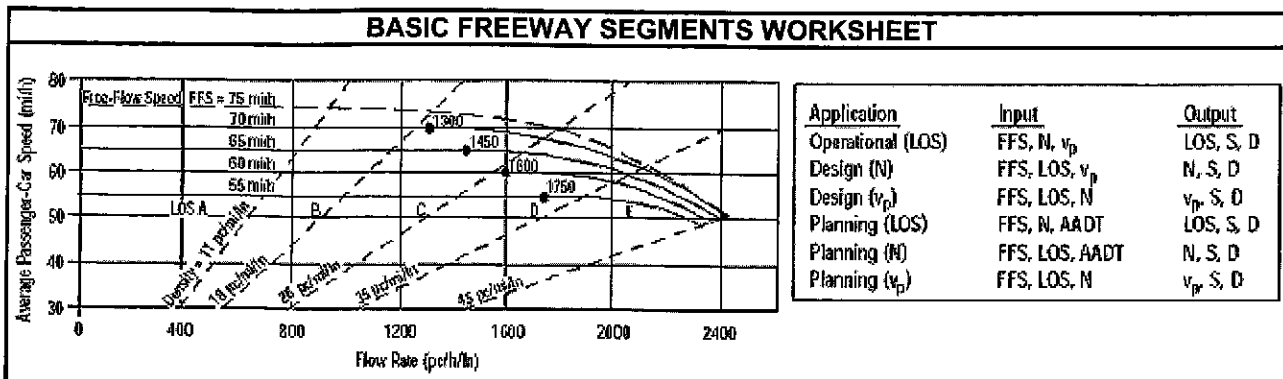
Flow Inputs			
Volume, V	3903	veh/h	Peak-Hour Factor, PHF
AAADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AAADT, K			% RVs, P _R
Peak-Hr Direction Prop., D			General Terrain:
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T * (E _T - 1) + P _R * (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1662 pc/h/ln	Design LOS	
S	69.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.1 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper. (LOS)
 Des. (N)
 Planning Data

Flow Inputs			
Volume, V	5542	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2360 pc/h/ln	Design LOS	
S	54.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	43.0 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

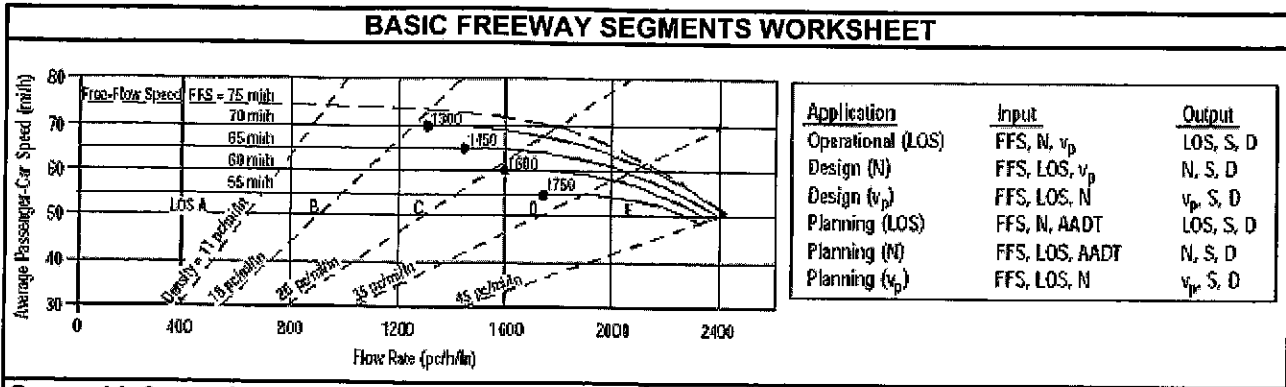
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different density and flow rate conditions: 70 mi/h, 85 mi/h, 60 mi/h, 55 mi/h, 20 pc/h/ln, 18 pc/h/ln, 25 pc/h/ln, 35 pc/h/ln, and 45 pc/h/ln. Points are marked at (1300, 70), (1450, 65), (1600, 60), and (1750, 55). A 'Free-Flow Speed' of 75 mi/h is indicated at the top left.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2030 Project Alt B AM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4226	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [1 + P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1799	pc/h/ln	Design LOS																			
S	67.9	mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
$D = v_p / S$	26.5	pc/mi/ln	S																			
LOS	D		$D = v_p / S$																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 1300, 1450, 1600, and 1750. Dashed lines indicate Level of Service (LOS) levels: LOS A (55 mi/h), LOS B (60 mi/h), LOS C (65 mi/h), and LOS D (70 mi/h). A legend for Free-Flow Speed (FFS) is provided: FFS = 75 mi/h, 70 mi/h, 65 mi/h, 60 mi/h, 55 mi/h.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2030 Project Alt B PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4850	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			% RVs, P_R																			
Peak-Hr Direction Prop., D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length %																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00		E_R																			
E_T	1.5		$f_{HV} = 1/P_T - (E_T - 1) + P_R(E_R - 1)$																			
Speed Inputs																						
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	2065	pc/h/ln	Design LOS																			
S	63.5	mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$																			
$D = v_p / S$	32.5	pc/mi/ln	S																			
LOS	D		$D = v_p / S$																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>Free-Flow Speed FFS = 75 mi/h 70 mi/h 65 mi/h 60 mi/h 55 mi/h LOS A Density = 11 pc/mi/ln 10 pc/mi/ln 20 pc/mi/ln 30 pc/mi/ln 45 pc/mi/ln Flow Rate (pc/h/ln)</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
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Analysis Time Period	2030 Project Alt B AM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3855	veh/h	Peak-Hour Factor, PHF 0.88																			
AADT		veh/day	%Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AADT, K			%RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AADT x K x D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [1 + P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	3		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		Design LOS																				
v_p	1641	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$ pc/h																			
S	69.2	mi/h	f_p mi/h																			
$D = v_p / S$	23.7	pc/mi/ln	S mi/h																			
LOS	C		$D = v_p / S$ pc/mi/ln																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
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Application	Input	Output																				
Operational (LOS)	FFS, N, v _p	LOS, S, D																				
Design (N)	FFS, LOS, v _p	N, S, D																				
Design (v _p)	FFS, LOS, N	v _p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v _p)	FFS, LOS, N	v _p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2030 Project Alt B PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	5499	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	% Trucks and Buses, P _T																			
Peak-Hr Prop. of AADT, K			% RVs, P _R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length %																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f _p	1.00	E _R	1.2																			
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f _{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																			
Interchange Density	0.50	l/mi	f _{ID}																			
Number of Lanes, N	3		f _N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)		Design LOS																				
	2341	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																			
S	55.6	mi/h	f _p																			
D = v _p / S	42.1	pc/mi/ln	S																			
LOS	E		D = v _p / S																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																			
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5465	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

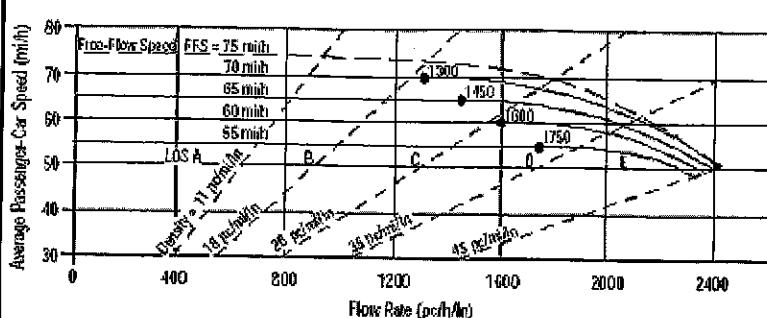
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2327 pc/h/ln	Design LOS	
S	56.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	41.5 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	7239	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

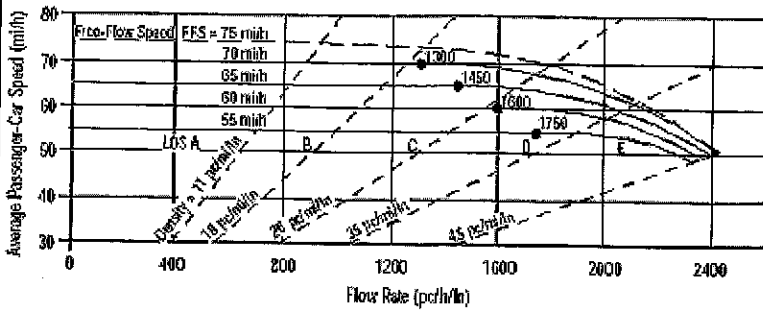
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	3082 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	mi/h	S	mi/h
D = v _p / S	pc/mi/ln	D = v _p / S	pc/mi/ln
LOS	F	Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																										
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Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst	R Davis		Highway/Direction of Travel	SR 99 Southbound																						
Agency or Company	TPG Consulting, Inc.		From/To	south of Avenue 17																						
Date Performed	9/22/08		Jurisdiction	Caltrans																						
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<input checked="" type="checkbox"/> Oper. (LOS)		<input checked="" type="checkbox"/> Des. (N)		<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	4593	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	% Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			% RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT x K x D		veh/h	Grade % Length	mi																						
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f _p	1.00		E _R	1.2																						
E _T	1.5		f _{HV} = [1/P _T (E _T -1) + P _R (E _R -1)]	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f _{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																						
Interchange Density	0.50	l/mi	f _{ID}	mi/h																						
Number of Lanes, N	3		f _N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1956	pc/h/ln	Design LOS																							
S	65.7	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h																						
D = v _p / S	29.8	pc/mi/ln	S	mi/h																						
LOS	D		D = v _p / S	pc/mi/ln																						
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																						
v _p - Flow rate	FFS - Free-flow speed		f _p - Page 23-12	f _N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																										

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt B PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7570	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	3223 pc/h/ln	Design LOS	
f _p		v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	
S	mi/h	f _p	
D = v _p / S	pc/mi/ln	S	
LOS	F	D = v _p / S	
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

ATTACHMENT VI – C - 30


















2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

INTERSECTION LEVEL OF SERVICE CALCULATIONS













1: Ave 18.5 & SR 99 NB ramps
2030 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.981			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1271	1338	0	0	1566	0	1388	1253	0	0	0	0
Flt Permitted	0.619						0.950					
Satd. Flow (perm)	828	1338	0	0	1566	0	1388	1253	0	0	0	0
Right Turn on Red			rs			rs		rs		rs		rs
Satd. Flow (RTOR)					24			66				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	344	99	0	0	177	29	227	3	61	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	374	108	0	0	192	32	247	3	66	0	0	0
Lane Group Flow (vph)	374	108	0	0	224	0	247	69	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.4	39.4	0.0	0.0	39.4	0.0	20.6	20.6	0.0	0.0	0.0	0.0
Total Split (%)	65.7%	65.7%	0.0%	0.0%	65.7%	0.0%	34.3%	34.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	34.8	34.8			34.8		16.0	16.0				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	37.5	37.5			37.5		14.5	14.5				
Actuated g/C Ratio	0.62	0.62			0.62		0.24	0.24				
v/c Ratio	0.72	0.13			0.23		0.74	0.20				
Control Delay	11.2	3.2			5.6		34.7	7.0				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	11.2	3.2			5.6		34.7	7.0				
LOS	B	A			A		C	A				
Approach Delay		9.4			5.6			28.6				

1: Ave 18.5 & SR 99 NB ramps
 2030 Project AM Alternative B

10/22/2008

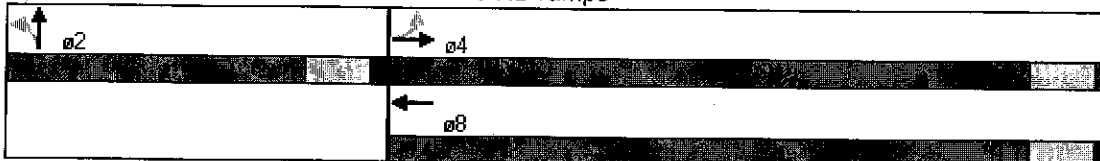
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	25	7			29		78	1				
Queue Length 95th (ft)	m#54	m11			58		#164	26				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	517	835			987		384	394				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.72	0.13			0.23		0.64	0.18				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 7 (12%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 14.5
 Intersection Capacity Utilization 52.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



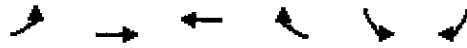
3: Ave 18.5 & Road 23
2030 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	
Trailing Detector (ft)		0	0		0	
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.902	
Flt Protected					0.987	
Satd. Flow (prot)	0	1418	1545	0	1244	0
Flt Permitted					0.987	
Satd. Flow (perm)	0	1418	1545	0	1244	0
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)					239	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	578	301	0	107	287
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	23%	23%	36%	36%
Adj. Flow (vph)	0	628	327	0	116	312
Lane Group Flow (vph)	0	628	327	0	428	0
Turn Type						
Protected Phases		4	8			
Permitted Phases					6	
Detector Phases		4	8		6	
Minimum Initial (s)		4.0	4.0		4.0	
Minimum Split (s)		20.6	20.6		21.3	
Total Split (s)	0.0	36.5	36.5	0.0	23.5	0.0
Total Split (%)	0.0%	60.8%	60.8%	0.0%	39.2%	0.0%
Maximum Green (s)		31.9	31.9		18.2	
ℳlow Time (s)		3.6	3.6		4.3	
All-Red Time (s)		1.0	1.0		1.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	
Recall Mode		C-Max	C-Max		Min	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effct Green (s)		36.3	36.3		15.7	
Actuated g/C Ratio		0.60	0.60		0.26	
v/c Ratio		0.73	0.35		0.85	
Control Delay		17.3	5.0		26.6	
Queue Delay		0.0	0.0		0.0	
Total Delay		17.3	5.0		26.6	
LOS		B	A		C	
Approach Delay		17.3	5.0		26.6	

3: Ave 18.5 & Road 23
 2030 Project AM Alternative B

10/22/2008



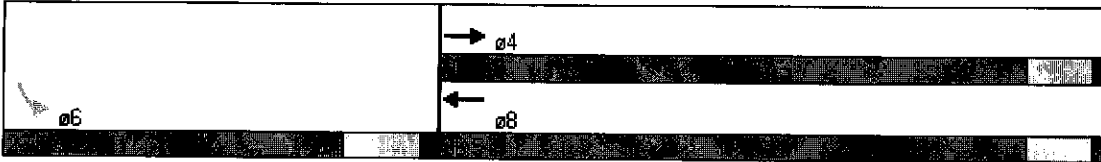
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		159	24		57	
Queue Length 95th (ft)		#364	m56		#199	
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		859	936		566	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.73	0.35		0.76	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 17.3
 Intersection Capacity Utilization 60.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: Ave 18.5 & Road 23























4: Ave 18.5 & Pistacchio
2030 Project AM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	495	427	181	68	64
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	538	464	197	74	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)			295			
pX, platoon unblocked	1.00				1.00	1.00
vC, conflicting volume	661				1043	464
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	661				1043	464
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				66	87
cM capacity (veh/h)	797				217	541
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	559	464	197	143		
Volume Left	21	0	0	74		
Volume Right	0	0	197	70		
cSH	797	1700	1700	306		
Volume to Capacity	0.03	0.27	0.12	0.47		
Queue Length 95th (ft)	2	0	0	59		
Control Delay (s)	0.7	0.0	0.0	26.7		
Lane LOS	A			D		
Approach Delay (s)	0.7	0.0		26.7		
Approach LOS				D		
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization		55.8%		ICU Level of Service		B
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
2030 Project AM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	15	70	39	286	75	107	110	69	17	38	60	235
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	76	42	311	82	116	120	75	18	41	65	255
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage (veh)												
Upstream signal (ft)					978							
pX, platoon unblocked												
vC, conflicting volume	198			118			1121	854	82	889	949	97
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			118			1121	854	82	889	949	97
tC, single (s)	4.1			4.1			7.8	6.5	6.9	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.1	4.0	3.9	3.5	4.0	3.3
p0 queue free %	99			79			0	67	98	74	68	73
cM capacity (veh/h)	1369			1470			63	230	821	162	203	959
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	135	392	116	195	18	41	321					
Volume Left	16	311	0	120	0	41	0					
Volume Right	42	0	116	0	18	0	255					
cSH	1369	1470	1700	88	821	162	545					
Volume to Capacity	0.01	0.21	0.07	2.21	0.02	0.26	0.59					
Queue Length 95th (ft)	1	20	0	437	2	24	94					
Control Delay (s)	1.0	6.8	0.0	658.4	9.5	34.7	20.6					
Lane LOS	A	A		F	A	D	C					
Approach Delay (s)	1.0	5.2		602.1		22.2						
Approach LOS				F		C						
Intersection Summary												
Average Delay			114.2									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

6: Ave 18 & Road 23
2030 Project AM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	8	3	11	2	42	1	388	3	58	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	3	12	2	46	1	422	3	63	390	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	989	943	390	949	942	423	390			425		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	989	943	390	949	942	423	390			425		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	96	99	94	99	92	100			94		
cM capacity (veh/h)	191	239	643	211	236	608	1036			995		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	60	426	453								
Volume Left	0	12	1	63								
Volume Right	3	46	3	0								
cSH	288	424	1036	995								
Volume to Capacity	0.04	0.14	0.00	0.06								
Queue Length 95th (ft)	3	12	0	5								
Control Delay (s)	18.0	14.9	0.0	1.9								
Lane LOS	C	B	A	A								
Approach Delay (s)	18.0	14.9	0.0	1.9								
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			62.7%		ICU Level of Service					B		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						118			504			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	250	530	0	0	1239	124	1192	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	272	576	0	0	1347	135	1296	7	549	0	0	0
Lane Group Flow (vph)	272	576	0	0	1347	135	648	655	549	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	20.0	60.0	0.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0	0.0	0.0
Total Split (%)	20.0%	60.0%	0.0%	0.0%	40.0%	40.0%	40.0%	40.0%	40.0%	0.0%	0.0%	0.0%
Maximum Green (s)	14.7	54.7			34.7	34.7	35.4	35.4	35.4			
Flow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	16.0	56.0			36.0	36.0	36.0	36.0	36.0			
Actuated g/C Ratio	0.16	0.56			0.36	0.36	0.36	0.36	0.36			
v/c Ratio	1.11	0.34			1.09	0.21	1.11	1.12	0.43			
Control Delay	109.4	8.2			84.9	6.5	104.3	107.1	4.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	109.4	8.2			84.9	6.5	104.3	107.1	4.2			
LOS	F	A			F	A	F	F	A			
Approach Delay		40.6			77.7			75.6				

7: Ave 17 & SR 99 NB ramps
2030 Project AM Alternative B

10/22/2008

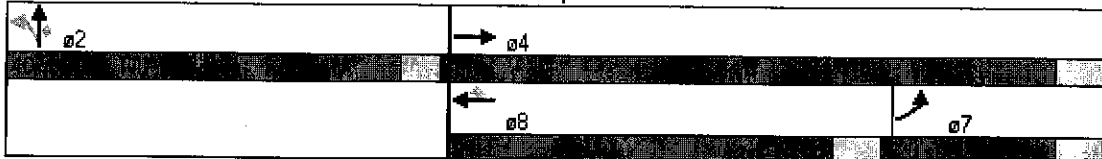
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			E				
Queue Length 50th (ft)	497	53			511	7	501	509	10			
Queue Length 95th (ft) m#257		m70			#645	46	#727	#736	48			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	245	1713			1238	629	582	584	1288			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.11	0.34			1.09	0.21	1.11	1.12	0.43			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 80 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.12
 Intersection Signal Delay: 69.3
 Intersection Capacity Utilization 91.3%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service F







~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
2030 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3112	3438	0	1480	1324
Flt Permitted					0.950	
Satd. Flow (perm)	0	3112	3438	0	1480	1324
Right Turn on Red				Ⓢ		Ⓢ
Satd. Flow (RTOR)						15
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1662	1906	0	299	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	1807	2072	0	325	117
Lane Group Flow (vph)	0	1807	2072	0	325	117
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	70.0	70.0	0.0	30.0	30.0
Total Split (%)	0.0%	70.0%	70.0%	0.0%	30.0%	30.0%
Maximum Green (s)		64.7	64.7		25.4	25.4
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		67.4	67.4		24.6	24.6
Actuated g/C Ratio		0.67	0.67		0.25	0.25
v/c Ratio		0.86	0.89		0.89	0.35
Control Delay		7.6	5.2		64.0	29.7
Queue Delay		11.1	2.3		0.0	0.1
Total Delay		18.8	7.5		64.0	29.8
LOS		B	A		E	C
Approach Delay		18.8	7.5		54.9	

9: Ave 17 & SR 99 SB off-ramp
 2030 Project AM Alternative B

10/22/2008



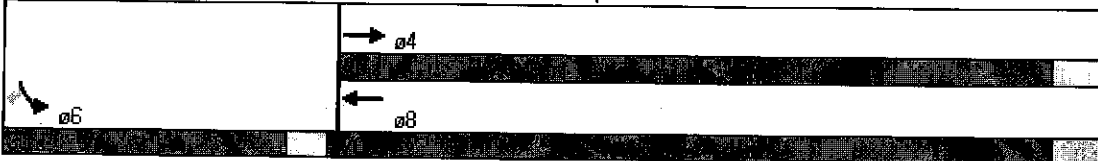
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		D	
Queue Length 50th (ft)		85	290		197	52
Queue Length 95th (ft)		m72	m184		#348	103
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2099	2319		385	355
Starvation Cap Reductn		300	0		0	0
Spillback Cap Reductn		0	143		0	25
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		1.00	0.95		0.84	0.35

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 65 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 17.1
 Intersection Capacity Utilization 75.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.990				0.850			0.850		0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3249	0	1626	3252	1455	1433	1508	1282	3155	1667	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1641	3249	0	1626	3252	1455	1433	1508	1282	3155	1667	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)		7				480			463		7	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	7	886	61	613	960	442	83	66	431	281	30	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	8	963	66	666	1043	480	90	72	468	305	33	7
Lane Group Flow (vph)	8	1029	0	666	1043	480	90	72	468	305	40	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.3	21.3		9.3	21.3	21.3	8.6	20.6	20.6	8.6	20.6	
Total Split (s)	9.3	32.4	0.0	35.0	58.1	58.1	11.3	20.6	20.6	12.0	21.3	0.0
Total Split (%)	9.3%	32.4%	0.0%	35.0%	58.1%	58.1%	11.3%	20.6%	20.6%	12.0%	21.3%	0.0%
Maximum Green (s)	4.0	27.1		29.7	52.8	52.8	6.7	16.0	16.0	7.4	16.7	
ℳlow Time (s)	4.3	4.3		4.3	4.3	4.3	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.3	28.4		31.0	61.5	61.5	16.5	11.9	11.9	12.7	8.1	
Actuated g/C Ratio	0.05	0.28		0.31	0.62	0.62	0.16	0.12	0.12	0.13	0.08	
v/c Ratio	0.09	1.11		1.32	0.52	0.44	0.38	0.40	0.84	0.76	0.28	
Control Delay	47.6	98.6		179.1	4.5	1.3	43.5	46.0	18.3	58.0	41.8	
Queue Delay	0.0	0.0		0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.6	98.6		179.1	5.0	2.0	43.5	46.0	18.3	58.0	41.8	
LOS	D	F		F	A	A	D	D	B	E	D	
Approach Delay		98.2			57.3			25.1			56.1	

10: Ave 17 & GS Blvd
 2030 Project AM Alternative B

10/22/2008

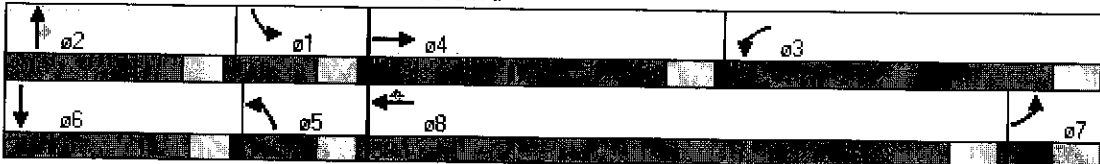
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			C			E	
Queue Length 50th (ft)	5	396		564	85	14	52	44	3	96	20	
Queue Length 95th (ft)	20	#526		m#684	m122	m16	104	83	#152	#208	52	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	87	928		504	2001	1080	236	250	599	401	294	
Starvation Cap Reductn	0	0		0	518	289	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.09	1.11		1.32	0.70	0.61	0.38	0.29	0.78	0.76	0.14	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 84 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 62.5
 Intersection Capacity Utilization 85.1%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.998			0.989			0.996	
Flt Protected		0.998			0.997			0.988			0.997	
Satd. Flow (prot)	0	1789	0	0	1734	0	0	1547	0	0	1509	0
Flt Permitted		0.973			0.914			0.820			0.949	
Satd. Flow (perm)	0	1745	0	0	1590	0	0	1284	0	0	1437	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		23			1			8			3	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	21	512	138	42	607	7	138	386	47	19	267	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	23	557	150	46	660	8	150	420	51	21	290	10
Lane Group Flow (vph)	0	730	0	0	714	0	0	621	0	0	321	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	34.0	34.0	0.0	34.0	34.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0
Total Split (%)	48.6%	48.6%	0.0%	48.6%	48.6%	0.0%	51.4%	51.4%	0.0%	51.4%	51.4%	0.0%
Maximum Green (s)	28.7	28.7		28.7	28.7		30.7	30.7		30.7	30.7	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			32.0			32.0	
Actuated g/C Ratio		0.43			0.43			0.46			0.46	
v/c Ratio		0.96			1.05			1.05			0.49	
Control Delay		45.5			70.5			73.3			16.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		45.5			70.5			73.3			16.3	
LOS		D			E			E			B	
Approach Delay		45.5			70.5			73.3			16.3	

11: Ave 17 & Road 23
 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			E			B	
Queue Length 50th (ft)		285			343			297			91	
Queue Length 95th (ft)		#516			#543			#489			159	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		761			682			591			659	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.96			1.05			1.05			0.49	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 56.3

Intersection LOS: E

Intersection Capacity Utilization 107.2%

ICU Level of Service G

Analysis Period (min) 15

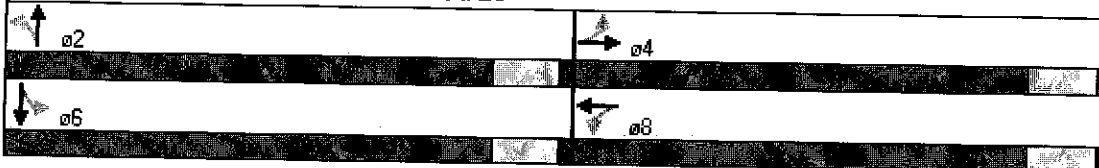
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frnt			0.850			0.850		0.967			0.997	
Fit Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3325	0	1752	3494	0
Fit Permitted		0.815			0.721		0.950			0.950		
Satd. Flow (perm)	0	1518	1583	0	1343	1583	1719	3325	0	1752	3494	0
Right Turn on Red												
Satd. Flow (RTOR)			15			54		73			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	50	10	380	109	31	606	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	54	11	413	118	34	659	12
Lane Group Flow (vph)	0	11	15	0	176	54	11	531	0	34	671	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	21.9	21.9	21.9	21.9	21.9	21.9	9.9	22.7	0.0	10.4	23.2	0.0
Total Split (%)	39.8%	39.8%	39.8%	39.8%	39.8%	39.8%	18.0%	41.3%	0.0%	18.9%	42.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	5.0	17.8		5.5	18.3	
Flow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effect Green (s)		13.0	13.0		13.2	13.2	6.3	25.4		6.8	27.7	
Actuated g/C Ratio		0.25	0.25		0.26	0.26	0.11	0.52		0.12	0.57	
v/c Ratio		0.03	0.04		0.51	0.12	0.06	0.30		0.16	0.34	
Control Delay		11.9	7.2		17.5	5.4	22.3	8.9		21.1	8.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.9	7.2		17.5	5.4	22.3	8.9		21.1	8.4	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		9.2			14.7			9.1			9.1	

12: Ellis OC & Road 26
 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1	0		20	0	1	23		4	36	
Queue Length 95th (ft)		11	10		90	19	15	95		32	134	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		523	555		463	581	190	1859		217	2049	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.03		0.38	0.09	0.06	0.29		0.16	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 55

Actuated Cycle Length: 49

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 9.9

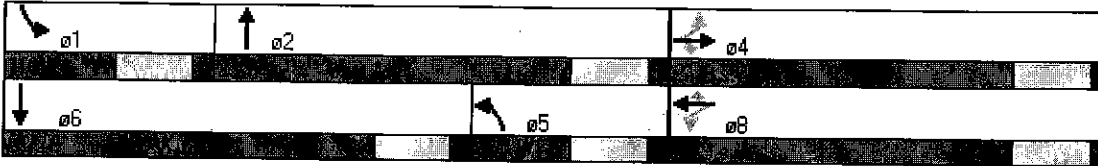
Intersection Capacity Utilization 46.1%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						164		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	482	314	0	0	240	151	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	524	341	0	0	261	164	222	2	95	0	0	0
Lane Group Flow (vph)	524	341	0	0	261	164	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.44	0.16			0.42	0.40	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.1			17.3			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
2030 Project AM Alternative B

10/22/2008

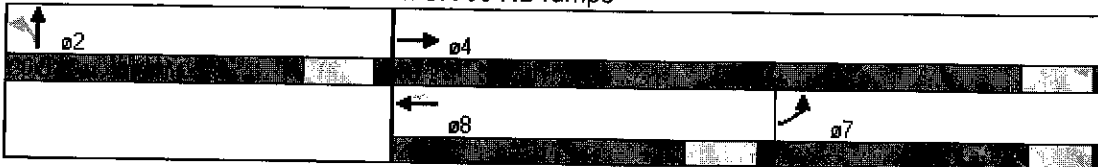
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	47	12			44	0	31	1				
Queue Length 95th (ft)	130	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	564	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.44	0.16			0.26	0.29	0.23	0.19				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



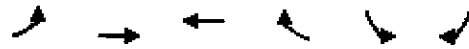
15: Ellis OC & SR 99 SB off-ramp
2030 Project AM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘↘	↙↙
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						477
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	634	368	0	162	439
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	689	400	0	176	477
Lane Group Flow (vph)	0	689	400	0	176	477
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
ℳlow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.45	0.26		0.12	0.32
Control Delay		13.1	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.1	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.1	2.7		4.2	
Approach LOS		B	A		A	

15: Ellis OC & SR 99 SB off-ramp
 2030 Project AM Alternative B

10/22/2008



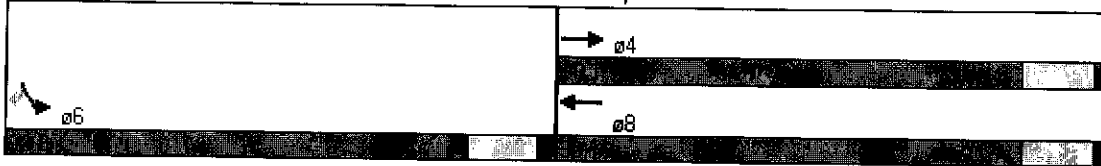
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		87	0		18	0
Queue Length 95th (ft)		126	3		34	24
Internal Link Dist (ft)		1000	630		1324	
Turn Bay Length (ft)						
Base Capacity (vph)		1539	1539		1482	1474
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.26		0.12	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB off-ramp



17: Ellis OC & Aviation Drive
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.926			0.899				0.850		0.850	
Fit Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Fit Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Right Turn on Red												
Satd. Flow (RTOR)		129			197				48		66	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	46	122	119	443	89	181	193	256	44	121	391	573
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	133	129	482	97	197	210	278	48	132	425	623
Lane Group Flow (vph)	50	262	0	482	294	0	210	278	48	132	1048	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4			8				6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9	20.9	
Total Split (s)	13.8	24.0	0.0	34.0	44.2	0.0	18.0	68.0	68.0	24.0	74.0	0.0
Total Split (%)	9.2%	16.0%	0.0%	22.7%	29.5%	0.0%	12.0%	45.3%	45.3%	16.0%	49.3%	0.0%
Maximum Green (s)	9.3	19.1		29.5	39.3		13.5	63.1	63.1	19.1	69.1	
Yellow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	8.8	12.2		30.0	35.6		14.0	64.0	64.0	20.0	70.0	
Actuated g/C Ratio	0.06	0.09		0.21	0.25		0.10	0.45	0.45	0.14	0.49	
v/c Ratio	0.46	0.66		1.29	0.31		1.21	0.35	0.06	0.53	1.29	
Control Delay	79.1	39.6		193.9	15.7		186.5	27.6	6.3	66.1	169.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	79.1	39.6		193.9	15.7		186.5	27.6	6.3	66.1	169.9	
LOS	E	D		F	B		F	C	A	E	F	
Approach Delay		45.9			126.4			88.0		158.3		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 Project AM Alternative B

10/22/2008

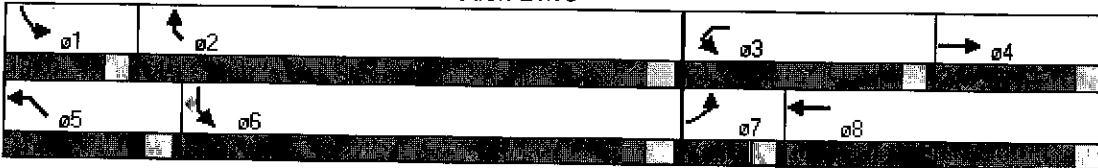
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	45	62		567	37		236	165	0	115	4205	
Queue Length 95th (ft)	94	111		#825	78		#420	253	25	193	#1540	
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	119	549		373	1019		174	797	739	249	813	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.42	0.48		1.29	0.29		1.21	0.35	0.06	0.53	1.29	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 142.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.29
 Intersection Signal Delay: 123.5
 Intersection Capacity Utilization 81.3%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			\forall s			\forall s		\forall s		\forall s		
Satd. Flow (RTOR)						516			103			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	195	982	0	0	931	475	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	212	1067	0	0	1012	516	390	0	384	0	0	0
Lane Group Flow (vph)	212	1067	0	0	1012	516	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	19.0	52.0	0.0	0.0	33.0	33.0	28.0	28.0	28.0	0.0	0.0	0.0
Total Split (%)	23.8%	65.0%	0.0%	0.0%	41.3%	41.3%	35.0%	35.0%	35.0%	0.0%	0.0%	0.0%
Maximum Green (s)	14.4	47.4			28.4	28.4	23.5	23.5	23.5			
Flow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	\forall s				\forall s	\forall s						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.5	48.0			30.5	30.5	24.0	24.0	24.0			
Actuated g/C Ratio	0.17	0.60			0.38	0.38	0.30	0.30	0.30			
v/c Ratio	0.73	0.51			0.76	0.57	0.40	0.40	0.73			
Control Delay	44.8	0.7			26.8	4.6	25.4	25.4	27.5			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	44.8	0.9			26.8	4.6	25.4	25.4	27.5			
LOS	D	A			C	A	C	C	C			
Approach Delay		8.2			19.3			26.4				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 Project AM Alternative B

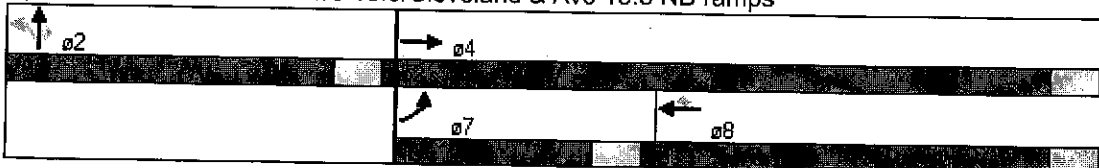
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	93	1			235	0	81	81	125			
Queue Length 95th (ft)	m107	m6			312	61	142	142	#238			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	326	2083			1325	912	485	485	529			
Starvation Cap Reductn	0	256			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.65	0.58			0.76	0.57	0.40	0.40	0.73			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 32 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 16.9
 Intersection Capacity Utilization 82.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)			458									120
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	760	421	414	921	0	0	0	0	417	0	226
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	826	458	450	1001	0	0	0	0	453	0	246
Lane Group Flow (vph)	0	826	458	450	1001	0	0	0	0	453	0	246
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	26.0	26.0	26.0	52.0	0.0	0.0	0.0	0.0	28.0	28.0	28.0
Total Split (%)	0.0%	32.5%	32.5%	32.5%	65.0%	0.0%	0.0%	0.0%	0.0%	35.0%	35.0%	35.0%
Maximum Green (s)		21.4	21.4	21.4	47.4					23.5	23.5	23.5
ℳlow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		22.1	22.1	22.0	48.1						23.9	23.9
Actuated g/C Ratio		0.28	0.28	0.28	0.60						0.30	0.30
v/c Ratio		0.89	0.61	0.95	0.48						0.95	0.48
Control Delay		40.9	6.5	47.0	3.3						60.5	15.2
Queue Delay		0.0	0.0	0.0	0.3						0.0	0.0
Total Delay		40.9	6.5	47.0	3.6						60.5	15.2
LOS		D	A	D	A						E	B
Approach Delay		28.7			17.1						44.5	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 Project AM Alternative B

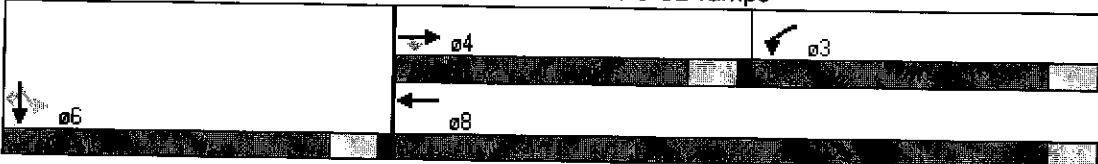
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						D	
Queue Length 50th (ft)		208	0	197	21						220	48
Queue Length 95th (ft)		#314	71	m#379	54						#401	115
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		933	749	473	2068						479	513
Starvation Cap Reductn		0	0	0	474						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.89	0.61	0.95	0.63						0.95	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 32 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 27.0
 Intersection Capacity Utilization 82.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
 2030 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	44	1	35	0	368	38	30	301	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	48	1	38	0	400	41	33	327	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	852	834	327	813	813	421	327			441		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	852	834	327	813	813	421	327			441		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	84	100	94	100			97		
cM capacity (veh/h)	256	295	714	290	303	633	1143			1034		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	87	441	360								
Volume Left	0	48	0	33								
Volume Right	0	38	41	0								
cSH	1700	380	1143	1034								
Volume to Capacity	0.00	0.23	0.00	0.03								
Queue Length 95th (ft)	0	22	0	2								
Control Delay (s)	0.0	17.3	0.0	1.1								
Lane LOS	A	C		A								
Approach Delay (s)	0.0	17.3	0.0	1.1								
Approach LOS	A	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization		52.1%		ICU Level of Service					A			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 Project AM Alternative B

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.960							0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3239	0	0	0	0	1752	1568	0
Flt Permitted	0.313									0.950		
Satd. Flow (perm)	1058	3312	0	0	3239	0	0	0	0	1752	1568	0
Right Turn on Red												
Satd. Flow (RTOR)					149						353	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	826	579	0	0	568	208	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	898	629	0	0	617	226	0	0	0	355	0	168
Lane Group Flow (vph)	898	629	0	0	843	0	0	0	0	355	168	0
Turn Type	Perm									Perm		
Protected Phases		2			6							8
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	69.0	69.0	0.0	0.0	69.0	0.0	0.0	0.0	0.0	21.0	21.0	0.0
Total Split (%)	76.7%	76.7%	0.0%	0.0%	76.7%	0.0%	0.0%	0.0%	0.0%	23.3%	23.3%	0.0%
Maximum Green (s)	64.4	64.4			64.4					16.5	16.5	
Flow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	65.0	65.0			65.0					17.0	17.0	
Actuated g/C Ratio	0.72	0.72			0.72					0.19	0.19	
v/c Ratio	1.18	0.26			0.35					1.07	0.29	
Control Delay	107.5	3.3			4.2					107.2	1.2	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	107.5	3.3			4.2					107.2	1.2	
LOS	F	A			A					F	A	
Approach Delay		64.6			4.2						73.2	

21: SR 145/Madera & SR 99 NB ramps
 2030 Project AM Alternative B

10/22/2008

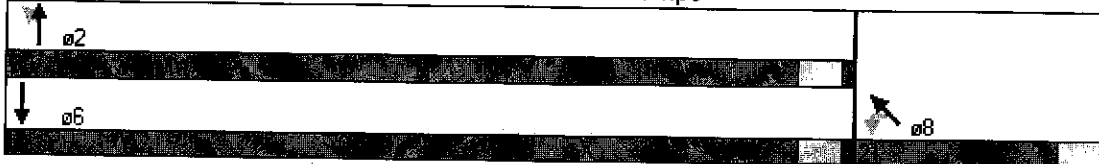
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		E			A							E
Queue Length 50th (ft)	322	37			61					227	0	
Queue Length 95th (ft)	#442	69			84					#395	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	764	2392			2381					331	583	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	1.18	0.26			0.35					1.07	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 6 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 48.5
 Intersection Capacity Utilization 74.0%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.991				0.850
Flt Protected	0.950						0.950				0.987	
Satd. Flow (prot)	1719	1810	1538	0	0	0	3213	3282	0	0	3426	1553
Flt Permitted	0.950						0.950				0.573	
Satd. Flow (perm)	1719	1810	1538	0	0	0	3213	3282	0	0	1989	1553
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			545					12				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	433	278	691	0	0	0	254	971	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	471	302	751	0	0	0	276	1055	71	130	374	468
Lane Group Flow (vph)	471	302	751	0	0	0	276	1126	0	0	504	468
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	38.4	38.4	38.4	0.0	0.0	0.0	20.6	51.6	0.0	31.0	31.0	31.0
Total Split (%)	42.7%	42.7%	42.7%	0.0%	0.0%	0.0%	22.9%	57.3%	0.0%	34.4%	34.4%	34.4%
Maximum Green (s)	33.9	33.9	33.9				16.0	47.0		26.4	26.4	26.4
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							ℳs			ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	34.4	34.4	34.4				16.6	47.6		27.0	27.0	27.0
Actuated g/C Ratio	0.38	0.38	0.38				0.18	0.53		0.30	0.30	0.30
v/c Ratio	0.72	0.44	0.81				0.47	0.65		0.94dl	0.59	0.59
Control Delay	28.6	22.1	15.7				35.7	17.2		35.1	4.6	4.6
Queue Delay	25.9	5.4	0.5				0.1	0.0		0.0	0.1	0.1
Total Delay	54.5	27.5	16.2				35.8	17.2		35.1	4.7	4.7
LOS	D	C	B				D	B		D	A	A
Approach Delay		30.3						20.8			20.5	

22: AVe 14/Olive & SR 145/Madera
 2030 Project AM Alternative B

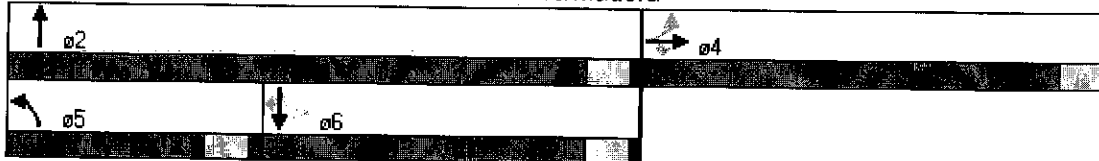
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C				
Queue Length 50th (ft)	173	105	96				72	225			151	37
Queue Length 95th (ft)	309	m166	#377				111	294			m184	m58
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	657	692	925				593	1741			597	794
Starvation Cap Reductn	195	322	29				0	0			0	19
Spillback Cap Reductn	0	0	0				27	0			0	4
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	1.02	0.82	0.84				0.49	0.65			0.84	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 39 (43%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 75.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVe 14/Olive & SR 99 SB off-ramp
2030 Project AM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↖↗	↘↙
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						125
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	823	685	0	579	317
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	895	745	0	629	345
Lane Group Flow (vph)	0	895	745	0	629	345
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	44.8	44.8	0.0	45.2	45.2
Total Split (%)	0.0%	49.8%	49.8%	0.0%	50.2%	50.2%
Maximum Green (s)		40.3	40.3		40.7	40.7
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		58.4	58.4		23.6	23.6
Actuated g/C Ratio		0.65	0.65		0.26	0.26
v/c Ratio		0.39	0.33		0.74	0.71
Control Delay		8.9	3.3		35.5	26.7
Queue Delay		0.1	0.2		0.0	0.0
Total Delay		9.0	3.5		35.5	26.7
LOS		A	A		D	C
Approach Delay		9.0	3.5		32.4	

23: AVE 14/Olive & SR 99 SB off-ramp
 2030 Project AM Alternative B

10/22/2008



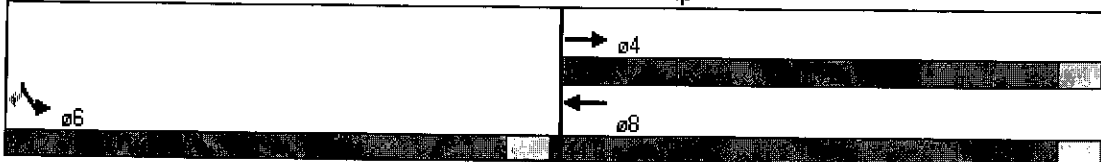
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		109	30		170	115
Queue Length 95th (ft)		196	52		197	184
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2276	2276		1484	752
Starvation Cap Reductn		0	783		0	0
Spillback Cap Reductn		372	0		8	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.47	0.50		0.43	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 16.2
 Intersection Capacity Utilization 45.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVE 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 2030 Project AM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	42	61	6	9	90	117	8	137	6	102	129	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	66	7	10	98	127	9	149	7	111	140	58
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	118	235	164	309								
Volume Left (vph)	46	10	9	111								
Volume Right (vph)	7	127	7	58								
Hadj (s)	0.18	-0.08	0.33	0.25								
Departure Headway (s)	5.9	5.4	5.8	5.4								
Degree Utilization, x	0.19	0.35	0.26	0.47								
Capacity (veh/h)	549	615	567	625								
Control Delay (s)	10.2	11.3	10.8	13.1								
Approach Delay (s)	10.2	11.3	10.8	13.1								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.7									
HCM Level of Service			B									
Intersection Capacity Utilization		55.3%			ICU Level of Service				B			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
2030 Project AM Alternative B

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.672	
Satd. Flow (perm)	3303	1524	1696	1442	1240	1845
Right Turn on Red		8s		8s		
Satd. Flow (RTOR)		82		497		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	791		408			1104
Travel Time (s)	18.0		9.3			25.1
Volume (vph)	1040	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	1130	82	117	497	303	74
Lane Group Flow (vph)	1130	82	117	497	303	74
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	63.8	56.2	56.2	56.2	56.2	56.2
Total Split (%)	53.2%	46.8%	46.8%	46.8%	46.8%	46.8%
Maximum Green (s)	59.3	51.7	51.7	51.7	51.7	51.7
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	77.2	34.8	34.8	34.8	34.8	34.8
Actuated g/C Ratio	0.64	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.53	0.16	0.24	0.64	0.84	0.14
Control Delay	15.0	5.4	35.1	10.6	59.1	28.4
Queue Delay	0.1	0.0	0.0	1.6	0.0	0.0
Total Delay	15.1	5.4	35.1	12.2	59.1	28.4
LOS	B	A	D	B	E	C
Approach Delay	14.5		16.6			53.1

25: SB Ramps & GS Blvd
 2030 Project AM Alternative B

10/22/2008

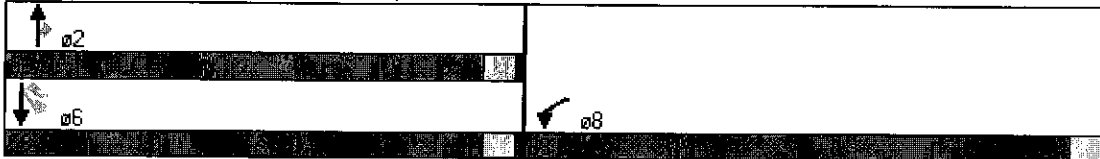
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			D
Queue Length 50th (ft)	212	0	69	68	227	44
Queue Length 95th (ft)	431	28	m14	m0	255	61
Internal Link Dist (ft)	711		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2140	716	746	912	545	811
Starvation Cap Reductn	0	0	0	243	0	0
Spillback Cap Reductn	187	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.11	0.16	0.74	0.56	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 69 (58%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 21.7
 Intersection Capacity Utilization 58.5%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.994			0.943			0.867				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	3039	0	1656	1511	0	3273	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	3039	0	1656	1511	0	3273	1776	1509
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		4			114			24				91
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	189	360	16	19	603	373	16	3	22	1014	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1102	11	91
Lane Group Flow (vph)	205	408	0	21	1060	0	17	27	0	1102	11	91
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	18.0	48.4	0.0	10.1	40.5	0.0	9.7	20.5	0.0	41.0	51.8	51.8
Total Split (%)	15.0%	40.3%	0.0%	8.4%	33.8%	0.0%	8.1%	17.1%	0.0%	34.2%	43.2%	43.2%
Maximum Green (s)	13.4	43.8		5.5	35.9		5.5	16.3		36.8	47.6	47.6
ℳlow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2		3.2	3.2	3.2
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	14.0	50.5		6.1	36.5		5.7	16.5		37.0	53.6	53.6
Actuated g/C Ratio	0.12	0.42		0.05	0.30		0.05	0.14		0.31	0.45	0.45
v/c Ratio	1.09	0.30		0.26	1.06		0.22	0.12		1.09	0.01	0.13
Control Delay	141.2	24.5		43.1	70.4		61.7	20.0		87.3	10.2	2.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		7.8	0.0	0.0
Total Delay	141.2	24.5		43.1	70.4		61.7	20.0		95.1	10.2	2.6
LOS	F	C		D	E		E	C		F	B	A
Approach Delay		63.5			69.9			36.1			87.3	

26: Ave 12 & GS Blvd
 2030 Project AM Alternative B

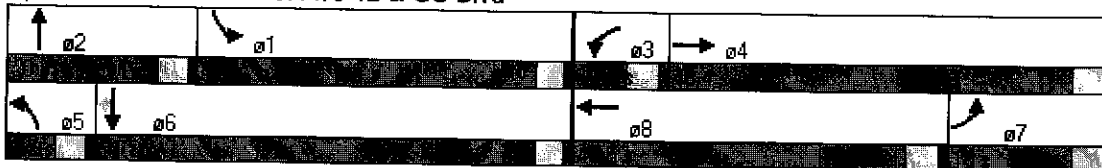
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			D			F	
Queue Length 50th (ft)	479	100		13	414		13	2		498	4	16
Queue Length 95th (ft)	#334	160		m27	m#549		38	30		#609	m3	4
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	188	1349		82	1004		79	228		1009	793	724
Starvation Cap Reductn	0	0		0	0		0	0		17	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.09	0.30		0.26	1.06		0.22	0.12		1.11	0.01	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 16 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.09
 Intersection Signal Delay: 75.2
 Intersection Capacity Utilization 84.7%
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd















27: Ave 12 & SR 99 NB Ramps
2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						785			70			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	198	1198	0	0	598	913	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	215	1302	0	0	650	992	432	0	283	0	0	0
Lane Group Flow (vph)	215	1302	0	0	650	992	0	432	283	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	22.0	80.0	0.0	0.0	58.0	58.0	40.0	40.0	40.0	0.0	0.0	0.0
Total Split (%)	18.3%	66.7%	0.0%	0.0%	48.3%	48.3%	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%
Maximum Green (s)	17.5	75.5			53.5	53.5	35.5	35.5	35.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	18.0	77.4			55.4	55.4		34.6	34.6			
Actuated g/C Ratio	0.15	0.64			0.46	0.46		0.29	0.29			
v/c Ratio	0.87	0.61			0.41	0.88		0.94	0.61			
Control Delay	59.2	3.1			22.9	16.7		70.7	33.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	59.2	3.1			22.9	16.7		70.7	33.4			
LOS	E	A			C	B		E	C			
Approach Delay		11.1			19.1			55.9				

27: Ave 12 & SR 99 NB Ramps
2030 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			E				
Queue Length 50th (ft)	176	30			176	154		321	140			
Queue Length 95th (ft)	m186	m32			226	#591		#512	236			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	248	2135			1572	1126		479	478			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.87	0.61			0.41	0.88		0.90	0.59			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 99 (83%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 22.8
 Intersection Capacity Utilization 99.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service F

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.986			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1467	1545	0	0	1643	0	1504	1346	0	0	0	0
Flt Permitted	0.590						0.950					
Satd. Flow (perm)	911	1545	0	0	1643	0	1504	1346	0	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)					17			788				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	469	139	0	0	220	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	510	151	0	0	239	28	277	0	91	0	0	0
Lane Group Flow (vph)	510	151	0	0	267	0	277	91	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.4	39.4	0.0	0.0	39.4	0.0	20.6	20.6	0.0	0.0	0.0	0.0
Total Split (%)	65.7%	65.7%	0.0%	0.0%	65.7%	0.0%	34.3%	34.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	34.8	34.8			34.8		16.0	16.0				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	37.2	37.2			37.2		14.8	14.8				
Actuated g/C Ratio	0.62	0.62			0.62		0.25	0.25				
v/c Ratio	0.90	0.16			0.26		0.75	0.10				
Control Delay	10.2	1.2			6.1		34.3	0.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	10.2	1.2			6.1		34.3	0.2				
LOS	B	A			A		C	A				
Approach Delay		8.1			6.1			25.9				

1: Ave 18.5 & SR 99 NB ramps
 2030 Project PM Alternative B

10/22/2008

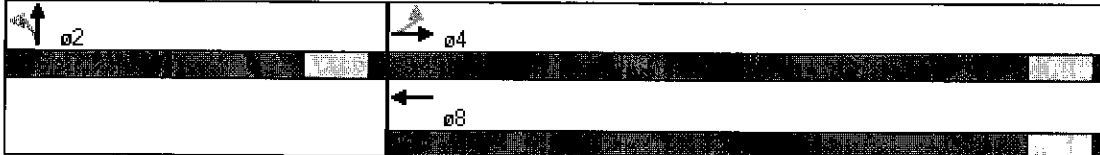
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	20	5			38		88	0				
Queue Length 95th (ft)	m19	m5			71		#181	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	564	958			1025		416	942				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.90	0.16			0.26		0.67	0.10				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 63.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



2: Ave 18.5 & SB Ramps
2030 Project PM Alternative B

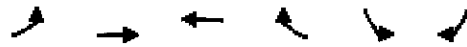
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	608	368	0	367	108	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	661	400	0	399	117	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		223			717							
pX, platoon unblocked				0.56			0.56	0.56	0.56	0.56	0.56	
vC, conflicting volume	516			1061			1060	1177	661	1060	1460	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	516			1109			1107	1317	394	1107	1822	399
tC, single (s)	4.3			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	955			318			106	89	369	106	44	655
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	661	400	399	117								
Volume Left	0	0	0	0								
Volume Right	0	400	0	117								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.39	0.24	0.23	0.07								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			35.3%		ICU Level of Service				A			
Analysis Period (min)			15									

3: Ave 18.5 & Road 23
2030 Project PM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	
Trailing Detector (ft)		0	0		0	
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.898	
Flt Protected					0.988	
Satd. Flow (prot)	0	1583	1597	0	1204	0
Flt Permitted					0.988	
Satd. Flow (perm)	0	1583	1597	0	1204	0
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)					269	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	839	348	0	137	417
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	19%	19%	40%	40%
Adj. Flow (vph)	0	912	378	0	149	453
Lane Group Flow (vph)	0	912	378	0	602	0
Turn Type						
Protected Phases		4	8			
Permitted Phases					6	
Detector Phases		4	8		6	
Minimum Initial (s)		4.0	4.0		4.0	
Minimum Split (s)		20.6	20.6		20.6	
Total Split (s)	0.0	36.7	36.7	0.0	23.3	0.0
Total Split (%)	0.0%	61.2%	61.2%	0.0%	38.8%	0.0%
Maximum Green (s)		32.1	32.1		18.7	
ℳlow Time (s)		3.6	3.6		3.6	
All-Red Time (s)		1.0	1.0		1.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	
Recall Mode		C-Max	C-Max		Min	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effct Green (s)		32.7	32.7		19.3	
Actuated g/C Ratio		0.54	0.54		0.32	
v/c Ratio		1.06	0.43		1.06	
Control Delay		64.5	8.6		69.2	
Queue Delay		0.0	0.0		0.0	
Total Delay		64.5	8.6		69.2	
LOS		E	A		E	
Approach Delay		64.5	8.6		69.2	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		E	A		E	
Queue Length 50th (ft)		374	59		172	
Queue Length 95th (ft)		#573	m88		#351	
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		863	870		570	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		1.06	0.43		1.06	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 54.9
 Intersection Capacity Utilization 84.1%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service E











~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
2030 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	691	523	224	136	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	751	568	243	148	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)			295			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	812				1448	568
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	804				1467	550
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	91				0	88
cM capacity (veh/h)	716				115	490
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	815	568	243	209		
Volume Left	64	0	0	148		
Volume Right	0	0	243	61		
cSH	716	1700	1700	148		
Volume to Capacity	0.09	0.33	0.14	1.41		
Queue Length 95th (ft)	7	0	0	336		
Control Delay (s)	2.4	0.0	0.0	277.0		
Lane LOS	A			F		
Approach Delay (s)	2.4	0.0		277.0		
Approach LOS				F		
Intersection Summary						
Average Delay			32.5			
Intersection Capacity Utilization			88.1%		ICU Level of Service	E
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
2030 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	18	97	66	397	74	109	125	109	15	49	105	380
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	105	72	432	80	118	136	118	16	53	114	413
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage veh												
Upstream signal (ft)					978							
pX, platoon unblocked												
vC, conflicting volume	199			177			1594	1160	80	1199	1242	141
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199			177			1594	1160	80	1199	1242	141
tC, single (s)	4.1			4.1			7.6	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.0	4.0	3.8	3.5	4.0	3.3
p0 queue free %	99			69			0	11	98	0	4	54
cM capacity (veh/h)	1373			1399			4	133	859	30	119	907
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	197	512	118	254	16	53	527					
Volume Left	20	432	0	136	0	53	0					
Volume Right	72	0	118	0	16	0	413					
cSH	1373	1399	1700	7	859	30	373					
Volume to Capacity	0.01	0.31	0.07	35.41	0.02	1.77	1.41					
Queue Length 95th (ft)	1	33	0	Err	1	153	668					
Control Delay (s)	0.9	7.8	0.0	Err	9.3	649.3	229.9					
Lane LOS	A	A		F	A	F	F					
Approach Delay (s)	0.9	6.3		9397.2		268.4						
Approach LOS				F		F						
Intersection Summary												
Average Delay			1610.8									
Intersection Capacity Utilization			76.0%		ICU Level of Service				D			
Analysis Period (min)			15									

6: Ave 18 & Road 23
 2030 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	12	6	5	12	87	5	525	5	75	523	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	13	7	5	13	95	5	571	5	82	568	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1418	1320	570	1330	1318	573	571			576		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1418	1320	570	1330	1318	573	571			576		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	99	90	99	95	91	82	99			91		
cM capacity (veh/h)	77	137	505	110	141	513	927			932		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	113	582	652								
Volume Left	1	5	5	82								
Volume Right	7	95	5	2								
cSH	168	347	927	932								
Volume to Capacity	0.12	0.33	0.01	0.09								
Queue Length 95th (ft)	10	35	0	7								
Control Delay (s)	29.3	20.3	0.2	2.2								
Lane LOS	D	C	A	A								
Approach Delay (s)	29.3	20.3	0.2	2.2								
Approach LOS	D	C										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			77.8%		ICU Level of Service					D		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						150			68			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35		35		
Link Distance (ft)		717			1330			1679		1421		
Travel Time (s)		10.9			20.2			32.7		27.7		
Volume (vph)	385	1233	0	0	2036	256	1983	17	1413	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	418	1340	0	0	2213	278	2155	18	1536	0	0	0
Lane Group Flow (vph)	418	1340	0	0	2213	278	1078	1095	1536	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	17.0	58.0	0.0	0.0	41.0	41.0	42.0	42.0	42.0	0.0	0.0	0.0
Total Split (%)	17.0%	58.0%	0.0%	0.0%	41.0%	41.0%	42.0%	42.0%	42.0%	0.0%	0.0%	0.0%
Maximum Green (s)	12.5	53.5			36.5	36.5	37.5	37.5	37.5			
Flow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.0	54.0			37.0	37.0	38.0	38.0	38.0			
Actuated g/C Ratio	0.13	0.54			0.37	0.37	0.38	0.38	0.38			
v/c Ratio	1.87	0.72			1.69	0.41	1.72	1.74	1.42			
Control Delay	420.5	12.5			339.6	12.4	355.5	364.9	221.8			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	420.5	12.5			339.6	12.4	355.5	364.9	221.8			
LOS	F	B			F	B	F	F	F			
Approach Delay		109.5			303.1			302.9				

7: Ave 17 & SR 99 NB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F				
Queue Length 50th (ft)	411	223			4094	55	4073	4096	744			
Queue Length 95th (ft)	m#225	m111			#1231	123	#1332	#1355	#896			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	223	1857			1309	680	627	629	1081			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.87	0.72			1.69	0.41	1.72	1.74	1.42			

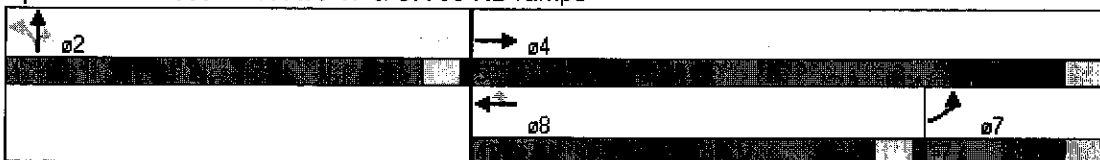
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 12 (12%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.87
 Intersection Signal Delay: 260.2
 Intersection Capacity Utilization 143.0%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



8: Ave 17 & SR 99 SB on-ramp
2030 Project PM Alternative B

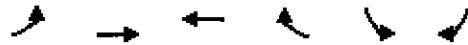
10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1575	2202	0	3114	902	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1712	2393	0	3385	980	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		213			717							
pX, platoon unblocked	0.64			0.36			0.54	0.54	0.36	0.54	0.54	0.64
vC, conflicting volume	4365			4105			3404	6077	856	4241	7490	1692
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5691			7795			2602	7525	0	4142	10127	1520
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	5			0			7	0	396	0	0	70
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3						
Volume Total	856	856	2393	1692	1692	980						
Volume Left	0	0	0	0	0	0						
Volume Right	0	0	2393	0	0	980						
cSH	1700	1700	1700	1700	1700	1700						
Volume to Capacity	0.50	0.50	1.41	1.00	1.00	0.58						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			139.7%		ICU Level of Service				H			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
2030 Project PM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr _t						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3471	3471	0	1687	1509
Flt Permitted					0.950	
Satd. Flow (perm)	0	3471	3471	0	1687	1509
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						1
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	3361	3114	0	506	193
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	3653	3385	0	550	210
Lane Group Flow (vph)	0	3653	3385	0	550	210
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	71.0	71.0	0.0	29.0	29.0
Total Split (%)	0.0%	71.0%	71.0%	0.0%	29.0%	29.0%
Maximum Green (s)		65.7	65.7		24.4	24.4
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		67.0	67.0		25.0	25.0
Actuated g/C Ratio		0.67	0.67		0.25	0.25
v/c Ratio		1.57	1.46		1.30	0.56
Control Delay		273.0	220.6		185.8	39.1
Queue Delay		50.1	37.5		0.0	0.0
Total Delay		323.1	258.0		185.8	39.1
LOS		F	F		F	D
Approach Delay		323.1	258.0		145.3	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		F	F		F	
Queue Length 50th (ft)		4813	4556		452	116
Queue Length 95th (ft)		m70	m216		#657	192
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2326	2326		422	378
Starvation Cap Reductn		154	0		0	0
Spillback Cap Reductn		0	126		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		1.68	1.54		1.30	0.56

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 96 (96%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.57
 Intersection Signal Delay: 277.5
 Intersection Capacity Utilization 127.6%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.987				0.850			0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3426	0	1719	3438	1538	1752	1845	1568	3099	1656	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3426	0	1719	3438	1538	1752	1845	1568	3099	1656	0
Right Turn on Red												
Satd. Flow (RTOR)		11				568			329		5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	14	1987	181	682	1902	725	171	100	741	633	84	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	15	2160	197	741	2067	788	186	109	805	688	91	10
Lane Group Flow (vph)	15	2357	0	741	2067	788	186	109	805	688	101	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5	8.5	20.5	
Total Split (s)	8.5	40.0	0.0	22.0	53.5	53.5	15.6	24.0	24.0	14.0	22.4	0.0
Total Split (%)	8.5%	40.0%	0.0%	22.0%	53.5%	53.5%	15.6%	24.0%	24.0%	14.0%	22.4%	0.0%
Maximum Green (s)	4.0	35.5		17.5	49.0	49.0	11.1	19.5	19.5	9.5	17.9	
Flow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	4.5	36.0		18.0	54.6	54.6	11.6	20.0	20.0	10.0	18.4	
Actuated g/C Ratio	0.04	0.36		0.18	0.55	0.55	0.12	0.20	0.20	0.10	0.18	
v/c Ratio	0.19	1.90		2.40	1.10	0.72	0.92	0.30	1.40	2.22	0.33	
Control Delay	51.9	432.1		650.0	62.7	4.4	90.0	36.6	209.2	583.1	37.0	
Queue Delay	0.0	91.6		0.0	136.4	7.6	0.0	0.0	493.9	123.1	0.0	
Total Delay	51.9	523.8		650.0	199.1	12.0	90.0	36.6	703.2	706.2	37.0	
LOS	D	F		F	F	B	F	D	F	F	D	
Approach Delay		520.8			251.0			533.4			620.5	

10: Ave 17 & GS Blvd
 2030 Project PM Alternative B

10/22/2008

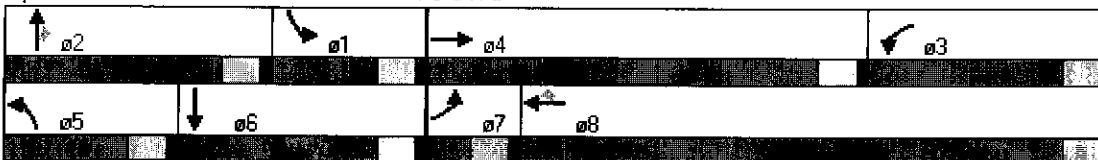
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	9	4233		810	778	38	119	60	513	366	54	
Queue Length 95th (ft)	31	#1372		m#522	m362	m28	#250	109	#747	#479	103	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	78	1240		309	1877	1098	203	369	577	310	309	
Starvation Cap Reductn	0	0		0	409	268	0	0	0	0	0	
Spillback Cap Reductn	0	120		0	0	0	0	0	463	310	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	2.10		2.40	1.41	0.95	0.92	0.30	7.06	688.00	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 24 (24%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.40
 Intersection Signal Delay: 409.1
 Intersection Capacity Utilization 134.6%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962			0.991			0.974			0.927	
Flt Protected		0.998			0.994			0.991			0.999	
Satd. Flow (prot)	0	1788	0	0	1749	0	0	1623	0	0	1543	0
Flt Permitted		0.937			0.625			0.632			0.988	
Satd. Flow (perm)	0	1679	0	0	1100	0	0	1035	0	0	1526	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		32			6			16			79	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	42	772	315	107	730	59	122	408	125	9	238	293
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	46	839	342	116	793	64	133	443	136	10	259	318
Lane Group Flow (vph)	0	1227	0	0	973	0	0	712	0	0	587	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	50.0	50.0	0.0	50.0	50.0	0.0	40.0	40.0	0.0	40.0	40.0	0.0
Total Split (%)	55.6%	55.6%	0.0%	55.6%	55.6%	0.0%	44.4%	44.4%	0.0%	44.4%	44.4%	0.0%
Maximum Green (s)	44.7	44.7		44.7	44.7		34.7	34.7		34.7	34.7	
ℳlow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		46.0			46.0			36.0			36.0	
Actuated g/C Ratio		0.51			0.51			0.40			0.40	
v/c Ratio		1.40			1.72			1.68			0.89	
Control Delay		211.7			354.3			339.5			40.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		211.7			354.3			339.5			40.1	
LOS		F			F			F			D	
Approach Delay		211.7			354.3			339.5			40.1	

11: Ave 17 & Road 23
 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			D	
Queue Length 50th (ft)		944			835			600			270	
Queue Length 95th (ft)		#1195			#1073			#819			#482	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		874			565			424			658	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.40			1.72			1.68			0.89	

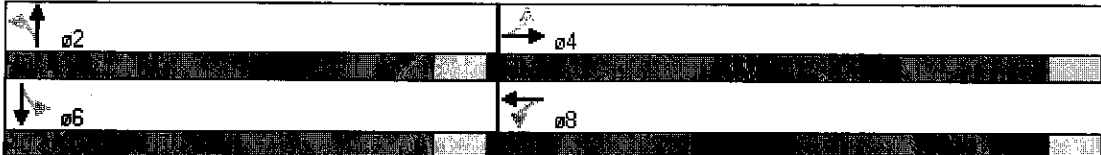
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.72
 Intersection Signal Delay: 248.6
 Intersection Capacity Utilization 164.4%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.969			0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.734			0.705		0.950			0.950		
Satd. Flow (perm)	0	1367	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red												
Satd. Flow (RTOR)			34			132		62			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	121	27	787	207	190	882	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	132	29	855	225	207	959	45
Lane Group Flow (vph)	0	41	34	0	242	132	29	1080	0	207	1004	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	26.1	0.0	13.0	30.2	0.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	34.8%	34.8%	14.8%	43.5%	0.0%	21.7%	50.3%	0.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.0	21.2		8.1	25.3	
Flow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)		14.5	14.5		14.5	14.5	4.9	21.5		8.9	31.1	
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.08	0.38		0.16	0.54	
v/c Ratio		0.12	0.08		0.72	0.26	0.21	0.81		0.75	0.52	
Control Delay		17.1	7.1		33.5	5.4	30.4	21.9		43.8	11.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.1	7.1		33.5	5.4	30.4	21.9		43.8	11.0	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.6			23.6			22.1			16.6	
Approach LOS		B			C			C			B	

12: Ellis OC & Road 26
 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		11	0		77	0	10	171		73	95	
Queue Length 95th (ft)		31	17		#164	33	32	#277		#170	199	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		390	475		375	546	140	1355		280	1919	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.11	0.07		0.65	0.24	0.21	0.80		0.74	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 57.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 19.7
 Intersection Capacity Utilization 67.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.868				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						222		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	788	451	0	0	378	204	276	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	857	490	0	0	411	222	300	18	130	0	0	0
Lane Group Flow (vph)	857	490	0	0	411	222	300	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Flow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.64	0.21			0.58	0.45	0.37	0.31				
Control Delay	13.5	1.3			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.5	1.3			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.7			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	156	6			85	0	55	6				
Queue Length 95th (ft)	238	14			118	48	89	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	562	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.64	0.21			0.46	0.40	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



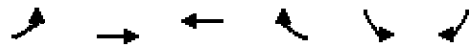
15: Ellis OC & SR 99 SB ramps
2030 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘↘	↙↙
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						352
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1010	572	0	229	712
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1098	622	0	249	774
Lane Group Flow (vph)	0	1098	622	0	249	774
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.6	37.6	0.0	32.4	32.4
Total Split (%)	0.0%	53.7%	53.7%	0.0%	46.3%	46.3%
Maximum Green (s)		32.7	32.7		27.9	27.9
ℳlow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.6	33.6		28.4	28.4
Actuated g/C Ratio		0.48	0.48		0.41	0.41
v/c Ratio		0.65	0.37		0.18	0.58
Control Delay		16.0	1.1		13.8	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.0	1.1		13.8	10.3
LOS		B	A		B	B
Approach Delay		16.0	1.1		11.2	
Approach LOS		B	A		B	

15: Ellis OC & SR 99 SB ramps
 2030 Project PM Alternative B

10/22/2008



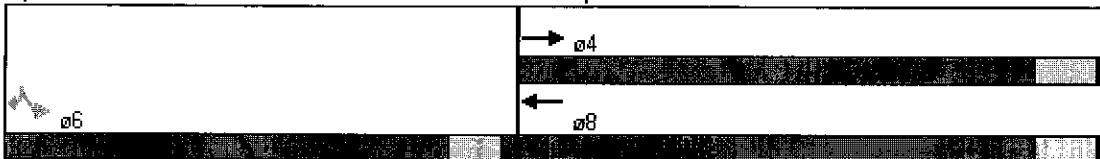
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		177	0		34	70
Queue Length 95th (ft)		240	6		56	126
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1699	1699		1393	1340
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.37		0.18	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.8
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps



17: Ellis OC & Aviation Drive
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.927			0.902				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		131			251				43		72	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			1080			1293		1356		
Travel Time (s)		18.2			18.4			22.0		23.1		
Volume (vph)	54	170	161	807	121	231	383	623	58	175	611	1011
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	185	175	877	132	251	416	677	63	190	664	1099
Lane Group Flow (vph)	59	360	0	877	383	0	416	677	63	190	1763	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9	20.9	
Total Split (s)	16.6	24.0	0.0	34.0	41.4	0.0	21.0	68.9	68.9	23.1	71.0	0.0
Total Split (%)	11.1%	16.0%	0.0%	22.7%	27.6%	0.0%	14.0%	45.9%	45.9%	15.4%	47.3%	0.0%
Maximum Green (s)	12.1	19.1		29.5	36.5		16.5	64.0	64.0	18.2	66.1	
Yellow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	10.3	16.2		30.0	38.2		17.0	64.9	64.9	19.1	67.0	
Actuated g/C Ratio	0.07	0.11		0.21	0.26		0.12	0.44	0.44	0.13	0.46	
v/c Ratio	0.48	0.75		2.42	0.38		2.02	0.86	0.09	0.82	2.31	
Control Delay	78.8	49.9		668.9	16.4		507.1	49.7	10.5	89.4	613.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	78.8	49.9		668.9	16.4		507.1	49.7	10.5	89.4	613.5	
LOS	E	D		F	B		F	D	B	F	F	
Approach Delay		54.0			470.6			212.2		562.5		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	55	113		4381	52		622	578	11	180	2730	
Queue Length 95th (ft)	106	171		#1678	102		#855	#842	41	#321	#3068	
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	148	551		363	1031		206	786	726	231	764	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.40	0.65		2.42	0.37		2.02	0.86	0.09	0.82	2.31	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 146.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 2.42
 Intersection Signal Delay: 409.2
 Intersection Capacity Utilization 124.6%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						809			10			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	302	1674	0	0	1457	813	523	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	328	1820	0	0	1584	884	568	7	807	0	0	0
Lane Group Flow (vph)	328	1820	0	0	1584	884	284	291	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	14.0	47.0	0.0	0.0	33.0	33.0	33.0	33.0	33.0	0.0	0.0	0.0
Total Split (%)	17.5%	58.8%	0.0%	0.0%	41.3%	41.3%	41.3%	41.3%	41.3%	0.0%	0.0%	0.0%
Maximum Green (s)	9.4	42.4			28.4	28.4	28.5	28.5	28.5			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	10.0	43.0			29.0	29.0	29.0	29.0	29.0			
Actuated g/C Ratio	0.12	0.54			0.36	0.36	0.36	0.36	0.36			
v/c Ratio	1.50	0.97			1.23	0.81	0.47	0.48	1.39			
Control Delay	252.1	14.8			138.6	10.0	22.7	22.9	211.7			
Queue Delay	0.0	15.6			0.0	0.0	0.0	0.0	0.0			
Total Delay	252.1	30.3			138.6	10.0	22.7	22.9	211.7			
LOS	F	C			F	B	C	C	F			
Approach Delay		64.2			92.5			133.1				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			F			F				
Queue Length 50th (ft)	226	214			524	25	112	115	549			
Queue Length 95th (ft) m#170		m#179			#655	#180	186	190	#766			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	219	1884			1283	1090	609	611	580			
Starvation Cap Reductn	0	122			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.50	1.03			1.23	0.81	0.47	0.48	1.39			

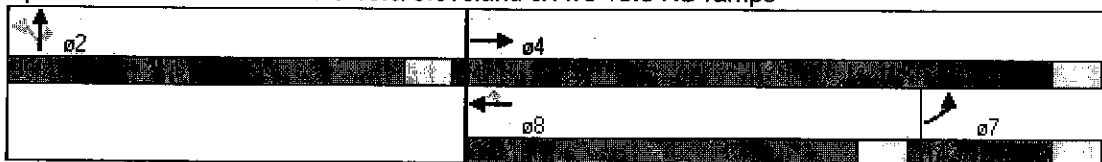
Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 70 (88%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.50
 Intersection Signal Delay: 91.7
 Intersection Capacity Utilization 183.6%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			763									8
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1205	702	290	1690	0	0	0	0	771	9	320
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1310	763	315	1837	0	0	0	0	838	10	348
Lane Group Flow (vph)	0	1310	763	315	1837	0	0	0	0	0	848	348
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	30.0	30.0	15.0	45.0	0.0	0.0	0.0	0.0	35.0	35.0	35.0
Total Split (%)	0.0%	37.5%	37.5%	18.8%	56.3%	0.0%	0.0%	0.0%	0.0%	43.8%	43.8%	43.8%
Maximum Green (s)		25.4	25.4	10.4	40.4					30.5	30.5	30.5
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		26.0	26.0	11.0	41.0						31.0	31.0
Actuated g/C Ratio		0.32	0.32	0.14	0.51						0.39	0.39
v/c Ratio		1.14	0.74	1.30	1.01						1.29	0.59
Control Delay		101.2	6.9	175.4	19.4						168.3	24.0
Queue Delay		0.0	0.0	0.0	24.0						0.0	0.0
Total Delay		101.2	6.9	175.4	43.4						168.3	24.0
LOS		F	A	F	D						F	C
Approach Delay		66.5			62.7						126.3	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E						F	
Queue Length 50th (ft)		408	0	214	476					550	132	
Queue Length 95th (ft)		#535	88	m#208	m126						#765	219
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1150	1030	243	1814						656	590
Starvation Cap Reductn		0	0	0	109						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		1.14	0.74	1.30	1.08						1.29	0.59

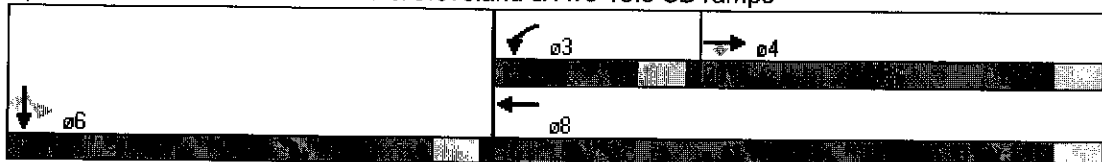
Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.30
 Intersection Signal Delay: 78.2
 Intersection Capacity Utilization 183.6%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps

























20: Ave 15.5/Cleveland & Road 23
2030 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	56	1	51	0	471	92	53	485	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	61	1	55	0	512	100	58	527	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1260	1254	527	1206	1204	562	527			612		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1260	1254	527	1206	1204	562	527			612		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	100	59	99	89	100			94		
cM capacity (veh/h)	124	161	551	149	170	521	1000			903		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	117	612	585								
Volume Left	0	61	0	58								
Volume Right	1	55	100	0								
cSH	249	226	1000	903								
Volume to Capacity	0.01	0.52	0.00	0.06								
Queue Length 95th (ft)	1	68	0	5								
Control Delay (s)	19.6	37.1	0.0	1.7								
Lane LOS	C	E		A								
Approach Delay (s)	19.6	37.1	0.0	1.7								
Approach LOS	C	E										
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			81.8%		ICU Level of Service					D		
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 Project PM Alternative B

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.958							0.853
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3391	0	0	0	0	1770	1589	0
Flt Permitted	0.188									0.950		
Satd. Flow (perm)	673	3505	0	0	3391	0	0	0	0	1770	1589	0
Right Turn on Red												
Satd. Flow (RTOR)					135							168
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	1201	809	0	0	837	323	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1305	879	0	0	910	351	0	0	0	397	3	168
Lane Group Flow (vph)	1305	879	0	0	1261	0	0	0	0	397	171	0
Turn Type	Perm						Perm					
Protected Phases		2			6							8
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	94.0	94.0	0.0	0.0	94.0	0.0	0.0	0.0	0.0	26.0	26.0	0.0
Total Split (%)	78.3%	78.3%	0.0%	0.0%	78.3%	0.0%	0.0%	0.0%	0.0%	21.7%	21.7%	0.0%
Maximum Green (s)	89.4	89.4			89.4					21.5	21.5	
Yellow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	90.0	90.0			90.0					22.0	22.0	
Actuated g/C Ratio	0.75	0.75			0.75					0.18	0.18	
v/c Ratio	2.58	0.33			0.49					1.22	0.40	
Control Delay	731.1	2.3			5.9					166.0	9.6	
Queue Delay	0.0	0.5			0.0					0.0	0.0	
Total Delay	731.1	2.8			5.9					166.0	9.6	
LOS	F	A			A					F	A	
Approach Delay		438.0			5.9						118.9	

21: SR 145/Madera & SR 99 NB ramps
 2030 Project PM Alternative B

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		F			A						F	
Queue Length 50th (ft)	889	37			152					378	2	
Queue Length 95th (ft) m#940		m56			190					#575	62	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	505	2629			2577					325	429	
Starvation Cap Reductn	0	1192			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	2.58	0.61			0.49					1.22	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.58
 Intersection Signal Delay: 257.0
 Intersection Capacity Utilization 97.9%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frt			0.850					0.998				0.850
Flt Protected	0.950						0.950				0.984	
Satd. Flow (prot)	1736	1827	1553	0	0	0	3433	3532	0	0	3449	1568
Flt Permitted	0.950						0.950				0.568	
Satd. Flow (perm)	1736	1827	1553	0	0	0	3433	3532	0	0	1991	1568
Right Turn on Red												
Satd. Flow (RTOR)			423					2				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	543	358	1139	0	0	0	343	1463	24	214	461	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	590	389	1238	0	0	0	373	1590	26	233	501	573
Lane Group Flow (vph)	590	389	1238	0	0	0	373	1616	0	0	734	573
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	60.4	60.4	60.4	0.0	0.0	0.0	20.6	59.6	0.0	39.0	39.0	39.0
Total Split (%)	50.3%	50.3%	50.3%	0.0%	0.0%	0.0%	17.2%	49.7%	0.0%	32.5%	32.5%	32.5%
Maximum Green (s)	55.9	55.9	55.9				16.0	55.0		34.4	34.4	34.4
Flow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effect Green (s)	56.4	56.4	56.4				16.6	55.6			35.0	35.0
Actuated g/C Ratio	0.47	0.47	0.47				0.14	0.46			0.29	0.29
v/c Ratio	0.72	0.45	1.30				0.79	0.99			3.82dl	0.66
Control Delay	29.9	23.2	161.2				62.7	51.4			158.0	3.7
Queue Delay	107.1	37.8	9.2				0.0	0.0			0.0	0.2
Total Delay	137.0	61.1	170.5				62.7	51.4			158.0	3.9
LOS	F	E	F				E	D			F	A
Approach Delay		142.4						53.5			90.4	

22: Ave 14/Olive & SR 145/Madera
 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F						D			F	
Queue Length 50th (ft)	325	177	4066				145	635			381	23
Queue Length 95th (ft)	m484	m246	#1492				#211	#816			m#424	m32
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	816	859	954				475	1638			581	863
Starvation Cap Reductn	336	487	15				0	0			0	18
Spillback Cap Reductn	0	0	0				0	0			0	28
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	1.23	1.05	1.32				0.79	0.99			1.26	0.69

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 55 (46%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.30
 Intersection Signal Delay: 98.0
 Intersection Capacity Utilization 100.2%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service G

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.
- dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 22: Ave 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
 2030 Project PM Alternative B

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↖↗	↘↙
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						78
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1110	870	0	930	389
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1207	946	0	1011	423
Lane Group Flow (vph)	0	1207	946	0	1011	423
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	61.3	61.3	0.0	58.7	58.7
Total Split (%)	0.0%	51.1%	51.1%	0.0%	48.9%	48.9%
Maximum Green (s)		56.8	56.8		54.2	54.2
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effect Green (s)		67.1	67.1		44.9	44.9
Actuated g/C Ratio		0.56	0.56		0.37	0.37
v/c Ratio		0.61	0.48		0.83	0.70
Control Delay		20.7	7.0		40.4	31.1
Queue Delay		0.9	0.8		0.0	0.0
Total Delay		21.6	7.7		40.4	31.1
LOS		C	A		D	C
Approach Delay		21.6	7.7		37.6	

23: Ave 14/Olive & SR 99 SB off-ramp
 2030 Project PM Alternative B

10/22/2008

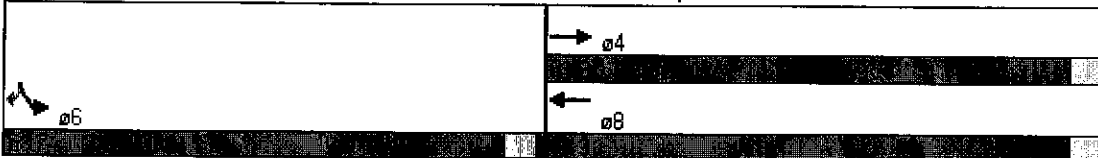
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		C	A		D	
Queue Length 50th (ft)		313	72		363	227
Queue Length 95th (ft)		462	116		387	300
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1979	1979		1478	724
Starvation Cap Reductn		0	659		0	0
Spillback Cap Reductn		455	0		12	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.79	0.72		0.69	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 24.3
 Intersection Capacity Utilization 63.9%
 Analysis Period (min) 15

















Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 23: Ave 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 2030 Project PM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	110	77	12	10	26	128	5	208	17	141	191	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	84	13	11	28	139	5	226	18	153	208	80
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	216	178	250	441								
Volume Left (vph)	120	11	5	153								
Volume Right (vph)	13	139	18	80								
Hadj (s)	0.13	-0.29	0.15	0.23								
Departure Headway (s)	6.6	6.3	6.2	6.0								
Degree Utilization, x	0.40	0.31	0.43	0.73								
Capacity (veh/h)	485	489	526	584								
Control Delay (s)	13.8	12.1	13.9	23.4								
Approach Delay (s)	13.8	12.1	13.9	23.4								
Approach LOS	B	B	B	C								
Intersection Summary												
Delay			17.5									
HCM Level of Service			C									
Intersection Capacity Utilization			68.6%		ICU Level of Service					C		
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
2030 Project PM Alternative B

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.652	
Satd. Flow (perm)	3335	1538	1759	1495	1191	1827
Right Turn on Red		RTOR		RTOR		
Satd. Flow (RTOR)		104		633		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	806		408			1104
Travel Time (s)	18.3		9.3			25.1
Volume (vph)	1363	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	1482	153	124	633	241	208
Lane Group Flow (vph)	1482	153	124	633	241	208
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	72.3	47.7	47.7	47.7	47.7	47.7
Total Split (%)	60.3%	39.8%	39.8%	39.8%	39.8%	39.8%
Maximum Green (s)	67.8	43.2	43.2	43.2	43.2	43.2
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	82.5	29.5	29.5	29.5	29.5	29.5
Actuated g/C Ratio	0.69	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.65	0.34	0.29	0.75	0.83	0.46
Control Delay	14.0	13.4	46.5	16.6	63.8	40.1
Queue Delay	0.7	0.0	0.0	6.8	0.0	0.0
Total Delay	14.7	13.4	46.5	23.4	63.8	40.1
LOS	B	B	D	C	E	D
Approach Delay	14.6		27.2			52.8

25: SB Ramps & GS Blvd
 2030 Project PM Alternative B

10/22/2008

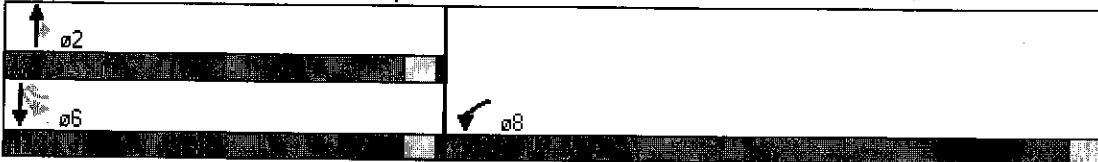
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		C			D
Queue Length 50th (ft)	289	30	85	305	180	140
Queue Length 95th (ft)	531	72	m37	m93	235	178
Internal Link Dist (ft)	726		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2294	626	641	947	434	665
Starvation Cap Reductn	0	0	0	263	0	0
Spillback Cap Reductn	444	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.24	0.19	0.93	0.56	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 62 (52%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 24.0
 Intersection Capacity Utilization 64.5%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.990			0.939			0.872				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3309	0	1687	3168	0	1752	1609	0	3335	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	3168	0	1752	1609	0	3335	1810	1538
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		6			137			104				114
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1421	28	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1545	30	114
Lane Group Flow (vph)	261	446	0	21	1179	0	47	122	0	1545	30	114
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	18.0	45.6	0.0	9.9	37.5	0.0	12.8	20.5	0.0	44.0	51.7	51.7
Total Split (%)	15.0%	38.0%	0.0%	8.3%	31.3%	0.0%	10.7%	17.1%	0.0%	36.7%	43.1%	43.1%
Maximum Green (s)	13.4	41.0		5.3	32.9		8.3	16.0		39.5	47.2	47.2
ℳlow Time (s)	3.6	3.6		3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lead		Lag	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	ℳs	ℳs	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	14.0	45.6		5.9	33.5		8.0	16.5		40.0	50.5	50.5
Actuated g/C Ratio	0.12	0.38		0.05	0.28		0.07	0.14		0.33	0.42	0.42
v/c Ratio	1.34	0.35		0.25	1.20		0.40	0.39		1.39	0.04	0.16
Control Delay	223.7	28.2		69.9	128.7		63.8	16.3		210.2	14.6	3.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		16.7	0.0	0.0
Total Delay	223.7	28.2		69.9	128.7		63.8	16.3		226.9	14.6	3.2
LOS	F	C		E	F		E	B		F	B	A
Approach Delay		100.3			127.7			29.5			208.0	

26: Ave 12 & GS Blvd
 2030 Project PM Alternative B

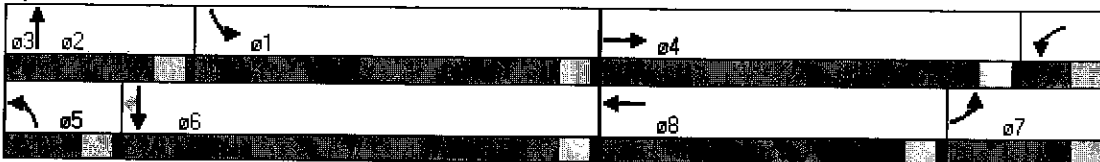
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			C			F	
Queue Length 50th (ft)	264	134		18	503		35	12		830	15	19
Queue Length 95th (ft)	#433	181		m30	m#554		76	69		#967	m12	m10
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	195	1260		83	983		128	311		1112	761	713
Starvation Cap Reductn	0	0		0	0		0	0		29	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.34	0.35		0.25	1.20		0.37	0.39		1.43	0.04	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 16 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 154.2
 Intersection LOS: F
 Intersection Capacity Utilization 102.4%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						614			44			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	361	1572	0	0	714	1163	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	392	1709	0	0	776	1264	424	2	392	0	0	0
Lane Group Flow (vph)	392	1709	0	0	776	1264	0	426	392	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	26.0	90.0	0.0	0.0	64.0	64.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	21.7%	75.0%	0.0%	0.0%	53.3%	53.3%	25.0%	25.0%	25.0%	0.0%	0.0%	0.0%
Maximum Green (s)	21.5	85.5			59.5	59.5	25.5	25.5	25.5			
Flow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	22.0	86.0			60.0	60.0		26.0	26.0			
Actuated g/C Ratio	0.18	0.72			0.50	0.50		0.22	0.22			
v/c Ratio	1.23	0.69			0.45	1.17		1.16	1.09			
Control Delay	142.5	3.6			20.4	102.0		140.6	112.0			
Queue Delay	0.0	0.5			0.0	0.0		0.0	0.0			
Total Delay	142.5	4.1			20.4	102.0		140.6	112.0			
LOS	F	A			C	F		F	F			
Approach Delay		29.9			70.9			126.9				

27: Ave 12 & SR 99 NB Ramps
 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			F				
Queue Length 50th (ft)	387	57			197	913		391	313			
Queue Length 95th (ft) m#305		m26			248	#1179		#593	#511			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	318	2488			1736	1084		367	361			
Starvation Cap Reductn	0	326			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	1.23	0.79			0.45	1.17		1.16	1.09			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 95 (79%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.23
 Intersection Signal Delay: 62.8
 Intersection Capacity Utilization 123.7%
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 31

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE B

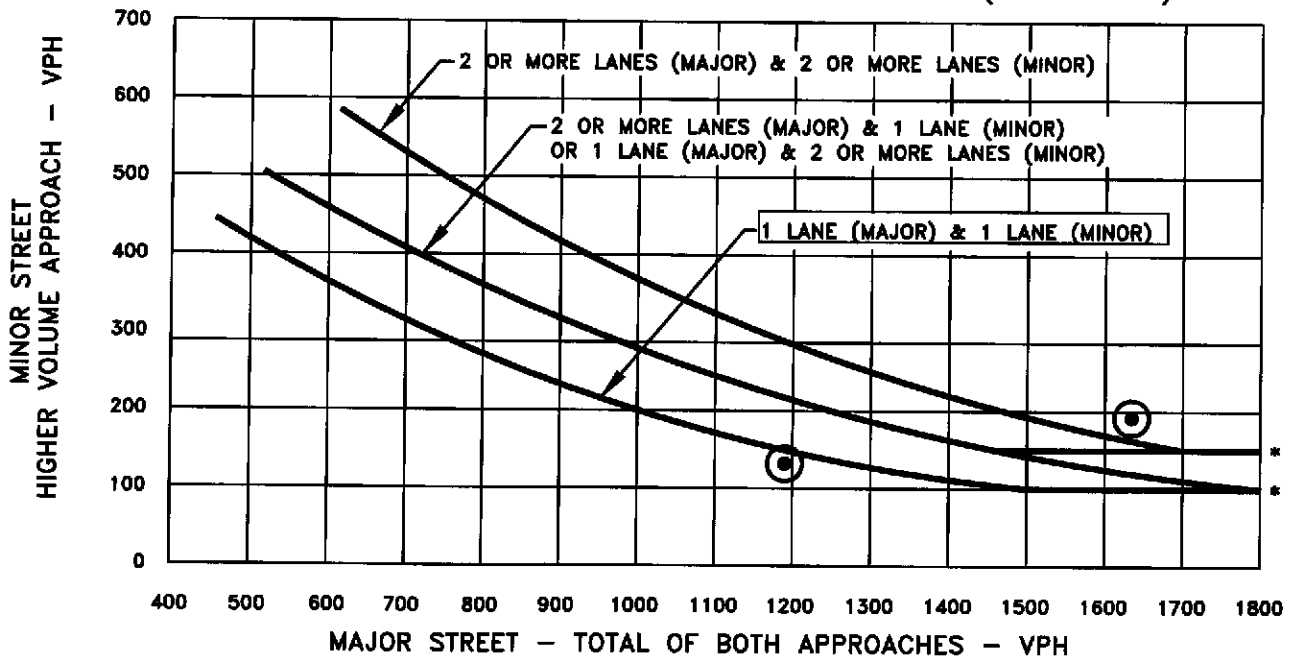
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Lanes		Hour		
	One	2 or more	AM	PM PEAK	
Both Approaches - Major Street	✓		1190	1633	
Highest Approaches - Minor Street	✓		132	192	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE B

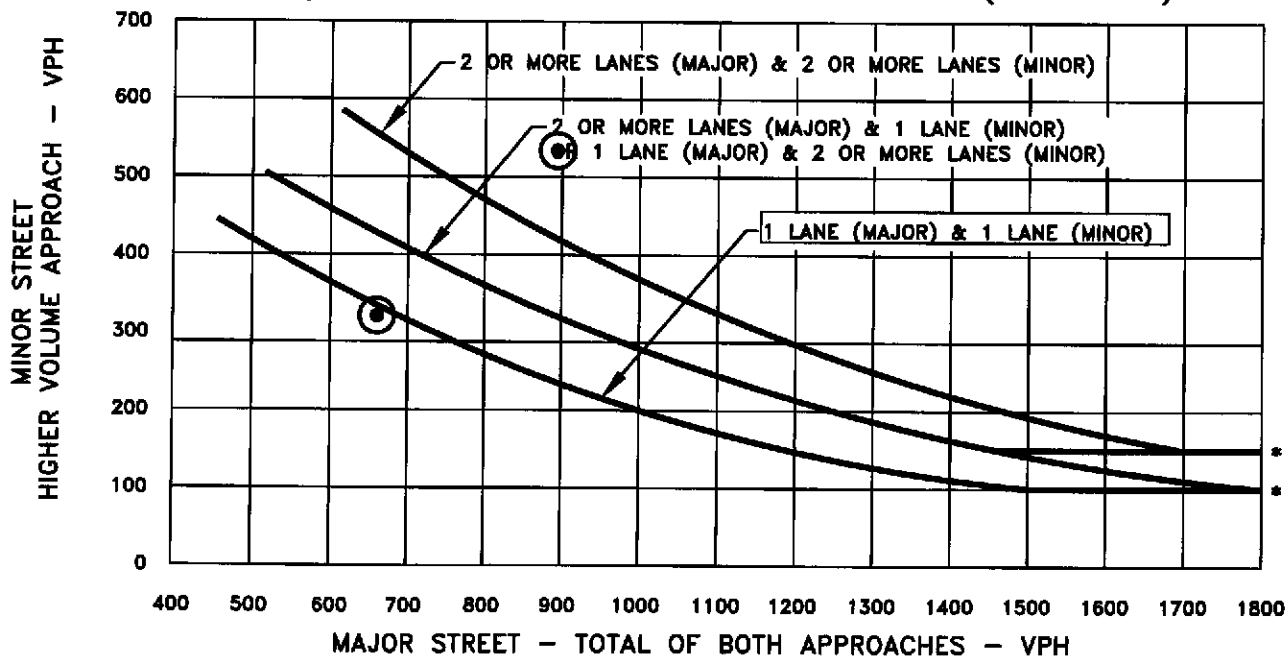
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour		
			AM	PM PEAK	
Both Approaches - Major Street	✓		660	894	
Highest Approaches - Minor Street	✓		333	534	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

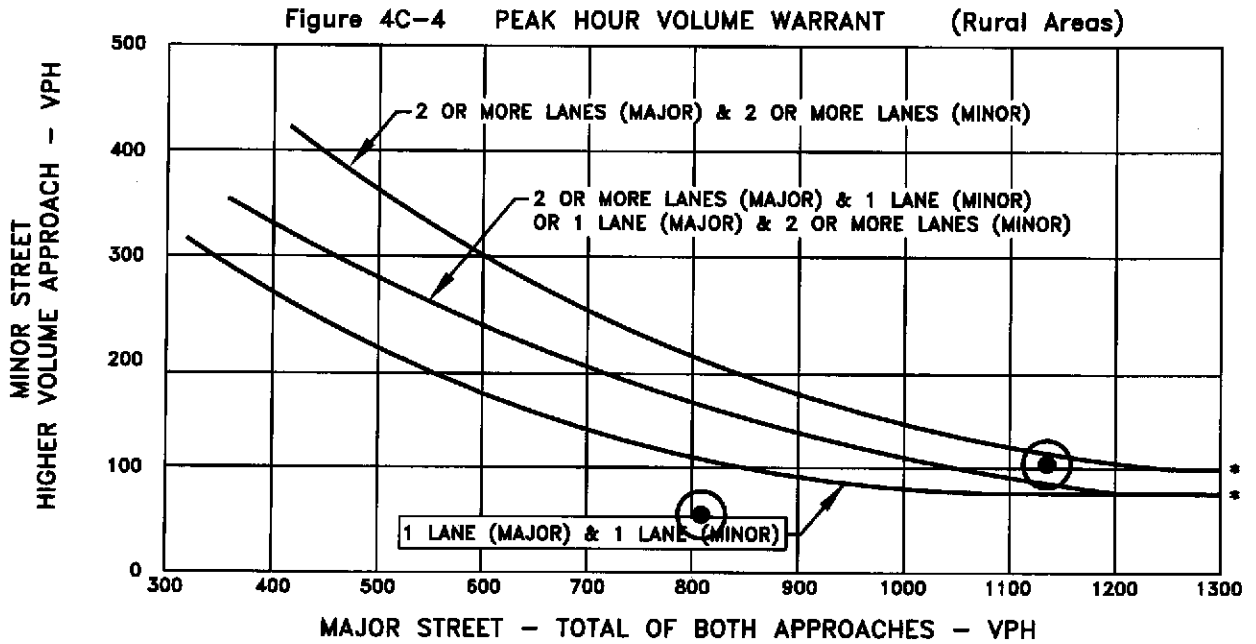
CONDITION: 2030 PROJECT - ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	809	1135		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	55	104		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

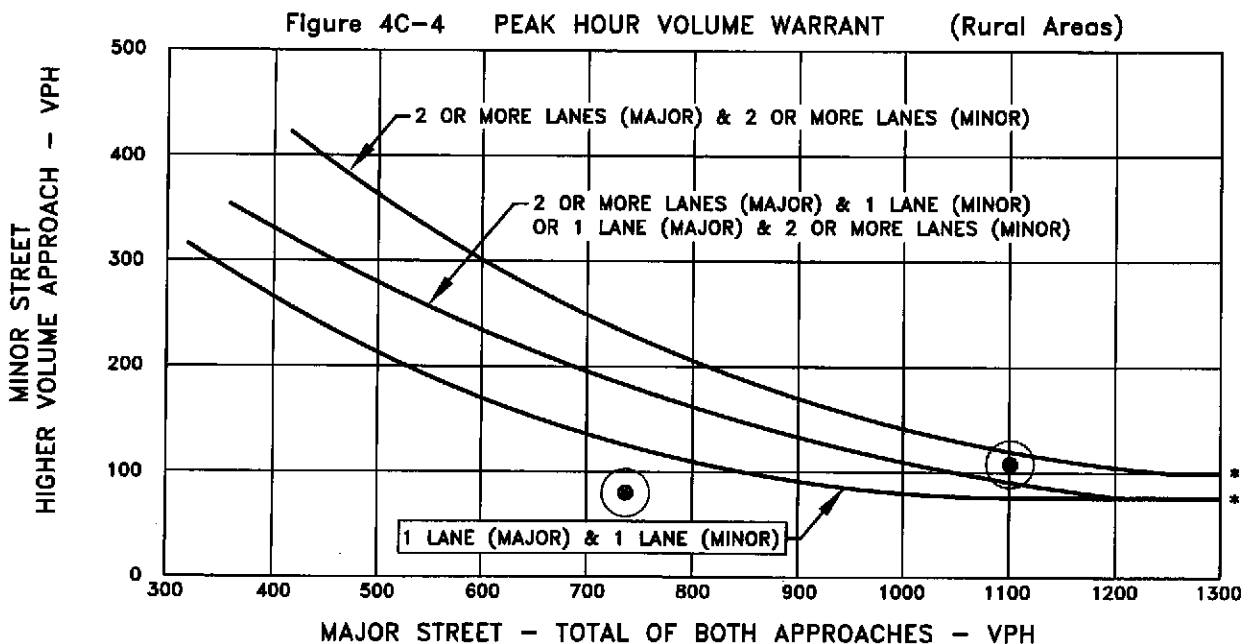
CONDITION: 2030 PROJECT - ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>		737	1101		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		80	108		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

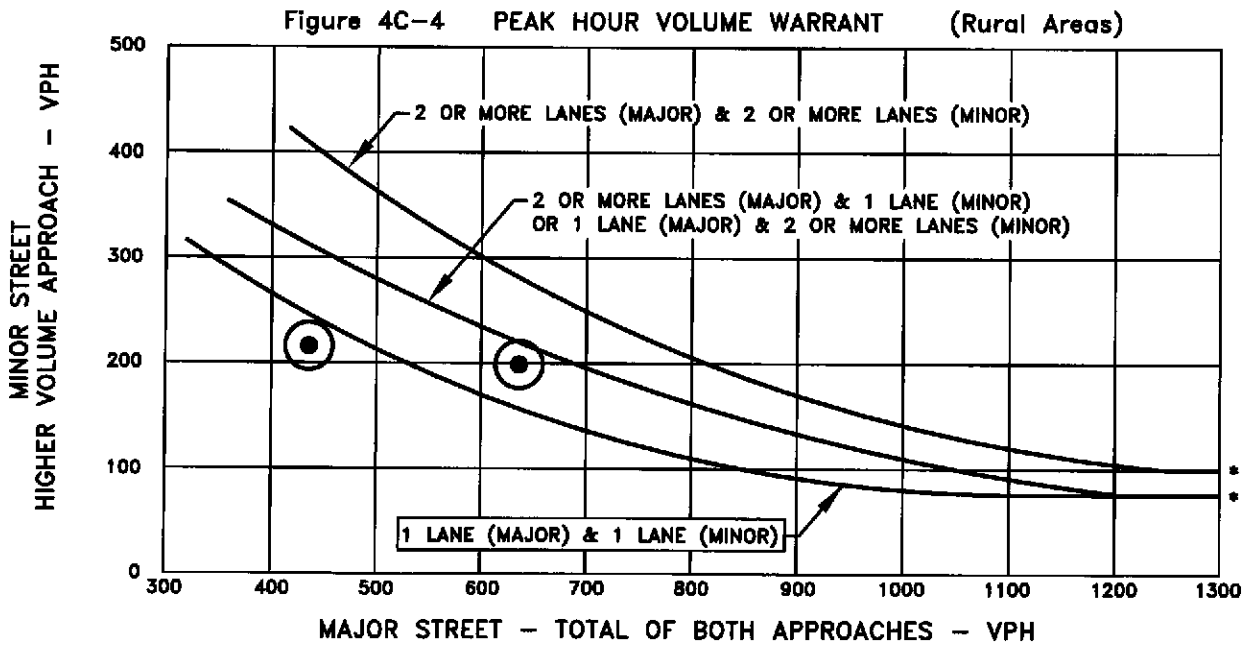
CONDITION: 2030 PROJECT - ALTERNATIVE B

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One		2 or more		Hour		
	AM PEAK	PM PEAK	AM PEAK	PM PEAK			
Both Approaches - Major Street	<input checked="" type="checkbox"/>		435	636			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		216	199			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 32

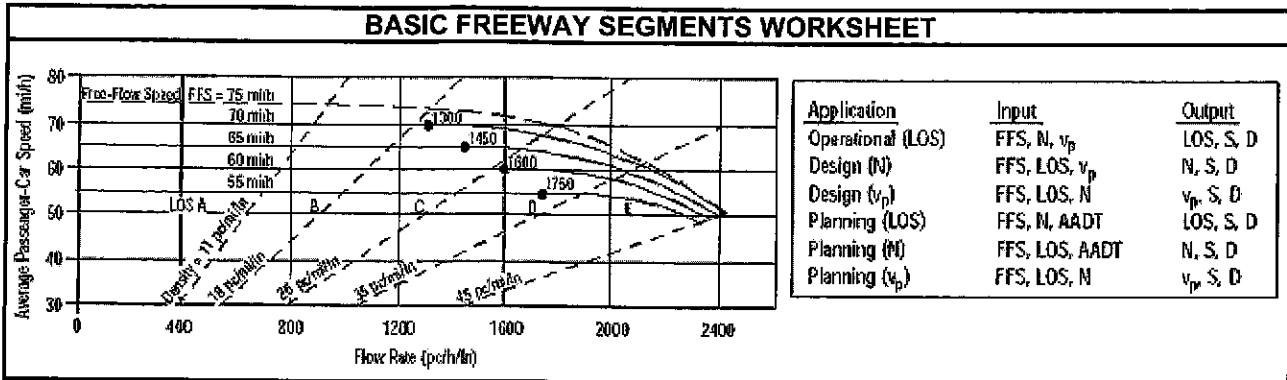
2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v_p	LOS, S, D																						
Design (N)	FFS, LOS, v_p	N, S, D																						
Design (v_p)	FFS, LOS, N	v_p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v_p)	FFS, LOS, N	v_p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	2030 Project Alt C AM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt C																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																						
<input checked="" type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	4243	veh/h	Peak-Hour Factor, PHF																					
AAADT		veh/day	%Trucks and Buses, P_T																					
Peak-Hr Prop. of AAADT, K			%RVs, P_R																					
Peak-Hr Direction Prop., D			General Terrain:																					
DDHV = AAADT x K x D		veh/h	Grade % Length																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00	E_R	1.2																					
E_T	1.5	$f_{HV} = 1 / [P_T (E_T - 1) + P_R (E_R - 1)]$	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																					
Interchange Density	0.50	l/mi	f_{ID}																					
Number of Lanes, N	3		f_N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1806	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$																					
S	67.8	mi/h	S																					
$D = v_p / S$	26.6	pc/mi/ln	$D = v_p / S$																					
LOS	D		Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET																										
			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst		R Davis	Highway/Direction of Travel		SR 99 Northbound																					
Agency or Company		TPG Consulting, Inc.	From/To		North of Avenue 18 1/2																					
Date Performed		9/22/08	Jurisdiction		Caltrans																					
Analysis Time Period		2030 Project Alt C PM	Analysis Year		2030																					
Project Description 04-837.2 Northfork Casino Alt C																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V		4999	veh/h	Peak-Hour Factor, PHF																						
AADT			veh/day	%Trucks and Buses, P _T																						
Peak-Hr Prop. of AADT, K				%RVs, P _R																						
Peak-Hr Direction Prop, D				General Terrain:																						
DDHV = AADT x K x D			veh/h	Grade % Length mi																						
Driver type adjustment		1.00		Up/Down %																						
Calculate Flow Adjustments																										
f _p		1.00		E _R																						
E _T		1.5		f _{HV} = 1/[P _T (E _T -1) + P _R (E _R -1)]																						
				0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width		12.0	ft	f _{LW}																						
Rt-Shoulder Lat. Clearance		6.0	ft	f _{LC}																						
Interchange Density		0.50	l/mi	f _{ID}																						
Number of Lanes, N		3		f _N																						
FFS (measured)		70.0	mi/h	FFS																						
Base free-flow Speed, BFFS			mi/h	70.0																						
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)			Design LOS																							
S		62.0	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																						
D = v _p / S		34.3	pc/mi/ln	S																						
LOS		D		D = v _p / S																						
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes		S - Speed	E _R - Exhibits 23-8, 23-10		f _{LW} - Exhibit 23-4																					
V - Hourly volume		D - Density	E _T - Exhibits 23-8, 23-10, 23-11		f _{LC} - Exhibit 23-5																					
v _p - Flow rate		FFS - Free-flow speed	f _p - Page 23-12		f _N - Exhibit 23-6																					
LOS - Level of service		BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3		f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																										



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs

Volume, V	3903	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

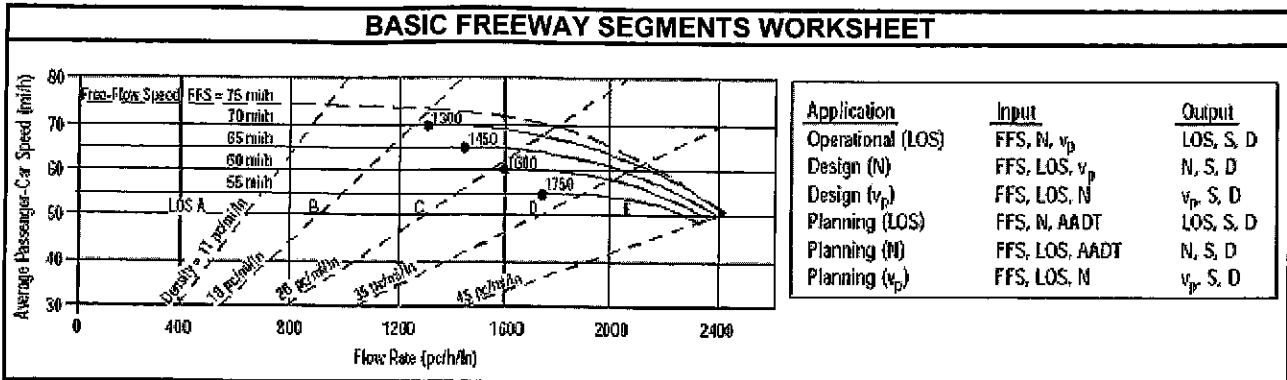
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T (E_T - 1) + P_R (E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	Design LOS
v_p	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$
S	S
$D = v_p / S$	$D = v_p / S$
LOS	Required Number of Lanes, N
	C

Glossary	Factor Location
N - Number of lanes	E_R - Exhibits 23-8, 23-10
V - Hourly volume	E_T - Exhibits 23-8, 23-10, 23-11
v_p - Flow rate	f_p - Page 23-12
LOS - Level of service	LOS, S, FFS, v_p - Exhibits 23-2, 23-3
DDHV - Directional design hour volume	f_{LW} - Exhibit 23-4
S - Speed	f_{LC} - Exhibit 23-5
D - Density	f_N - Exhibit 23-6
FFS - Free-flow speed	f_{ID} - Exhibit 23-7
BFFS - Base free-flow speed	

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 1300, 1450, 1600, and 1750. Dashed lines indicate free-flow speeds (FFS) of 75, 70, 65, 60, and 55 mi/h. A horizontal line at 55 mi/h is labeled 'LOS A'. Density lines are also shown: 11 pc/mi/ln, 14 pc/mi/ln, 18 pc/mi/ln, 24 pc/mi/ln, and 30 pc/mi/ln.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	2030 Project Alt C PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt C																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	5542	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / (P_T (E_T - 1) + P_R (E_R - 1))$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	2360	pc/h/ln	Design LOS																			
S	54.9	mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$																			
$D = v_p / S$	43.0	pc/mi/ln	f_p																			
LOS	E		S																			
			$D = v_p / S$																			
			Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs

Volume, V	4226	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P_T	24
Peak-Hr Prop. of AADT, K			%RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

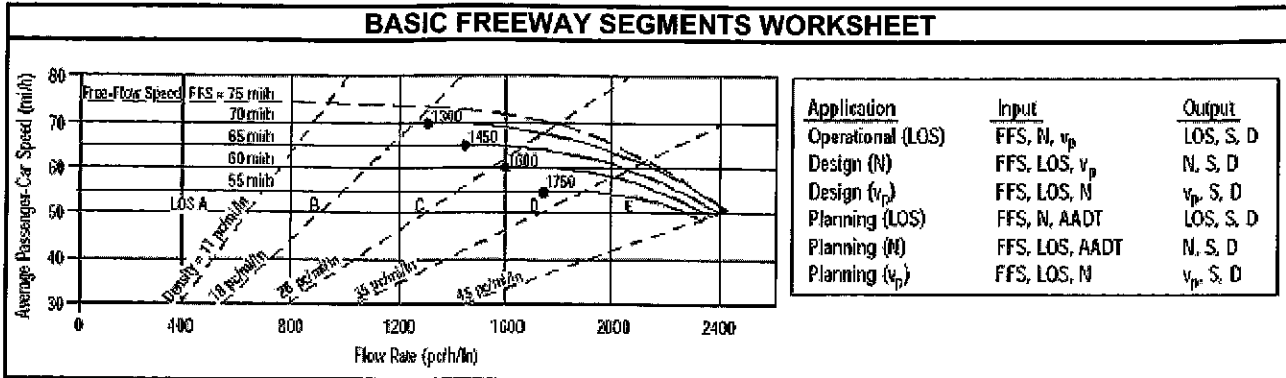
Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T (E_T - 1) + P_R (E_R - 1)]$	0.890

Speed Inputs	Calc Speed Adj and FFS		
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	Design LOS
v_p	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$
S	S
$D = v_p / S$	$D = v_p / S$
LOS	Required Number of Lanes, N

Glossary	Factor Location
N - Number of lanes	E_R - Exhibits 23-8, 23-10
V - Hourly volume	E_T - Exhibits 23-8, 23-10, 23-11
v_p - Flow rate	f_p - Page 23-12
LOS - Level of service	LOS, S, FFS, v_p - Exhibits 23-2, 23-3
DDHV - Directional design hour volume	f_{LW} - Exhibit 23-4
S - Speed	f_{LC} - Exhibit 23-5
D - Density	f_N - Exhibit 23-6
FFS - Free-flow speed	f_{ID} - Exhibit 23-7
BFFS - Base free-flow speed	



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	2030 Project Alt C PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4850	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AAADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

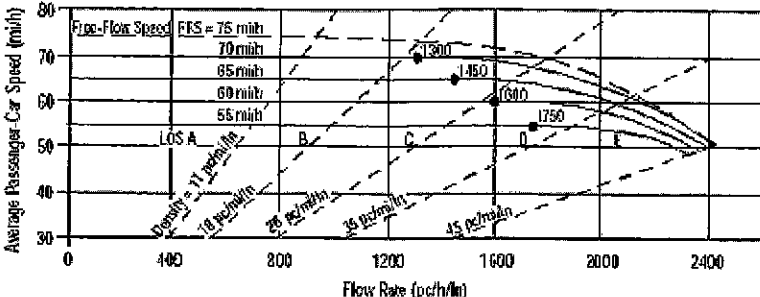
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/P_T^{(E_T-1)} \cdot P_R^{(E_R-1)}$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	2065 pc/h/ln	Design LOS	
S	63.5 mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	32.5 pc/mi/ln	S	mi/h
LOS	D	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v_p	LOS, S, D																						
Design (N)	FFS, LOS, v_p	N, S, D																						
Design (v_p)	FFS, LOS, N	v_p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v_p)	FFS, LOS, N	v_p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																					
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
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Project Description 04-837.2 Northfork Casino Alt C																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	3855	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P_T																					
Peak-Hr Prop. of AADT, K			%RVs, P_R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT x K x D		veh/h	Grade % Length																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00		E_R																					
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																					
Interchange Density	0.50	l/mi	f_{ID}																					
Number of Lanes, N	3		f_N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$	1641	pc/h/ln	Design LOS																					
S	69.2	mi/h	$v_p = V \text{ or DDHV} / (PHF \times N \times f_{HV} \times f_p)$																					
$D = v_p / S$	23.7	pc/mi/ln	S																					
LOS	C		$D = v_p / S$																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																					
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Application	Input	Output																								
Operational (LOS)	FFS, N, v_p	LOS, S, D																								
Design (N)	FFS, LOS, v_p	N, S, D																								
Design (v_p)	FFS, LOS, N	v_p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v_p)	FFS, LOS, N	v_p , S, D																								
General Information			Site Information																							
Analyst		R Davis	Highway/Direction of Travel		SR 99 Southbound																					
Agency or Company		TPG Consulting, Inc.	From/To		between Ave 18 1/2 & Ave 17																					
Date Performed		9/22/08	Jurisdiction		Caltrans																					
Analysis Time Period		2030 Project Alt C PM	Analysis Year		2030																					
Project Description 04-837.2 Northfork Casino Alt C																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V		5418	veh/h	Peak-Hour Factor, PHF																						
AADT			veh/day	%Trucks and Buses, P_T																						
Peak-Hr Prop. of AADT, K				%RVs, P_R																						
Peak-Hr Direction Prop, D				General Terrain:																						
DDHV = AADT x K x D			veh/h	Grade % Length																						
Driver type adjustment		1.00		Up/Down %																						
Calculate Flow Adjustments																										
f_p		1.00		E_R																						
E_T		1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$																						
f_{HV}				0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width		12.0	ft	f_{LW}																						
Rt-Shoulder Lat. Clearance		6.0	ft	f_{LC}																						
Interchange Density		0.50	l/mi	f_{ID}																						
Number of Lanes, N		3		f_N																						
FFS (measured)		70.0	mi/h	FFS																						
Base free-flow Speed, BFFS			mi/h	70.0																						
LOS and Performance Measures			Design (N)																							
Operational (LOS)																										
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$		2307	pc/h/ln	Design (N)																						
S		56.8	mi/h	Design LOS																						
$D = v_p / S$		40.6	pc/mi/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																						
LOS		E		S																						
				$D = v_p / S$																						
				Required Number of Lanes, N																						
Glossary			Factor Location																							
N - Number of lanes		S - Speed		E_R - Exhibits 23-8, 23-10																						
V - Hourly volume		D - Density		E_T - Exhibits 23-8, 23-10, 23-11																						
v_p - Flow rate		FFS - Free-flow speed		f_p - Page 23-12																						
LOS - Level of service		BFFS - Base free-flow speed		LOS, S, FFS, v_p - Exhibits 23-2, 23-3																						
DDHV - Directional design hour volume				f_{LW} - Exhibit 23-4																						
				f_{LC} - Exhibit 23-5																						
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				f_{ID} - Exhibit 23-7																						

BASIC FREEWAY SEGMENTS WORKSHEET																										
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<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	5452	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT x K x D		veh/h	Grade %	Length	mi																					
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f _p	1.00		E _R	1.2																						
E _T	1.5		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f _{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																						
Interchange Density	0.50	l/mi	f _{ID}	mi/h																						
Number of Lanes, N	3		f _N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)			Design LOS																							
	2321	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																							
S	56.3	mi/h	mi/h																							
D = v _p / S	41.2	pc/mi/ln	pc/mi/ln																							
LOS	E		Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																						
v _p - Flow rate	FFS - Free-flow speed		f _p - Page 23-12	f _N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																						
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Application	Input	Output																								
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Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
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Project Description 04-837.2 Northfork Casino Alt C																										
<input checked="" type="checkbox"/> Oper. (LOS)		<input checked="" type="checkbox"/> Des. (N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	7312	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT x K x D		veh/h	Grade %	Length	mi																					
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f _p	1.00		E _R	1.2																						
E _T	1.5		f _{HV} = 1/[P _T (E _T - 1) + P _R (E _R - 1)]	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f _{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																						
Interchange Density	0.50	l/mi	f _{ID}	mi/h																						
Number of Lanes, N	3		f _N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	3113	pc/h/ln	Design LOS																							
S		mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h																						
D = v _p / S		pc/mi/ln	S	mi/h																						
LOS	F		D = v _p / S	pc/mi/ln																						
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																						
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v _p - Flow rate	FFS - Free-flow speed		f _p - Page 23-12	f _N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																						
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BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different Level of Service (LOS) and Free-Flow Speed (FFS) conditions. Key points on the curves are labeled with flow rates: 1300, 1450, 1600, and 1750. The curves are labeled with LOS A, B, C, D, and E, and FFS values of 75, 70, 65, 60, and 55 mi/h. Density values of 11, 19, 28, 35, and 45 pc/mi/ln are also indicated.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
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Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
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<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4648	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT x K x D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00		E_R																			
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	3		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$	1979	pc/h/ln	Design LOS																			
S	65.2	mi/h	$v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$																			
$D = v_p / S$	30.3	pc/mi/ln	f_p																			
LOS	D		S																			
			$D = v_p / S$																			
			Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
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<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	7653	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P _T																					
Peak-Hr Prop. of AADT, K			%RVs, P _R																					
Peak-Hr Direction Prop, D			General Terrain:																					
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Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																					
Interchange Density	0.50	l/mi	f _{ID}																					
Number of Lanes, N	3		f _N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)		Design LOS																						
3258 pc/h/ln		v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																						
S		S																						
mi/h		mi/h																						
D = v _p / S		D = v _p / S																						
pc/mi/ln		pc/mi/ln																						
LOS		Required Number of Lanes, N																						
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ATTACHMENT VI – C - 33

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.981			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1271	1338	0	0	1566	0	1388	1253	0	0	0	0
Flt Permitted	0.619						0.950					
Satd. Flow (perm)	828	1338	0	0	1566	0	1388	1253	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)					24			66				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	352	100	0	0	177	29	227	3	61	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	383	109	0	0	192	32	247	3	66	0	0	0
Lane Group Flow (vph)	383	109	0	0	224	0	247	69	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.4	39.4	0.0	0.0	39.4	0.0	20.6	20.6	0.0	0.0	0.0	0.0
Total Split (%)	65.7%	65.7%	0.0%	0.0%	65.7%	0.0%	34.3%	34.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	34.8	34.8			34.8		16.0	16.0				
ℳlow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	37.5	37.5			37.5		14.5	14.5				
Actuated g/C Ratio	0.62	0.62			0.62		0.24	0.24				
v/c Ratio	0.74	0.13			0.23		0.74	0.20				
Control Delay	12.4	3.4			5.6		34.7	7.0				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	12.4	3.4			5.6		34.7	7.0				
LOS	B	A			A		C	A				
Approach Delay		10.4			5.6			28.6				

1: Ave 18.5 & SR 99 NB ramps
 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			C				
Queue Length 50th (ft)	28	7			29		78	1				
Queue Length 95th (ft)	m#59	m12			58		#164	26				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	517	835			987		384	394				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.74	0.13			0.23		0.64	0.18				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 14.9
 Intersection Capacity Utilization 53.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

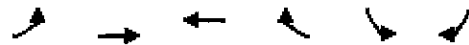
Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23
2030 Project AM Alternative C

10/22/2008

	↗	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	
Trailing Detector (ft)	0	0	0		0	
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.902	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1415	1545	0	1244	0
Flt Permitted		0.985			0.987	
Satd. Flow (perm)	0	1397	1545	0	1244	0
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)					228	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	19	568	301	0	107	284
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	23%	23%	36%	36%
Adj. Flow (vph)	21	617	327	0	116	309
Lane Group Flow (vph)	0	638	327	0	425	0
Turn Type	Perm					
Protected Phases		4	8			
Permitted Phases	4				6	
Detector Phases	4	4	8		6	
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	20.6	20.6	20.6		21.3	
Total Split (s)	38.0	38.0	38.0	0.0	22.0	0.0
Total Split (%)	63.3%	63.3%	63.3%	0.0%	36.7%	0.0%
Maximum Green (s)	33.4	33.4	33.4		16.7	
ℳlow Time (s)	3.6	3.6	3.6		4.3	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	C-Max		Min	
Walk Time (s)	5.0	5.0	5.0		5.0	
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0	0		0	
Act Effct Green (s)		36.7	36.7		15.3	
Actuated g/C Ratio		0.61	0.61		0.26	
v/c Ratio		0.75	0.35		0.87	
Control Delay		17.2	4.4		30.3	
Queue Delay		0.0	0.0		0.0	
Total Delay		17.2	4.4		30.3	
LOS		B	A		C	
Approach Delay		17.2	4.4		30.3	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		163	22		61	
Queue Length 95th (ft)		#365	m51		#210	
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		856	946		533	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.75	0.35		0.80	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 18.2
 Intersection Capacity Utilization 75.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D











95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
2030 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	504	424	181	68	64
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	548	461	197	74	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked						
vC, conflicting volume	658				1050	461
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	658				1050	461
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				66	87
cM capacity (veh/h)	799				215	543
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	568	461	197	143		
Volume Left	21	0	0	74		
Volume Right	0	0	197	70		
cSH	799	1700	1700	305		
Volume to Capacity	0.03	0.27	0.12	0.47		
Queue Length 95th (ft)	2	0	0	60		
Control Delay (s)	0.7	0.0	0.0	26.9		
Lane LOS	A			D		
Approach Delay (s)	0.7	0.0		26.9		
Approach LOS				D		
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			56.3%		ICU Level of Service	B
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
2030 Project AM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↕			↕	↗		↘	↗	↖	↘	
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	15	70	38	283	75	107	110	70	17	38	64	244
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	76	41	308	82	116	120	76	18	41	70	265
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage veh												
Upstream signal (ft)					978							
pX, platoon unblocked												
vC, conflicting volume	198			117			1126	847	82	883	942	97
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			117			1126	847	82	883	942	97
tC, single (s)	4.1			4.1			7.8	6.5	6.9	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.1	4.0	3.9	3.5	4.0	3.3
p0 queue free %	99			79			0	67	98	75	66	72
cM capacity (veh/h)	1369			1471			61	234	821	164	205	960
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	134	389	116	196	18	41	335					
Volume Left	16	308	0	120	0	41	0					
Volume Right	41	0	116	0	18	0	265					
cSH	1369	1471	1700	86	821	164	544					
Volume to Capacity	0.01	0.21	0.07	2.29	0.02	0.25	0.62					
Queue Length 95th (ft)	1	20	0	447	2	24	104					
Control Delay (s)	1.0	6.8	0.0	692.7	9.5	34.2	21.6					
Lane LOS	A	A		F	A	D	C					
Approach Delay (s)	1.0	5.2		633.7		23.0						
Approach LOS				F		C						
Intersection Summary												
Average Delay			119.7									
Intersection Capacity Utilization			52.0%		ICU Level of Service				A			
Analysis Period (min)			15									

6: Ave 18 & Road 23
2030 Project AM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	8	3	12	2	54	1	389	3	54	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	3	13	2	59	1	423	3	59	390	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	994	936	390	942	934	424	390			426		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	994	936	390	942	934	424	390			426		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.4			4.4		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.5			2.5		
p0 queue free %	100	96	99	94	99	90	100			94		
cM capacity (veh/h)	186	243	643	214	239	607	1036			994		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	74	427	449								
Volume Left	0	13	1	59								
Volume Right	3	59	3	0								
cSH	292	444	1036	994								
Volume to Capacity	0.04	0.17	0.00	0.06								
Queue Length 95th (ft)	3	15	0	5								
Control Delay (s)	17.8	14.7	0.0	1.7								
Lane LOS	C	B	A	A								
Approach Delay (s)	17.8	14.7	0.0	1.7								
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			63.4%		ICU Level of Service					B		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1530	3059	0	0	3438	1538	1618	1623	2682	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)						120		497				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35		35		
Link Distance (ft)		717			1330			1679		1421		
Travel Time (s)		10.9			20.2			32.7		27.7		
Volume (vph)	251	546	0	0	1239	124	1180	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	273	593	0	0	1347	135	1283	7	549	0	0	0
Lane Group Flow (vph)	273	593	0	0	1347	135	642	648	549	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3	21.3	20.6	20.6	20.6			
Total Split (s)	20.0	61.0	0.0	0.0	41.0	41.0	39.0	39.0	39.0	0.0	0.0	0.0
Total Split (%)	20.0%	61.0%	0.0%	0.0%	41.0%	41.0%	39.0%	39.0%	39.0%	0.0%	0.0%	0.0%
Maximum Green (s)	14.7	55.7			35.7	35.7	34.4	34.4	34.4			
Yellow Time (s)	4.3	4.3			4.3	4.3	3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	16.0	57.0			37.0	37.0	35.0	35.0	35.0			
Actuated g/C Ratio	0.16	0.57			0.37	0.37	0.35	0.35	0.35			
v/c Ratio	1.11	0.34			1.06	0.21	1.13	1.14	0.44			
Control Delay	109.3	8.0			74.1	6.1	112.6	114.9	4.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	109.3	8.0			74.1	6.1	112.6	114.9	4.5			
LOS	F	A			E	A	F	F	A			
Approach Delay		40.0			67.9			81.1				

7: Ave 17 & SR 99 NB ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			F				
Queue Length 50th (ft)	200	57			498	6	504	511	12			
Queue Length 95th (ft) m#246		m65			#633	45	#730	#736	51			
Internal Link Dist (ft)		637			1250			1599				1341
Turn Bay Length (ft)												
Base Capacity (vph)	245	1744			1272	645	566	568	1262			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.11	0.34			1.06	0.21	1.13	1.14	0.44			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 77 (77%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.14
 Intersection Signal Delay: 67.9
 Intersection Capacity Utilization 91.0%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E







~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
2030 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr _t						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3112	3438	0	1480	1324
Flt Permitted					0.950	
Satd. Flow (perm)	0	3112	3438	0	1480	1324
Right Turn on Red				ℓs		ℓs
Satd. Flow (RTOR)						15
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1733	1895	0	299	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	1884	2060	0	325	116
Lane Group Flow (vph)	0	1884	2060	0	325	116
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	70.0	70.0	0.0	30.0	30.0
Total Split (%)	0.0%	70.0%	70.0%	0.0%	30.0%	30.0%
Maximum Green (s)		64.7	64.7		25.4	25.4
ℓlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		67.4	67.4		24.6	24.6
Actuated g/C Ratio		0.67	0.67		0.25	0.25
v/c Ratio		0.90	0.89		0.89	0.35
Control Delay		8.9	5.3		64.0	29.6
Queue Delay		19.3	0.0		0.0	0.0
Total Delay		28.2	5.3		64.0	29.6
LOS		C	A		E	C
Approach Delay		28.2	5.3		54.9	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		C	A		D	
Queue Length 50th (ft)		95	320		197	52
Queue Length 95th (ft)		m77	m200		#348	102
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2099	2319		385	355
Starvation Cap Reductn		276	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		1.03	0.89		0.84	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 63 (63%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 20.1
 Intersection Capacity Utilization 75.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.990				0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	3249	0	1626	3252	1455	1433	1508	1282	3155	1679	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1641	3249	0	1626	3252	1455	1433	1508	1282	3155	1679	0
Right Turn on Red												
Satd. Flow (RTOR)		7				467			443		6	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	7	887	61	613	961	430	82	60	431	351	44	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	8	964	66	666	1045	467	89	65	468	382	48	7
Lane Group Flow (vph)	8	1030	0	666	1045	467	89	65	468	382	55	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.3	21.3		9.3	21.3	21.3	8.6	20.6	20.6	8.6	20.6	
Total Split (s)	9.3	31.4	0.0	34.0	56.1	56.1	13.3	20.6	20.6	14.0	21.3	0.0
Total Split (%)	9.3%	31.4%	0.0%	34.0%	56.1%	56.1%	13.3%	20.6%	20.6%	14.0%	21.3%	0.0%
Maximum Green (s)	4.0	26.1		28.7	50.8	50.8	8.7	16.0	16.0	9.4	16.7	
Flow Time (s)	4.3	4.3		4.3	4.3	4.3	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.3	27.4		30.0	59.5	59.5	15.1	11.9	11.9	14.7	13.8	
Actuated g/C Ratio	0.05	0.27		0.30	0.60	0.60	0.15	0.12	0.12	0.15	0.14	
v/c Ratio	0.09	1.15		1.36	0.54	0.44	0.41	0.36	0.86	0.82	0.23	
Control Delay	47.6	115.0		198.4	5.5	1.6	44.1	44.7	22.2	59.4	40.7	
Queue Delay	0.0	0.0		0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.6	115.0		198.4	6.2	2.2	44.1	44.7	22.2	59.4	40.7	
LOS	D	F		F	A	A	D	D	C	E	D	
Approach Delay		114.5			64.1			27.7			57.0	

10: Ave 17 & GS Blvd
 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			C			E	
Queue Length 50th (ft)	5	408		576	111	19	50	39	15	121	30	
Queue Length 95th (ft)	20	#539		m#701	m150	m21	102	77	#175	#247	66	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	87	895		488	1936	1056	221	250	582	464	340	
Starvation Cap Reductn	0	0		0	484	276	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.09	1.15		1.36	0.72	0.60	0.40	0.26	0.80	0.82	0.16	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 84 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.36
 Intersection Signal Delay: 70.3
 Intersection Capacity Utilization 87.1%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.998			0.989			0.994	
Flt Protected		0.998			0.997			0.988			0.997	
Satd. Flow (prot)	0	1789	0	0	1734	0	0	1547	0	0	1506	0
Flt Permitted		0.975			0.914			0.813			0.951	
Satd. Flow (perm)	0	1748	0	0	1590	0	0	1273	0	0	1437	0
Right Turn on Red			↻s			↻s			↻s		↻s	
Satd. Flow (RTOR)		23			1			8			5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	20	512	138	42	607	7	138	386	47	19	272	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	22	557	150	46	660	8	150	420	51	21	296	16
Lane Group Flow (vph)	0	729	0	0	714	0	0	621	0	0	333	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	34.0	34.0	0.0	34.0	34.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0
Total Split (%)	48.6%	48.6%	0.0%	48.6%	48.6%	0.0%	51.4%	51.4%	0.0%	51.4%	51.4%	0.0%
Maximum Green (s)	28.7	28.7		28.7	28.7		30.7	30.7		30.7	30.7	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			32.0			32.0	
Actuated g/C Ratio		0.43			0.43			0.46			0.46	
v/c Ratio		0.96			1.05			1.06			0.50	
Control Delay		45.0			70.5			76.3			16.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		45.0			70.5			76.3			16.5	
LOS		D			E			E			B	
Approach Delay		45.0			70.5			76.3			16.5	

11: Ave 17 & Road 23
 2030 Project AM Alternative C

10/22/2008

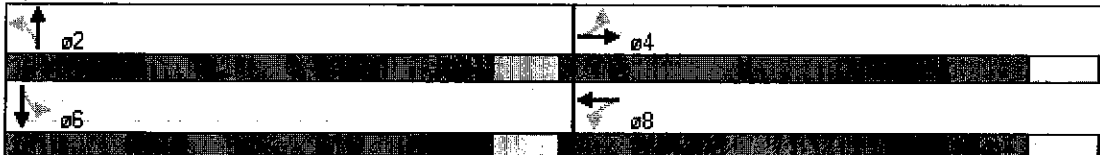
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			E			B	
Queue Length 50th (ft)		285			343			300			95	
Queue Length 95th (ft)		#514			#543			#491			165	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		762			682			586			660	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.96			1.05			1.06			0.50	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 56.7
 Intersection Capacity Utilization 108.2%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service G

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.967			0.997	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3325	0	1752	3494	0
Flt Permitted		0.815			0.721		0.950			0.950		
Satd. Flow (perm)	0	1518	1583	0	1343	1583	1719	3325	0	1752	3494	0
Right Turn on Red												
Satd. Flow (RTOR)			15			54		73			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	50	10	380	109	32	609	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	54	11	413	118	35	662	12
Lane Group Flow (vph)	0	11	15	0	176	54	11	531	0	35	674	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	21.9	21.9	21.9	21.9	21.9	21.9	9.9	22.7	0.0	10.4	23.2	0.0
Total Split (%)	39.8%	39.8%	39.8%	39.8%	39.8%	39.8%	18.0%	41.3%	0.0%	18.9%	42.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	5.0	17.8		5.5	18.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		13.0	13.0		13.2	13.2	6.3	25.4		6.8	27.7	
Actuated g/C Ratio		0.25	0.25		0.26	0.26	0.11	0.52		0.12	0.57	
v/c Ratio		0.03	0.04		0.51	0.12	0.06	0.30		0.16	0.34	
Control Delay		11.9	7.2		17.6	5.4	22.3	8.8		21.2	8.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.9	7.2		17.6	5.4	22.3	8.8		21.2	8.4	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		9.2			14.7			9.1			9.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1	0		21	0	1	23		5	36	
Queue Length 95th (ft)		11	10		90	19	15	95		32	135	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		523	555		462	580	190	1857		217	2048	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.03		0.38	0.09	0.06	0.29		0.16	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 55

Actuated Cycle Length: 49

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 10.0

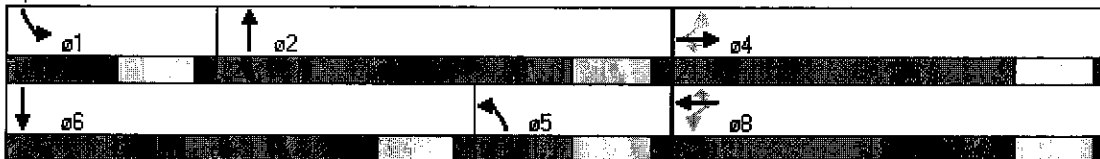
Intersection Capacity Utilization 46.2%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						164		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	481	315	0	0	240	151	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	523	342	0	0	261	164	222	2	95	0	0	0
Lane Group Flow (vph)	523	342	0	0	261	164	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
Flow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.44	0.17			0.42	0.40	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.2			17.3			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	48	12			44	0	31	1				
Queue Length 95th (ft)	130	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	564	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.44	0.17			0.26	0.29	0.23	0.19				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB off-ramp
 2030 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘↘	↘↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Flt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						479
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	633	368	0	163	441
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	688	400	0	177	479
Lane Group Flow (vph)	0	688	400	0	177	479
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
ℳlow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.45	0.26		0.12	0.32
Control Delay		13.1	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.1	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.1	2.7		4.2	
Approach LOS		B	A		A	

15: Ellis OC & SR 99 SB off-ramp
 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		87	0		18	0
Queue Length 95th (ft)		126	3		34	24
Internal Link Dist (ft)		1000	630		1324	
Turn Bay Length (ft)						
Base Capacity (vph)		1539	1539		1482	1475
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.26		0.12	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB off-ramp



17: Ellis OC & Aviation Drive
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.926			0.899				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3277	0	1770	3182	0	1770	1770	1583	1770	1583	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		129			197				48		66	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	47	122	119	445	89	181	194	261	44	121	387	571
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	133	129	484	97	197	211	284	48	132	421	621
Lane Group Flow (vph)	51	262	0	484	294	0	211	284	48	132	1042	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4			8				6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9	20.9	
Total Split (s)	14.9	22.0	0.0	35.0	42.1	0.0	19.0	68.0	68.0	25.0	74.0	0.0
Total Split (%)	9.9%	14.7%	0.0%	23.3%	28.1%	0.0%	12.7%	45.3%	45.3%	16.7%	49.3%	0.0%
Maximum Green (s)	10.4	17.1		30.5	37.2		14.5	63.1	63.1	20.1	69.1	
ℳlow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	9.3	12.3		31.0	36.2		15.0	64.1	64.1	21.0	70.1	
Actuated g/C Ratio	0.06	0.09		0.21	0.25		0.10	0.44	0.44	0.15	0.49	
v/c Ratio	0.45	0.66		1.27	0.31		1.15	0.36	0.07	0.51	1.30	
Control Delay	78.5	40.2		186.6	15.9		166.7	28.8	6.5	65.5	174.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	78.5	40.2		186.6	15.9		166.7	28.8	6.5	65.5	174.6	
LOS	E	D		F	B		F	C	A	E	F	
Approach Delay		46.5			122.1			80.4		162.3		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	47	63		573	38		232	175	0	116	4222	
Queue Length 95th (ft)	95	113		#832	80		#416	265	26	195	#1558	
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	130	507		380	989		184	785	729	258	802	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.39	0.52		1.27	0.30		1.15	0.36	0.07	0.51	1.30	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 144.4
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.30
 Intersection Signal Delay: 122.4
 Intersection Capacity Utilization 81.0%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	1618	1618	1524	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)						514			100			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	196	995	0	0	931	473	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	213	1082	0	0	1012	514	390	0	384	0	0	0
Lane Group Flow (vph)	213	1082	0	0	1012	514	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	18.0	52.0	0.0	0.0	34.0	34.0	28.0	28.0	28.0	0.0	0.0	0.0
Total Split (%)	22.5%	65.0%	0.0%	0.0%	42.5%	42.5%	35.0%	35.0%	35.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.4	47.4			29.4	29.4	23.5	23.5	23.5			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.0	48.0			31.0	31.0	24.0	24.0	24.0			
Actuated g/C Ratio	0.16	0.60			0.39	0.39	0.30	0.30	0.30			
v/c Ratio	0.75	0.52			0.75	0.56	0.40	0.40	0.73			
Control Delay	46.5	1.1			25.9	4.5	25.4	25.4	27.9			
Queue Delay	0.0	0.2			0.0	0.0	0.0	0.0	0.0			
Total Delay	46.5	1.3			25.9	4.5	25.4	25.4	27.9			
LOS	D	A			C	A	C	C	C			
Approach Delay		8.7			18.6			26.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 Project AM Alternative C

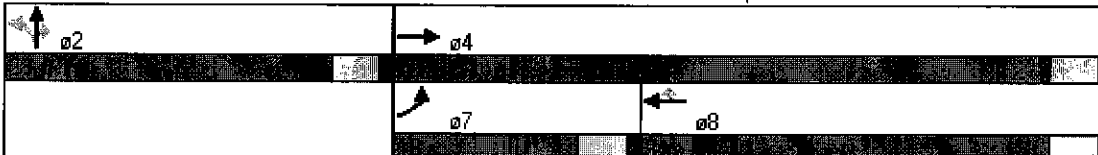
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C				
Queue Length 50th (ft)	96	3			230	0	81	81	126			
Queue Length 95th (ft)	m107	m12			305	60	142	142	#241			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	304	2083			1344	916	485	485	527			
Starvation Cap Reductn	0	289			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.70	0.60			0.75	0.56	0.40	0.40	0.73			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 30 (38%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 16.8
 Intersection Capacity Utilization 82.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	0	1597	1429
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			459									118
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	760	422	414	921	0	0	0	0	430	0	229
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	826	459	450	1001	0	0	0	0	467	0	249
Lane Group Flow (vph)	0	826	459	450	1001	0	0	0	0	0	467	249
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	25.6	25.6	26.0	51.6	0.0	0.0	0.0	0.0	28.4	28.4	28.4
Total Split (%)	0.0%	32.0%	32.0%	32.5%	64.5%	0.0%	0.0%	0.0%	0.0%	35.5%	35.5%	35.5%
Maximum Green (s)		21.0	21.0	21.4	47.0					23.9	23.9	23.9
ℳlow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		21.6	21.6	22.0	47.6					24.4	24.4	
Actuated g/C Ratio		0.27	0.27	0.28	0.60					0.30	0.30	
v/c Ratio		0.91	0.62	0.95	0.49					0.96	0.48	
Control Delay		43.8	6.7	47.3	3.2					61.6	15.2	
Queue Delay		0.0	0.0	0.0	0.3					0.0	0.0	
Total Delay		43.8	6.7	47.3	3.5					61.6	15.2	
LOS		D	A	D	A					E	B	
Approach Delay		30.5			17.1					45.5		

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 Project AM Alternative C

10/22/2008

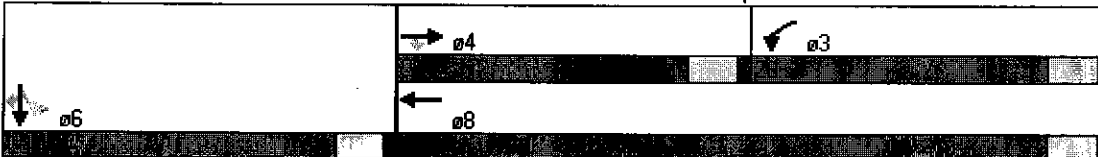
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						D	
Queue Length 50th (ft)		209	0	195	19						228	50
Queue Length 95th (ft)		#318	71 m	#385	51						#413	117
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		911	743	473	2046						487	518
Starvation Cap Reductn		0	0	0	475						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.91	0.62	0.95	0.64						0.96	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 32 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 28.0
 Intersection Capacity Utilization 82.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E













95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2030 Project AM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	44	1	35	0	368	38	30	306	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	48	1	38	0	400	41	33	333	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	857	839	333	818	818	421	333			441		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	857	839	333	818	818	421	333			441		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.4		
p0 queue free %	100	100	100	83	100	94	100			97		
cM capacity (veh/h)	254	292	709	287	301	633	1137			1034		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	87	441	365								
Volume Left	0	48	0	33								
Volume Right	0	38	41	0								
cSH	1700	378	1137	1034								
Volume to Capacity	0.00	0.23	0.00	0.03								
Queue Length 95th (ft)	0	22	0	2								
Control Delay (s)	0.0	17.4	0.0	1.1								
Lane LOS	A	C		A								
Approach Delay (s)	0.0	17.4	0.0	1.1								
Approach LOS	A	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			52.3%		ICU Level of Service					A		
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 Project AM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.960							0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3239	0	0	0	0	1752	1568	0
Flt Permitted	0.313									0.950		
Satd. Flow (perm)	1058	3312	0	0	3239	0	0	0	0	1752	1568	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)					149						353	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		491			1298			1379		1837		
Travel Time (s)		9.6			25.3			31.3		41.8		
Volume (vph)	822	580	0	0	568	208	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	893	630	0	0	617	226	0	0	0	355	0	168
Lane Group Flow (vph)	893	630	0	0	843	0	0	0	0	355	168	0
Turn Type	Perm						Perm					
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	69.0	69.0	0.0	0.0	69.0	0.0	0.0	0.0	0.0	21.0	21.0	0.0
Total Split (%)	76.7%	76.7%	0.0%	0.0%	76.7%	0.0%	0.0%	0.0%	0.0%	23.3%	23.3%	0.0%
Maximum Green (s)	64.4	64.4			64.4					16.5	16.5	
ℳlow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	65.0	65.0			65.0					17.0	17.0	
Actuated g/C Ratio	0.72	0.72			0.72					0.19	0.19	
v/c Ratio	1.17	0.26			0.35					1.07	0.29	
Control Delay	104.7	3.3			4.2					107.2	1.2	
Queue Delay	0.0	0.0			0.0					0.0	0.0	
Total Delay	104.7	3.3			4.2					107.2	1.2	
LOS	F	A			A					F	A	
Approach Delay		62.8			4.2						73.2	

21: SR 145/Madera & SR 99 NB ramps
 2030 Project AM Alternative C

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		E			A						E	
Queue Length 50th (ft)	319	37			61					227	0	
Queue Length 95th (ft)	#439	69			84					#395	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	764	2392			2381					331	583	
Starvation Cap Reductn	0	0			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	1.17	0.26			0.35					1.07	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 6 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 47.6
 Intersection Capacity Utilization 73.9%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frnt			0.850					0.991				0.850
Flt Protected	0.950						0.950				0.987	
Satd. Flow (prot)	1719	1810	1538	0	0	0	3213	3282	0	0	3426	1553
Flt Permitted	0.950						0.950				0.573	
Satd. Flow (perm)	1719	1810	1538	0	0	0	3213	3282	0	0	1989	1553
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			545					12				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	433	278	697	0	0	0	254	974	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	471	302	758	0	0	0	276	1059	71	130	374	468
Lane Group Flow (vph)	471	302	758	0	0	0	276	1130	0	0	504	468
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	38.4	38.4	38.4	0.0	0.0	0.0	20.6	51.6	0.0	31.0	31.0	31.0
Total Split (%)	42.7%	42.7%	42.7%	0.0%	0.0%	0.0%	22.9%	57.3%	0.0%	34.4%	34.4%	34.4%
Maximum Green (s)	33.9	33.9	33.9				16.0	47.0		26.4	26.4	26.4
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							ℳs			ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	34.4	34.4	34.4				16.6	47.6			27.0	27.0
Actuated g/C Ratio	0.38	0.38	0.38				0.18	0.53			0.30	0.30
v/c Ratio	0.72	0.44	0.82				0.47	0.65		0.94dl	0.59	
Control Delay	28.5	22.0	16.1				35.7	17.2			35.1	4.6
Queue Delay	25.3	5.3	0.6				0.1	0.0			0.0	0.1
Total Delay	53.8	27.3	16.7				35.8	17.2			35.1	4.7
LOS	D	C	B				D	B			D	A
Approach Delay		30.2						20.9			20.5	

22: AVE 14/Olive & SR 145/Madera
 2030 Project AM Alternative C

10/22/2008

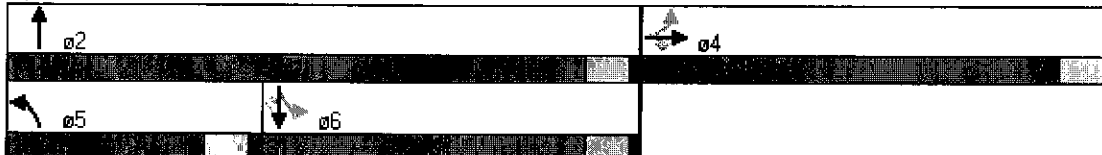
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C				C
Queue Length 50th (ft)	172	105	98				72	226			151	37
Queue Length 95th (ft)	308	m166	#405				111	295			m184	m58
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	657	692	925				593	1741			597	794
Starvation Cap Reductn	194	321	28				0	0			0	19
Spillback Cap Reductn	0	0	0				27	0			0	4
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	1.02	0.81	0.85				0.49	0.65			0.84	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 39 (43%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 76.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 22: AVE 14/Olive & SR 145/Madera



23: Ave 14/Olive & SR 99 SB off-ramp
 2030 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Fr _t						0.850
Fl _t Protected					0.950	
Satd. Flow (prot)	0	3505	3505	0	3242	1495
Fl _t Permitted					0.950	
Satd. Flow (perm)	0	3505	3505	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						124
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	823	685	0	585	319
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	895	745	0	636	347
Lane Group Flow (vph)	0	895	745	0	636	347
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	44.7	44.7	0.0	45.3	45.3
Total Split (%)	0.0%	49.7%	49.7%	0.0%	50.3%	50.3%
Maximum Green (s)		40.2	40.2		40.8	40.8
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		58.1	58.1		23.9	23.9
Actuated g/C Ratio		0.65	0.65		0.27	0.27
v/c Ratio		0.40	0.33		0.74	0.71
Control Delay		9.1	3.4		35.2	26.6
Queue Delay		0.1	0.2		0.0	0.0
Total Delay		9.2	3.6		35.2	26.6
LOS		A	A		D	C
Approach Delay		9.2	3.6		32.1	



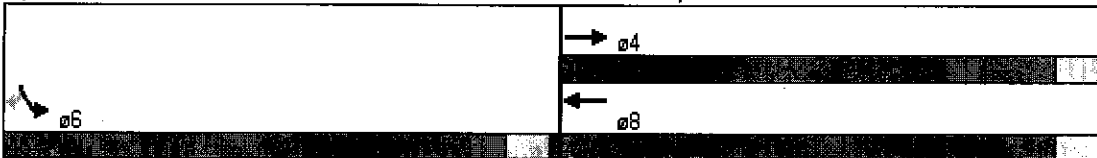
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		110	30		172	116
Queue Length 95th (ft)		197	52		198	185
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2263	2263		1488	753
Starvation Cap Reductn		0	777		0	0
Spillback Cap Reductn		369	0		8	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.47	0.50		0.43	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 16.2
 Intersection Capacity Utilization 46.1%
 Analysis Period (min) 15

















Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 2030 Project AM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	42	61	6	9	90	117	8	137	6	103	131	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	66	7	10	98	127	9	149	7	112	142	58
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	118	235	164	312								
Volume Left (vph)	46	10	9	112								
Volume Right (vph)	7	127	7	58								
Hadj (s)	0.18	-0.08	0.33	0.25								
Departure Headway (s)	5.9	5.4	5.8	5.5								
Degree Utilization, x	0.19	0.35	0.26	0.47								
Capacity (veh/h)	547	614	566	624								
Control Delay (s)	10.3	11.3	10.8	13.2								
Approach Delay (s)	10.3	11.3	10.8	13.2								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.8									
HCM Level of Service			B									
Intersection Capacity Utilization			55.5%		ICU Level of Service				B			
Analysis Period (min)			15									

25: SB Ramps & GS Blvd
2030 Project AM Alternative C

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.672	
Satd. Flow (perm)	3303	1524	1696	1442	1240	1845
Right Turn on Red		ℳs		ℳs		
Satd. Flow (RTOR)		82		497		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	791		408			1104
Travel Time (s)	18.0		9.3			25.1
Volume (vph)	1045	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	1136	82	117	497	303	74
Lane Group Flow (vph)	1136	82	117	497	303	74
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	63.8	56.2	56.2	56.2	56.2	56.2
Total Split (%)	53.2%	46.8%	46.8%	46.8%	46.8%	46.8%
Maximum Green (s)	59.3	51.7	51.7	51.7	51.7	51.7
ℳlow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	77.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.64	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.54	0.16	0.24	0.64	0.84	0.14
Control Delay	15.3	5.3	36.9	11.6	58.1	28.2
Queue Delay	0.1	0.0	0.0	1.5	0.0	0.0
Total Delay	15.5	5.3	36.9	13.1	58.1	28.2
LOS	B	A	D	B	E	C
Approach Delay	14.8		17.6			52.2

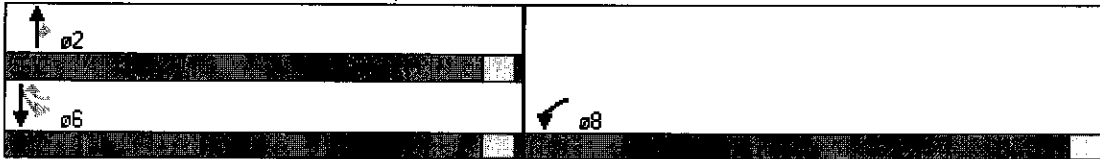
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			D
Queue Length 50th (ft)	214	0	72	74	227	44
Queue Length 95th (ft)	443	28	m18	m10	250	60
Internal Link Dist (ft)	711		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2140	718	749	914	547	815
Starvation Cap Reductn	0	0	0	237	0	0
Spillback Cap Reductn	217	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.11	0.16	0.73	0.55	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 67 (56%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 22.0
 Intersection Capacity Utilization 58.6%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Frnt		0.994			0.943			0.867				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	3039	0	1656	1511	0	3273	1776	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	3039	0	1656	1511	0	3273	1776	1509
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)		4			114			24				91
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	189	360	16	19	603	373	16	3	22	1019	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1108	11	91
Lane Group Flow (vph)	205	408	0	21	1060	0	17	27	0	1108	11	91
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	18.0	48.4	0.0	10.1	40.5	0.0	9.7	20.5	0.0	41.0	51.8	51.8
Total Split (%)	15.0%	40.3%	0.0%	8.4%	33.8%	0.0%	8.1%	17.1%	0.0%	34.2%	43.2%	43.2%
Maximum Green (s)	13.4	43.8		5.5	35.9		5.5	16.3		36.8	47.6	47.6
ℳlow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2		3.2	3.2	3.2
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	14.0	50.5		6.1	36.5		5.7	16.5		37.0	53.6	53.6
Actuated g/C Ratio	0.12	0.42		0.05	0.30		0.05	0.14		0.31	0.45	0.45
v/c Ratio	1.09	0.30		0.26	1.06		0.22	0.12		1.10	0.01	0.13
Control Delay	141.2	24.5		44.2	69.7		61.7	20.0		89.7	9.3	2.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		7.9	0.0	0.0
Total Delay	141.2	24.5		44.2	69.7		61.7	20.0		97.6	9.3	2.7
LOS	F	C		D	E		E	C		F	A	A
Approach Delay		63.5			69.2			36.1			89.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			D			F	
Queue Length 50th (ft)	479	100		13	416		13	2		504	4	18
Queue Length 95th (ft)	#334	160		m26	m#552		38	30		#614	m2	2
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	188	1349		82	1004		79	228		1009	793	724
Starvation Cap Reductn	0	0		0	0		0	0		17	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.09	0.30		0.26	1.06		0.22	0.12		1.12	0.01	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 16 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 75.9
 Intersection Capacity Utilization 84.8%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1656	3312	0	0	3406	1524	0	1597	1429	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		
Satd. Flow (RTOR)						774			71			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	209	1192	0	0	598	909	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	227	1296	0	0	650	988	432	0	283	0	0	0
Lane Group Flow (vph)	227	1296	0	0	650	988	0	432	283	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	23.0	80.0	0.0	0.0	57.0	57.0	40.0	40.0	40.0	0.0	0.0	0.0
Total Split (%)	19.2%	66.7%	0.0%	0.0%	47.5%	47.5%	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%
Maximum Green (s)	18.5	75.5			52.5	52.5	35.5	35.5	35.5			
ℳlow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	19.0	77.4			54.4	54.4		34.6	34.6			
Actuated g/C Ratio	0.16	0.64			0.45	0.45		0.29	0.29			
v/c Ratio	0.87	0.61			0.42	0.89		0.94	0.61			
Control Delay	58.2	3.4			23.6	17.7		70.7	33.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	58.2	3.4			23.6	17.7		70.7	33.2			
LOS	E	A			C	B		E	C			
Approach Delay		11.6			20.0			55.9				

27: Ave 12 & SR 99 NB Ramps
 2030 Project AM Alternative C

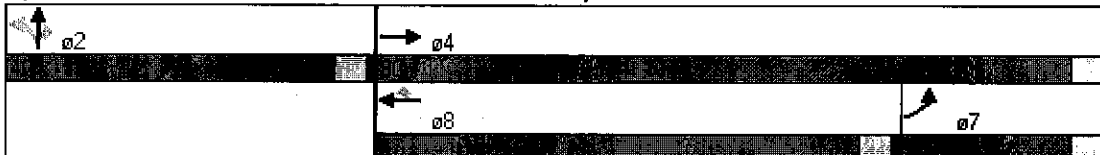
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			E				
Queue Length 50th (ft)	185	28			179	167		321	140			
Queue Length 95th (ft)	m195	m30			230	#594		#512	236			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	262	2135			1543	1114		479	478			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.87	0.61			0.42	0.89		0.90	0.59			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 100 (83%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 23.3
 Intersection Capacity Utilization 99.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



1: Ave 18.5 & SR 99 NB ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.986			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1467	1545	0	0	1643	0	1504	1346	0	0	0	0
Flt Permitted	0.587						0.950					
Satd. Flow (perm)	907	1545	0	0	1643	0	1504	1346	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)					17			785				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	482	141	0	0	223	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	524	153	0	0	242	28	277	0	91	0	0	0
Lane Group Flow (vph)	524	153	0	0	270	0	277	91	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.4	39.4	0.0	0.0	39.4	0.0	20.6	20.6	0.0	0.0	0.0	0.0
Total Split (%)	65.7%	65.7%	0.0%	0.0%	65.7%	0.0%	34.3%	34.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	34.8	34.8			34.8		16.0	16.0				
ℳlow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	37.2	37.2			37.2		14.8	14.8				
Actuated g/C Ratio	0.62	0.62			0.62		0.25	0.25				
v/c Ratio	0.93	0.16			0.26		0.75	0.10				
Control Delay	12.2	1.4			6.1		34.3	0.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	12.2	1.4			6.1		34.3	0.2				
LOS	B	A			A		C	A				
Approach Delay		9.7			6.1			25.9				

1: Ave 18.5 & SR 99 NB ramps
2030 Project PM Alternative C

10/22/2008

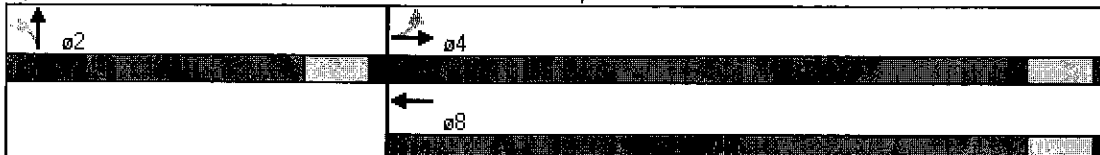
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	24	6			39			88				
Queue Length 95th (ft)	m22	m6			72			#181				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	562	958			1025			416		940		
Starvation Cap Reductn	0	0			0			0		0		
Spillback Cap Reductn	0	0			0			0		0		
Storage Cap Reductn	0	0			0			0		0		
Reduced v/c Ratio	0.93	0.16			0.26			0.67		0.10		

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 13.5
 Intersection Capacity Utilization 64.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C













95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



2: Ave 18.5 & SB Ramps
2030 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	622	368	0	370	108	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	676	400	0	402	117	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		223			717							
pX, platoon unblocked				0.60			0.60	0.60	0.60	0.60	0.60	
vC, conflicting volume	520			1076			1078	1196	676	1078	1478	402
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	520			1126			1130	1324	463	1130	1793	402
tC, single (s)	4.3			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	952			337			110	95	364	110	49	652
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	676	400	402	117								
Volume Left	0	0	0	0								
Volume Right	0	400	0	117								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.40	0.24	0.24	0.07								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			36.1%		ICU Level of Service				A			
Analysis Period (min)			15									

3: Ave 18.5 & Road 23
2030 Project PM Alternative C

10/22/2008

	↖	→	←	↖	↘	↘
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	
Trailing Detector (ft)	0	0	0		0	
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.898	
Flt Protected		0.998			0.988	
Satd. Flow (prot)	0	1580	1597	0	1204	0
Flt Permitted		0.971			0.988	
Satd. Flow (perm)	0	1537	1597	0	1204	0
Right Turn on Red				No		No
Satd. Flow (RTOR)					275	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	40	813	351	0	137	429
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	19%	19%	40%	40%
Adj. Flow (vph)	43	884	382	0	149	466
Lane Group Flow (vph)	0	927	382	0	615	0
Turn Type	Perm					
Protected Phases		4	8			
Permitted Phases	4				6	
Detector Phases	4	4	8		6	
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	20.6	20.6	20.6		20.6	
Total Split (s)	37.0	37.0	37.0	0.0	23.0	0.0
Total Split (%)	61.7%	61.7%	61.7%	0.0%	38.3%	0.0%
Maximum Green (s)	32.4	32.4	32.4		18.4	
Yellow Time (s)	3.6	3.6	3.6		3.6	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	C-Max		Min	
Walk Time (s)	5.0	5.0	5.0		5.0	
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0	0		0	
Act Effct Green (s)		33.0	33.0		19.0	
Actuated g/C Ratio		0.55	0.55		0.32	
v/c Ratio		1.10	0.44		1.08	
Control Delay		78.8	8.6		77.4	
Queue Delay		0.0	0.0		0.0	
Total Delay		78.8	8.6		77.4	
LOS		E	A		E	
Approach Delay		78.8	8.6		77.4	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		E	A		E	
Queue Length 50th (ft)		393	60		480	
Queue Length 95th (ft)		#593	m90		#360	
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		845	878		569	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		1.10	0.44		1.08	

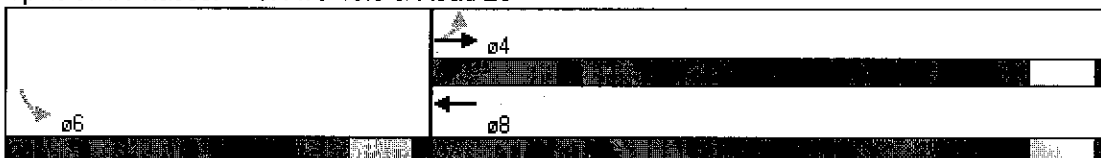
Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 64.4
 Intersection Capacity Utilization 107.5%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service G







- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
2030 Project PM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	706	538	224	136	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	767	585	243	148	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			295			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	828				1480	585
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	820				1504	565
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	91				0	87
cM capacity (veh/h)	702				108	478
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	832	585	243	209		
Volume Left	64	0	0	148		
Volume Right	0	0	243	61		
cSH	702	1700	1700	140		
Volume to Capacity	0.09	0.34	0.14	1.49		
Queue Length 95th (ft)	8	0	0	354		
Control Delay (s)	2.5	0.0	0.0	314.1		
Lane LOS	A			F		
Approach Delay (s)	2.5	0.0		314.1		
Approach LOS				F		
Intersection Summary						
Average Delay			36.2			
Intersection Capacity Utilization			89.7%		ICU Level of Service	E
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
2030 Project PM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Free			Free			Stop		Stop		
Grade		0%			0%			0%		0%		
Volume (veh/h)	18	97	67	409	74	109	125	111	15	50	110	395
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	105	73	445	80	118	136	121	16	54	120	429
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None		None		
Median storage veh												
Upstream signal (ft)					978							
pX, platoon unblocked												
vC, conflicting volume	199			178			1640	1187	80	1227	1269	142
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199			178			1640	1187	80	1227	1269	142
tC, single (s)	4.1			4.1			7.6	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			4.0	4.0	3.8	3.5	4.0	3.3
p0 queue free %	99			68			0	5	98	0	0	53
cM capacity (veh/h)	1373			1398			0	127	859	18	113	906
Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2	NW 1	NW 2					
Volume Total	198	525	118	257	16	54	549					
Volume Left	20	445	0	136	0	54	0					
Volume Right	73	0	118	0	16	0	429					
cSH	1373	1398	1700	0	859	18	359					
Volume to Capacity	0.01	0.32	0.07	Err	0.02	3.05	1.53					
Queue Length 95th (ft)	1	35	0	Err	1	Err	764					
Control Delay (s)	0.9	7.9	0.0	Err	9.3	Err	280.1					
Lane LOS	A	A		F	A	F	F					
Approach Delay (s)	0.9	6.4		Err		1155.7						
Approach LOS				F		F						
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			78.0%		ICU Level of Service					D		
Analysis Period (min)			15									

6: Ave 18 & Road 23
 2030 Project PM Alternative C

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	12	6	6	12	107	5	526	6	93	524	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	13	7	7	13	116	5	572	7	101	570	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1482	1362	571	1372	1360	575	572			578		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1482	1362	571	1372	1360	575	572			578		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.2	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.4			2.3		
p0 queue free %	98	90	99	94	90	77	99			89		
cM capacity (veh/h)	64	126	504	101	130	512	926			930		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	136	584	673								
Volume Left	1	7	5	101								
Volume Right	7	116	7	2								
cSH	155	346	926	930								
Volume to Capacity	0.13	0.39	0.01	0.11								
Queue Length 95th (ft)	11	45	0	9								
Control Delay (s)	31.9	22.0	0.2	2.7								
Lane LOS	D	C	A	A								
Approach Delay (s)	31.9	22.0	0.2	2.7								
Approach LOS	D	C										
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			80.6%		ICU Level of Service					D		
Analysis Period (min)			15									

7: Ave 17 & SR 99 NB ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1719	3438	0	0	3539	1583	1649	1654	2733	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)						150		53				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	387	1319	0	0	2048	257	2046	17	1411	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	421	1434	0	0	2226	279	2224	18	1534	0	0	0
Lane Group Flow (vph)	421	1434	0	0	2226	279	1112	1130	1534	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	17.0	58.0	0.0	0.0	41.0	41.0	42.0	42.0	42.0	0.0	0.0	0.0
Total Split (%)	17.0%	58.0%	0.0%	0.0%	41.0%	41.0%	42.0%	42.0%	42.0%	0.0%	0.0%	0.0%
Maximum Green (s)	12.5	53.5			36.5	36.5	37.5	37.5	37.5			
Flow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	13.0	54.0			37.0	37.0	38.0	38.0	38.0			
Actuated g/C Ratio	0.13	0.54			0.37	0.37	0.38	0.38	0.38			
v/c Ratio	1.89	0.77			1.70	0.41	1.77	1.80	1.43			
Control Delay	426.5	13.5			344.0	12.4	379.2	389.2	226.9			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	426.5	13.5			344.0	12.4	379.2	389.2	226.9			
LOS	F	B			F	B	F	F	F			
Approach Delay		107.2			307.0			320.3				

7: Ave 17 & SR 99 NB ramps
2030 Project PM Alternative C

10/22/2008

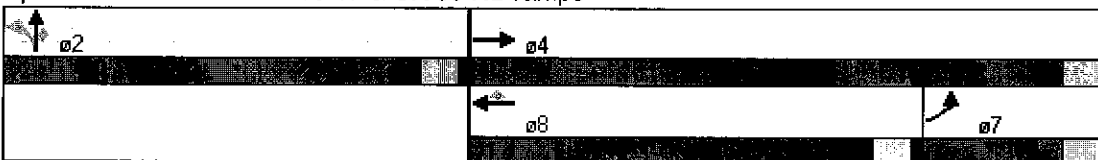
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F				
Queue Length 50th (ft)	415	257			4103	56	4122	4145	751			
Queue Length 95th (ft)	m#227	m122			#1241	124	#1381	#1406	#901			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	223	1857			1309	680	627	629	1071			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.89	0.77			1.70	0.41	1.77	1.80	1.43			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 4 (4%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.89
 Intersection Signal Delay: 267.6
 Intersection Capacity Utilization 145.2%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H













~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps

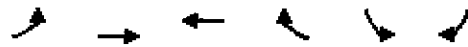


8: Ave 17 & SR 99 SB on-ramp
2030 Project PM Alternative C

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1617	2283	0	3199	895	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1758	2482	0	3477	973	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		213			717							
pX, platoon unblocked	0.64			0.36			0.54	0.54	0.36	0.54	0.54	0.64
vC, conflicting volume	4450			4239			3496	6208	879	4356	7716	1739
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5823			8235			2777	7810	0	4373	10610	1592
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	5			0			5	0	392	0	0	63
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3						
Volume Total	879	879	2482	1739	1739	973						
Volume Left	0	0	0	0	0	0						
Volume Right	0	0	2482	0	0	973						
cSH	1700	1700	1700	1700	1700	1700						
Volume to Capacity	0.52	0.52	1.46	1.02	1.02	0.57						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		144.7%			ICU Level of Service				H			
Analysis Period (min)			15									

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3471	3471	0	1687	1509
Flt Permitted					0.950	
Satd. Flow (perm)	0	3471	3471	0	1687	1509
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						1
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	3483	3199	0	506	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	3786	3477	0	550	212
Lane Group Flow (vph)	0	3786	3477	0	550	212
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	71.0	71.0	0.0	29.0	29.0
Total Split (%)	0.0%	71.0%	71.0%	0.0%	29.0%	29.0%
Maximum Green (s)		65.7	65.7		24.4	24.4
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		67.0	67.0		25.0	25.0
Actuated g/C Ratio		0.67	0.67		0.25	0.25
v/c Ratio		1.63	1.49		1.30	0.56
Control Delay		299.7	239.1		185.8	39.3
Queue Delay		133.7	46.3		0.0	0.0
Total Delay		433.4	285.5		185.8	39.3
LOS		F	F		F	D
Approach Delay		433.4	285.5		145.0	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		F	F		F	
Queue Length 50th (ft)		4912	4639		452	118
Queue Length 95th (ft)		m106	m273		#657	194
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		2326	2326		422	378
Starvation Cap Reductn		359	0		0	0
Spillback Cap Reductn		0	150		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		1.92	1.60		1.30	0.56

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 89 (89%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.63
 Intersection Signal Delay: 341.9
 Intersection Capacity Utilization 131.0%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frnt		0.988				0.850			0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3430	0	1719	3438	1538	1752	1845	1568	3099	1660	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3430	0	1719	3438	1538	1752	1845	1568	3099	1660	0
Right Turn on Red												
Satd. Flow (RTOR)		10				616			230		4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	14	1988	180	681	1897	815	175	125	740	755	109	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	15	2161	196	740	2062	886	190	136	804	821	118	11
Lane Group Flow (vph)	15	2357	0	740	2062	886	190	136	804	821	129	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phases	7	4		3	8	8	5	2	2	1	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5	8.5	20.5	
Total Split (s)	8.5	39.0	0.0	21.0	51.5	51.5	18.6	25.0	25.0	15.0	21.4	0.0
Total Split (%)	8.5%	39.0%	0.0%	21.0%	51.5%	51.5%	18.6%	25.0%	25.0%	15.0%	21.4%	0.0%
Maximum Green (s)	4.0	34.5		16.5	47.0	47.0	14.1	20.5	20.5	10.5	16.9	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Min	Min	None	Min	
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	4.5	35.0		17.0	52.6	52.6	19.0	21.0	21.0	11.0	13.0	
Actuated g/C Ratio	0.04	0.35		0.17	0.53	0.53	0.19	0.21	0.21	0.11	0.13	
v/c Ratio	0.19	1.95		2.53	1.14	0.80	0.57	0.35	1.57	2.41	0.59	
Control Delay	51.9	455.2		710.2	80.6	3.8	46.0	36.8	290.0	664.6	50.2	
Queue Delay	0.0	92.5		0.0	110.6	22.8	0.0	0.0	414.1	38.9	0.0	
Total Delay	51.9	547.8		710.2	191.2	26.6	46.0	36.8	704.1	703.5	50.2	
LOS	D	F		F	F	C	D	D	F	F	D	
Approach Delay		544.6			255.8			513.2			614.7	

10: Ave 17 & GS Blvd
 2030 Project PM Alternative C

10/22/2008

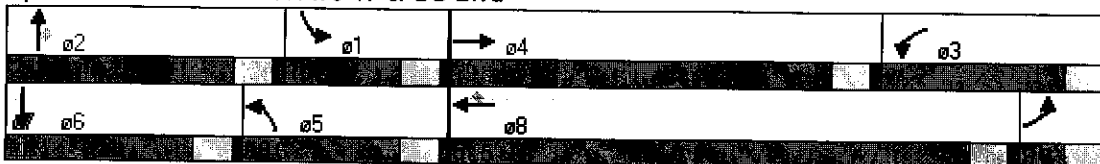
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	9	4245		796	761	15	111	74	614	447	76	
Queue Length 95th (ft)	31	#1385		m#498	m311	m12	#220	131	#848	#566	130	
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	78	1207		292	1808	1101	334	387	511	341	292	
Starvation Cap Reductn	0	0		0	323	240	0	0	0	0	0	
Spillback Cap Reductn	0	115		0	0	0	0	0	380	341	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	2.16		2.53	1.39	1.03	0.57	0.35	6.14	821.00	0.44	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 4 (4%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.53
 Intersection Signal Delay: 417.6
 Intersection Capacity Utilization 139.9%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.963			0.991			0.975			0.927	
Flt Protected		0.998			0.994			0.991			0.999	
Satd. Flow (prot)	0	1790	0	0	1749	0	0	1625	0	0	1543	0
Flt Permitted		0.917			0.628			0.621			0.989	
Satd. Flow (perm)	0	1645	0	0	1105	0	0	1018	0	0	1528	0
Right Turn on Red												
Satd. Flow (RTOR)		31			6			15			79	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	51	772	315	107	730	59	122	416	125	9	246	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	55	839	342	116	793	64	133	452	136	10	267	330
Lane Group Flow (vph)	0	1236	0	0	973	0	0	721	0	0	607	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	50.0	50.0	0.0	50.0	50.0	0.0	40.0	40.0	0.0	40.0	40.0	0.0
Total Split (%)	55.6%	55.6%	0.0%	55.6%	55.6%	0.0%	44.4%	44.4%	0.0%	44.4%	44.4%	0.0%
Maximum Green (s)	44.7	44.7		44.7	44.7		34.7	34.7		34.7	34.7	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		46.0			46.0			36.0			36.0	
Actuated g/C Ratio		0.51			0.51			0.40			0.40	
v/c Ratio		1.44			1.71			1.73			0.92	
Control Delay		229.3			350.3			363.2			44.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		229.3			350.3			363.2			44.3	
LOS		F			F			F			D	
Approach Delay		229.3			350.3			363.2			44.3	

11: Ave 17 & Road 23
 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			D	
Queue Length 50th (ft)		967			833			616			287	
Queue Length 95th (ft)		#1219			#1071			#835			#509	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		856			568			416			659	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.44			1.71			1.73			0.92	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.73

Intersection Signal Delay: 258.1

Intersection LOS: F

Intersection Capacity Utilization 161.7%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frts			0.850			0.850		0.969			0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.734			0.705		0.950			0.950		
Satd. Flow (perm)	0	1367	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red												
Satd. Flow (RTOR)			34			135		62			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	124	27	790	207	184	902	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	135	29	859	225	200	980	45
Lane Group Flow (vph)	0	41	34	0	242	135	29	1084	0	200	1025	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	26.1	0.0	13.0	30.2	0.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	34.8%	34.8%	14.8%	43.5%	0.0%	21.7%	50.3%	0.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.0	21.2		8.1	25.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		14.6	14.6		14.6	14.6	4.9	21.6		8.9	31.1	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.08	0.38		0.16	0.54	
v/c Ratio		0.12	0.08		0.72	0.27	0.21	0.81		0.73	0.53	
Control Delay		17.1	7.1		33.5	5.4	30.4	21.9		42.3	11.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.1	7.1		33.5	5.4	30.4	21.9		42.3	11.2	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.6			23.4			22.2			16.3	
Approach LOS		B			C			C			B	

12: Ellis OC & Road 26
 2030 Project PM Alternative C

10/22/2008

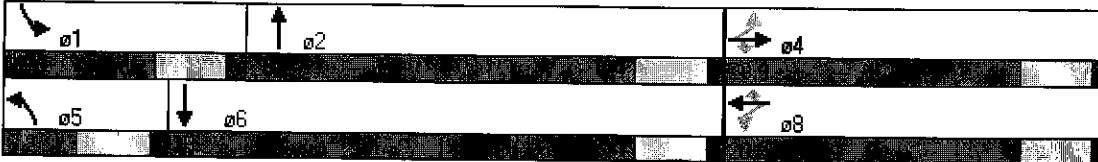
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		11	0		77	0	10	172		70	98	
Queue Length 95th (ft)		31	17		#164	33	32	#280		#163	205	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		390	476		375	548	140	1357		280	1919	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.11	0.07		0.65	0.25	0.21	0.80		0.71	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 57.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 19.5
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frts						0.850		0.868				
Fit Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Fit Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						222		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	791	453	0	0	378	204	275	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	860	492	0	0	411	222	299	18	130	0	0	0
Lane Group Flow (vph)	860	492	0	0	411	222	299	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.64	0.21			0.58	0.45	0.37	0.31				
Control Delay	13.5	1.3			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.5	1.3			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.7			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
 2030 Project PM Alternative C

10/22/2008

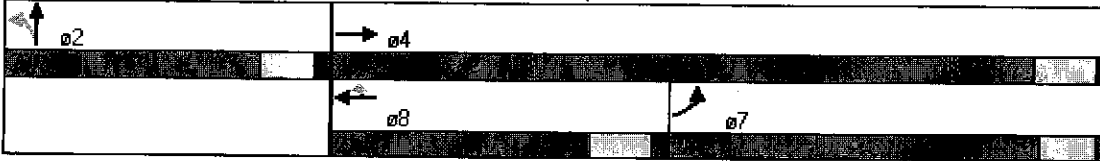
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	156	6			85	0	55	6				
Queue Length 95th (ft)	239	14			118	48	88	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	562	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.64	0.21			0.46	0.40	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

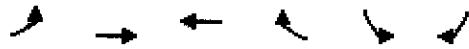
Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB ramps
2030 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frnt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						352
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1013	571	0	234	716
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1101	621	0	254	778
Lane Group Flow (vph)	0	1101	621	0	254	778
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.5	37.5	0.0	32.5	32.5
Total Split (%)	0.0%	53.6%	53.6%	0.0%	46.4%	46.4%
Maximum Green (s)		32.6	32.6		28.0	28.0
ℳlow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.5	33.5		28.5	28.5
Actuated g/C Ratio		0.48	0.48		0.41	0.41
v/c Ratio		0.65	0.37		0.18	0.58
Control Delay		16.1	1.2		13.7	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.1	1.2		13.7	10.3
LOS		B	A		B	B
Approach Delay		16.1	1.2		11.2	
Approach LOS		B	A		B	



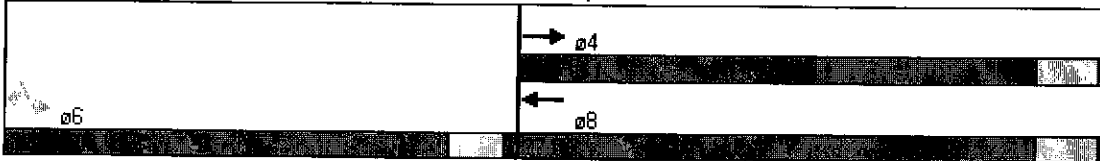
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		177	0		35	71
Queue Length 95th (ft)		241	7		57	127
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1694	1694		1398	1343
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.37		0.18	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps



17: Ellis OC & Aviation Drive
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.927			0.902				0.850		0.850	
Flt Protected	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (prot)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Flt Permitted	0.950			0.950			0.950	0.950		0.950		
Satd. Flow (perm)	1770	3281	0	1770	3192	0	1770	1770	1583	1770	1583	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		131			250				43		70	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			1080			1293		1356		
Travel Time (s)		18.2			18.4			22.0		23.1		
Volume (vph)	54	170	161	810	122	230	393	622	58	175	631	1013
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	185	175	880	133	250	427	676	63	190	686	1101
Lane Group Flow (vph)	59	360	0	880	383	0	427	676	63	190	1787	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases									6		2	
Detector Phases	7	4		3	8		1	6	6	5	2	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9		8.5	20.9		8.5	20.9	20.9	20.9	20.9	
Total Split (s)	16.6	24.0	0.0	34.0	41.4	0.0	21.0	68.9	68.9	23.1	71.0	0.0
Total Split (%)	11.1%	16.0%	0.0%	22.7%	27.6%	0.0%	14.0%	45.9%	45.9%	15.4%	47.3%	0.0%
Maximum Green (s)	12.1	19.1		29.5	36.5		16.5	64.0	64.0	18.2	66.1	
ℳlow Time (s)	3.5	3.9		3.5	3.9		3.5	3.9	3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	ℳs		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	Max	Max	
Walk Time (s)		5.0			5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0			11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effct Green (s)	10.3	16.2		30.0	38.2		17.0	64.9	64.9	19.1	67.0	
Actuated g/C Ratio	0.07	0.11		0.21	0.26		0.12	0.44	0.44	0.13	0.46	
v/c Ratio	0.48	0.75		2.42	0.38		2.07	0.86	0.09	0.82	2.34	
Control Delay	78.8	49.9		672.5	16.6		530.0	49.6	10.5	89.4	628.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	78.8	49.9		672.5	16.6		530.0	49.6	10.5	89.4	628.7	
LOS	E	D		F	B		F	D	B	F	F	
Approach Delay		54.0			473.6			223.4		576.9		
Approach LOS		D			F			F		F		

17: Ellis OC & Aviation Drive
 2030 Project PM Alternative C

10/22/2008

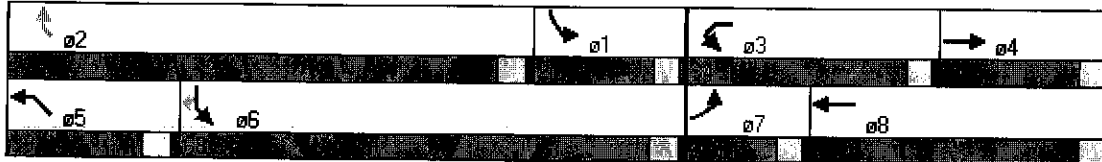
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	55	113		4387	53		644	577	11	180	2780	
Queue Length 95th (ft)	106	171		#1684	102		#882	#840	41	#321	#3120	
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	148	551		363	1030		206	786	726	231	763	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.40	0.65		2.42	0.37		2.07	0.86	0.09	0.82	2.34	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 146.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 2.42
 Intersection Signal Delay: 419.0
 Intersection Capacity Utilization 125.9%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1752	3505	0	0	3539	1583	1681	1686	1583	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)						733			9			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		391			1686			1254		906		
Travel Time (s)		7.6			32.8			28.5		20.6		
Volume (vph)	306	1692	0	0	1463	827	521	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	333	1839	0	0	1590	899	566	7	807	0	0	0
Lane Group Flow (vph)	333	1839	0	0	1590	899	283	290	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	16.0	52.0	0.0	0.0	36.0	36.0	38.0	38.0	38.0	0.0	0.0	0.0
Total Split (%)	17.8%	57.8%	0.0%	0.0%	40.0%	40.0%	42.2%	42.2%	42.2%	0.0%	0.0%	0.0%
Maximum Green (s)	11.4	47.4			31.4	31.4	33.5	33.5	33.5			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	12.0	48.0			32.0	32.0	34.0	34.0	34.0			
Actuated g/C Ratio	0.13	0.53			0.36	0.36	0.38	0.38	0.38			
v/c Ratio	1.42	0.98			1.26	0.87	0.45	0.46	1.34			
Control Delay	220.7	17.6			153.3	16.0	23.7	23.9	189.1			
Queue Delay	0.0	27.6			0.0	0.0	0.0	0.0	0.0			
Total Delay	220.7	45.2			153.3	16.0	23.7	23.9	189.1			
LOS	F	D			F	B	C	C	F			
Approach Delay		72.1			103.7			120.5				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			F			F				
Queue Length 50th (ft)	255	238			604	68	124	128	606			
Queue Length 95th (ft) m#189		m198			#739	#390	200	204	#833			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	234	1869			1258	1035	635	637	604			
Starvation Cap Reductn	0	151			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	1.42	1.07			1.26	0.87	0.45	0.46	1.34			

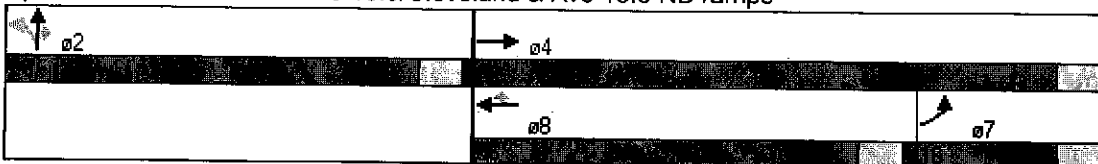
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 79 (88%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.42
 Intersection Signal Delay: 96.2
 Intersection Capacity Utilization 185.7%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	0	1692	1509
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			719									8
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1209	705	290	1694	0	0	0	0	789	9	324
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1314	766	315	1841	0	0	0	0	858	10	352
Lane Group Flow (vph)	0	1314	766	315	1841	0	0	0	0	0	868	352
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	6
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	20.5
Total Split (s)	0.0	33.0	33.0	17.0	50.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	36.7%	36.7%	18.9%	55.6%	0.0%	0.0%	0.0%	0.0%	44.4%	44.4%	44.4%
Maximum Green (s)		28.4	28.4	12.4	45.4					35.5	35.5	35.5
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0					0	0	0
Act Effct Green (s)		29.0	29.0	13.0	46.0						36.0	36.0
Actuated g/C Ratio		0.32	0.32	0.14	0.51						0.40	0.40
v/c Ratio		1.15	0.77	1.23	1.02						1.28	0.58
Control Delay		109.1	9.0	152.3	21.6						164.9	25.2
Queue Delay		7.6	0.0	0.0	33.0						9.4	0.0
Total Delay		116.8	9.0	152.3	54.6						174.3	25.2
LOS		F	A	F	D						F	C
Approach Delay		77.1			68.9						131.3	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 2030 Project PM Alternative C

10/22/2008

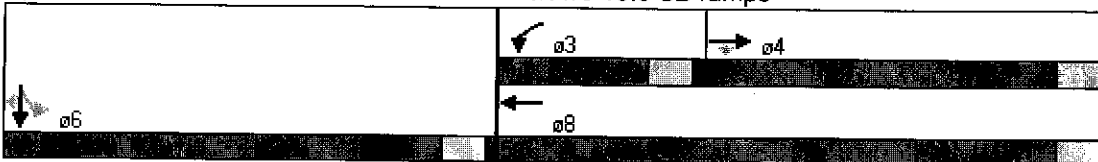
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E						F	
Queue Length 50th (ft)		467	19	234	497					633	149	
Queue Length 95th (ft)		#598	146	m#218	m130						#860	239
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1140	997	256	1809						677	608
Starvation Cap Reductn		0	0	0	139						0	0
Spillback Cap Reductn		17	0	0	0						11	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		1.17	0.77	1.23	1.10						1.30	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.28
 Intersection Signal Delay: 86.0
 Intersection Capacity Utilization 185.7%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps




















20: Ave 15.5/Cleveland & Road 23
 2030 Project PM Alternative C

10/22/2008

Movement												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1	1	56	1	51	0	478	92	53	496	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	61	1	55	0	520	100	58	539	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1280	1274	539	1226	1224	570	539			620		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1280	1274	539	1226	1224	570	539			620		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.2	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	100	58	99	89	100			94		
cM capacity (veh/h)	120	156	542	145	165	516	990			897		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	117	620	597								
Volume Left	0	61	0	58								
Volume Right	1	55	100	0								
cSH	243	220	990	897								
Volume to Capacity	0.01	0.53	0.00	0.06								
Queue Length 95th (ft)	1	71	0	5								
Control Delay (s)	20.0	38.8	0.0	1.7								
Lane LOS	C	E		A								
Approach Delay (s)	20.0	38.8	0.0	1.7								
Approach LOS	C	E										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization		82.7%		ICU Level of Service					E			
Analysis Period (min)			15									

21: SR 145/Madera & SR 99 NB ramps
2030 Project PM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50					50	50	
Trailing Detector (ft)	0	0			0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950				0.958					0.950		0.853
Satd. Flow (prot)	3400	3505	0	0	3391	0	0	0	0	1770	1589	0
Flt Permitted	0.187									0.950		
Satd. Flow (perm)	669	3505	0	0	3391	0	0	0	0	1770	1589	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)					136						168	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	1209	810	0	0	838	326	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1314	880	0	0	911	354	0	0	0	397	3	168
Lane Group Flow (vph)	1314	880	0	0	1265	0	0	0	0	397	171	0
Turn Type	Perm									Perm		
Protected Phases		2			6						8	
Permitted Phases	2									8		
Detector Phases	2	2			6					8	8	
Minimum Initial (s)	4.0	4.0			4.0					4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6					20.5	20.5	
Total Split (s)	94.0	94.0	0.0	0.0	94.0	0.0	0.0	0.0	0.0	26.0	26.0	0.0
Total Split (%)	78.3%	78.3%	0.0%	0.0%	78.3%	0.0%	0.0%	0.0%	0.0%	21.7%	21.7%	0.0%
Maximum Green (s)	89.4	89.4			89.4					21.5	21.5	
Flow Time (s)	3.6	3.6			3.6					3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0					1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Recall Mode	C-Max	C-Max			C-Max					None	None	
Walk Time (s)	5.0	5.0			5.0					5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0					11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0					0	0	
Act Effct Green (s)	90.0	90.0			90.0					22.0	22.0	
Actuated g/C Ratio	0.75	0.75			0.75					0.18	0.18	
v/c Ratio	2.62	0.33			0.49					1.22	0.40	
Control Delay	745.9	2.4			5.9					166.0	9.6	
Queue Delay	0.0	0.5			0.0					0.0	0.0	
Total Delay	745.9	2.9			5.9					166.0	9.6	
LOS	F	A			A					F	A	
Approach Delay		447.9			5.9						118.9	

21: SR 145/Madera & SR 99 NB ramps
 2030 Project PM Alternative C

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		F			A						F	
Queue Length 50th (ft)	898	39			153					378	2	
Queue Length 95th (ft) m#946		m57			191					#575	62	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	502	2629			2577					325	429	
Starvation Cap Reductn	0	1196			0					0	0	
Spillback Cap Reductn	0	0			0					0	0	
Storage Cap Reductn	0	0			0					0	0	
Reduced v/c Ratio	2.62	0.61			0.49					1.22	0.40	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.62

Intersection Signal Delay: 262.6

Intersection LOS: F

Intersection Capacity Utilization 98.3%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Frnt			0.850					0.998				0.850
Flt Protected	0.950						0.950				0.984	
Satd. Flow (prot)	1736	1827	1553	0	0	0	3433	3532	0	0	3449	1568
Flt Permitted	0.950						0.950				0.567	
Satd. Flow (perm)	1736	1827	1553	0	0	0	3433	3532	0	0	1987	1568
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			423					2				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	554	358	1147	0	0	0	343	1469	24	214	462	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	602	389	1247	0	0	0	373	1597	26	233	502	573
Lane Group Flow (vph)	602	389	1247	0	0	0	373	1623	0	0	735	573
Turn Type	Perm		Perm				Prot			Perm		Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		6
Detector Phases	4	4	4				5	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	60.4	60.4	60.4	0.0	0.0	0.0	20.6	59.6	0.0	39.0	39.0	39.0
Total Split (%)	50.3%	50.3%	50.3%	0.0%	0.0%	0.0%	17.2%	49.7%	0.0%	32.5%	32.5%	32.5%
Maximum Green (s)	55.9	55.9	55.9				16.0	55.0		34.4	34.4	34.4
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag			Lead	Lead	Lead
Lead-Lag Optimize?							ℳs			ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	56.4	56.4	56.4				16.6	55.6			35.0	35.0
Actuated g/C Ratio	0.47	0.47	0.47				0.14	0.46			0.29	0.29
v/c Ratio	0.74	0.45	1.31				0.79	0.99			3.82dl	0.66
Control Delay	30.4	23.2	165.4				62.7	52.4			159.6	3.7
Queue Delay	109.9	36.9	8.7				0.0	0.0			0.0	0.2
Total Delay	140.4	60.1	174.1				62.7	52.4			159.6	3.9
LOS	F	E	F				E	D			F	A
Approach Delay		145.2						54.3			91.4	

22: AVe 14/Olive & SR 145/Madera
 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F						D			F	
Queue Length 50th (ft)	342	177	4239				145	640			382	23
Queue Length 95th (ft)	m505	m246	#1506				#211	#823			m#426	m32
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	816	859	954				475	1638			580	863
Starvation Cap Reductn	329	486	14				0	0			0	18
Spillback Cap Reductn	0	0	0				0	0			0	30
Storage Cap Reductn	0	0	0				0	0			0	0
Reduced v/c Ratio	1.24	1.04	1.33				0.79	0.99			1.27	0.69

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 55 (46%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.31
 Intersection Signal Delay: 99.8
 Intersection Capacity Utilization 101.0%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service G







~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.







Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
2030 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1495
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1495
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						77
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1112	870	0	937	393
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1209	946	0	1018	427
Lane Group Flow (vph)	0	1209	946	0	1018	427
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	61.0	61.0	0.0	59.0	59.0
Total Split (%)	0.0%	50.8%	50.8%	0.0%	49.2%	49.2%
Maximum Green (s)		56.5	56.5		54.5	54.5
ℳlow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		66.7	66.7		45.3	45.3
Actuated g/C Ratio		0.56	0.56		0.38	0.38
v/c Ratio		0.61	0.48		0.83	0.70
Control Delay		21.0	7.2		40.0	31.1
Queue Delay		0.9	0.8		0.0	0.0
Total Delay		21.9	7.9		40.0	31.1
LOS		C	A		D	C
Approach Delay		21.9	7.9		37.4	

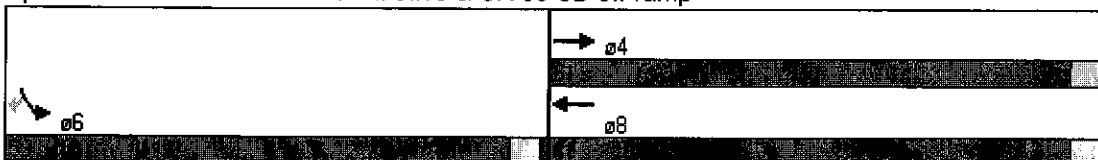
						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		C	A		D	
Queue Length 50th (ft)		321	74		362	228
Queue Length 95th (ft)		465	117		389	304
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1967	1967		1486	727
Starvation Cap Reductn		0	643		0	0
Spillback Cap Reductn		451	0		12	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.80	0.71		0.69	0.59

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 24.5
 Intersection Capacity Utilization 64.1%
 Analysis Period (min) 15













Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 2030 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	112	77	12	10	26	129	5	211	17	142	194	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	84	13	11	28	140	5	229	18	154	211	83
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	218	179	253	448								
Volume Left (vph)	122	11	5	154								
Volume Right (vph)	13	140	18	83								
Hadj (s)	0.13	-0.29	0.15	0.23								
Departure Headway (s)	6.6	6.3	6.3	6.0								
Degree Utilization, x	0.40	0.32	0.44	0.75								
Capacity (veh/h)	481	484	522	582								
Control Delay (s)	14.0	12.3	14.2	24.4								
Approach Delay (s)	14.0	12.3	14.2	24.4								
Approach LOS	B	B	B	C								

Intersection Summary

Delay		18.0			
HCM Level of Service		C			
Intersection Capacity Utilization	69.3%		ICU Level of Service		C
Analysis Period (min)		15			

25: SB Ramps & GS Blvd
2030 Project PM Alternative C

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↖	↑	↗	↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.652	
Satd. Flow (perm)	3335	1538	1759	1495	1191	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		104		633		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	806		408			1104
Travel Time (s)	18.3		9.3			25.1
Volume (vph)	1365	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	1484	153	124	633	241	208
Lane Group Flow (vph)	1484	153	124	633	241	208
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	72.3	47.7	47.7	47.7	47.7	47.7
Total Split (%)	60.3%	39.8%	39.8%	39.8%	39.8%	39.8%
Maximum Green (s)	67.8	43.2	43.2	43.2	43.2	43.2
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	82.5	29.5	29.5	29.5	29.5	29.5
Actuated g/C Ratio	0.69	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.65	0.34	0.29	0.75	0.83	0.46
Control Delay	14.0	13.4	46.4	16.6	63.8	40.1
Queue Delay	0.7	0.0	0.0	6.9	0.0	0.0
Total Delay	14.7	13.4	46.4	23.5	63.8	40.1
LOS	B	B	D	C	E	D
Approach Delay	14.6		27.2			52.8

25: SB Ramps & GS Blvd
 2030 Project PM Alternative C

10/22/2008

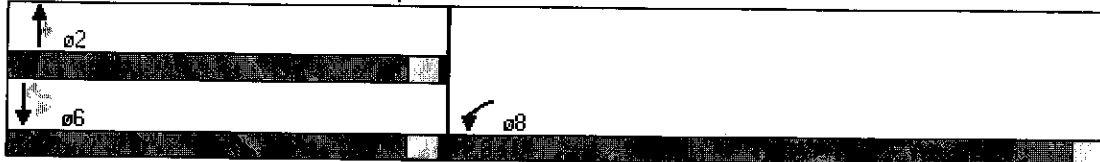
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		C			D
Queue Length 50th (ft)	290	30	84	304	180	140
Queue Length 95th (ft)	533	72	m37	m93	235	178
Internal Link Dist (ft)	726		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2294	626	641	947	434	665
Starvation Cap Reductn	0	0	0	264	0	0
Spillback Cap Reductn	445	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.24	0.19	0.93	0.56	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 62 (52%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 24.0
 Intersection Capacity Utilization 64.6%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.990			0.939			0.872				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3309	0	1687	3168	0	1752	1609	0	3335	1810	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	3168	0	1752	1609	0	3335	1810	1538
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		6			137			104				113
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1424	28	104
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1548	30	113
Lane Group Flow (vph)	261	446	0	21	1179	0	47	122	0	1548	30	113
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Detector Phases	7	4		3	8		5	2		1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.6	20.6		8.6	20.6		8.5	20.5		8.5	20.5	20.5
Total Split (s)	18.0	45.6	0.0	9.9	37.5	0.0	12.8	20.5	0.0	44.0	51.7	51.7
Total Split (%)	15.0%	38.0%	0.0%	8.3%	31.3%	0.0%	10.7%	17.1%	0.0%	36.7%	43.1%	43.1%
Maximum Green (s)	13.4	41.0		5.3	32.9		8.3	16.0		39.5	47.2	47.2
ℳlow Time (s)	3.6	3.6		3.6	3.6		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lag	Lead		Lag	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	ℳs	ℳs	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	14.0	45.6		5.9	33.5		8.0	16.5		40.0	50.5	50.5
Actuated g/C Ratio	0.12	0.38		0.05	0.28		0.07	0.14		0.33	0.42	0.42
v/c Ratio	1.34	0.35		0.25	1.20		0.40	0.39		1.39	0.04	0.16
Control Delay	223.7	28.2		70.1	128.8		63.8	16.3		211.3	14.6	3.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		16.1	0.0	0.0
Total Delay	223.7	28.2		70.1	128.8		63.8	16.3		227.5	14.6	3.2
LOS	F	C		E	F		E	B		F	B	A
Approach Delay		100.3			127.8			29.5			208.7	

26: Ave 12 & GS Blvd
2030 Project PM Alternative C

10/22/2008

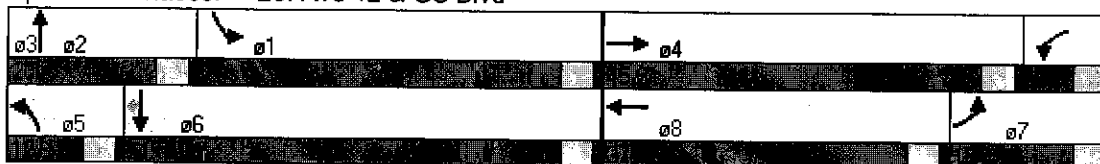
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			C			F	
Queue Length 50th (ft)	264	134		18	503		35	12		832	15	19
Queue Length 95th (ft)	#433	181		m30	m#554		76	69		#969	m12	m10
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	195	1260		83	983		128	311		1112	761	712
Starvation Cap Reductn	0	0		0	0		0	0		28	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.34	0.35		0.25	1.20		0.37	0.39		1.43	0.04	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 16 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 154.5
 Intersection Capacity Utilization 102.5%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service G

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1736	3471	0	0	3471	1553	0	1692	1509	0	0	0
Right Turn on Red												
Satd. Flow (RTOR)						601			46			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30		30		
Link Distance (ft)		818			2610			987		1106		
Travel Time (s)		15.9			50.8			22.4		25.1		
Volume (vph)	382	1553	0	0	714	1169	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	415	1688	0	0	776	1271	424	2	392	0	0	0
Lane Group Flow (vph)	415	1688	0	0	776	1271	0	426	392	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	27.0	90.0	0.0	0.0	63.0	63.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	22.5%	75.0%	0.0%	0.0%	52.5%	52.5%	25.0%	25.0%	25.0%	0.0%	0.0%	0.0%
Maximum Green (s)	22.5	85.5			58.5	58.5	25.5	25.5	25.5			
Flow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	23.0	86.0			59.0	59.0		26.0	26.0			
Actuated g/C Ratio	0.19	0.72			0.49	0.49		0.22	0.22			
v/c Ratio	1.25	0.68			0.45	1.19		1.16	1.08			
Control Delay	147.8	3.4			21.1	112.1		140.6	109.8			
Queue Delay	0.0	0.4			0.0	0.0		0.0	0.0			
Total Delay	147.8	3.8			21.1	112.1		140.6	109.8			
LOS	F	A			C	F		F	F			
Approach Delay		32.2			77.6			125.8				

27: Ave 12 & SR 99 NB Ramps
2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			F				
Queue Length 50th (ft)	412	50			201	938		391	310			
Queue Length 95th (ft) m#324		m25			253	#1204		#593	#508			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	333	2488			1707	1069		367	363			
Starvation Cap Reductn	0	331			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	1.25	0.78			0.45	1.19		1.16	1.08			

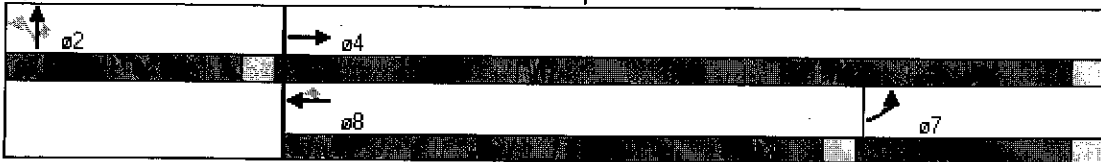
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 95 (79%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 66.3
 Intersection Capacity Utilization 125.3%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 34

2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: PISTACHIO DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT - ALTERNATIVE C

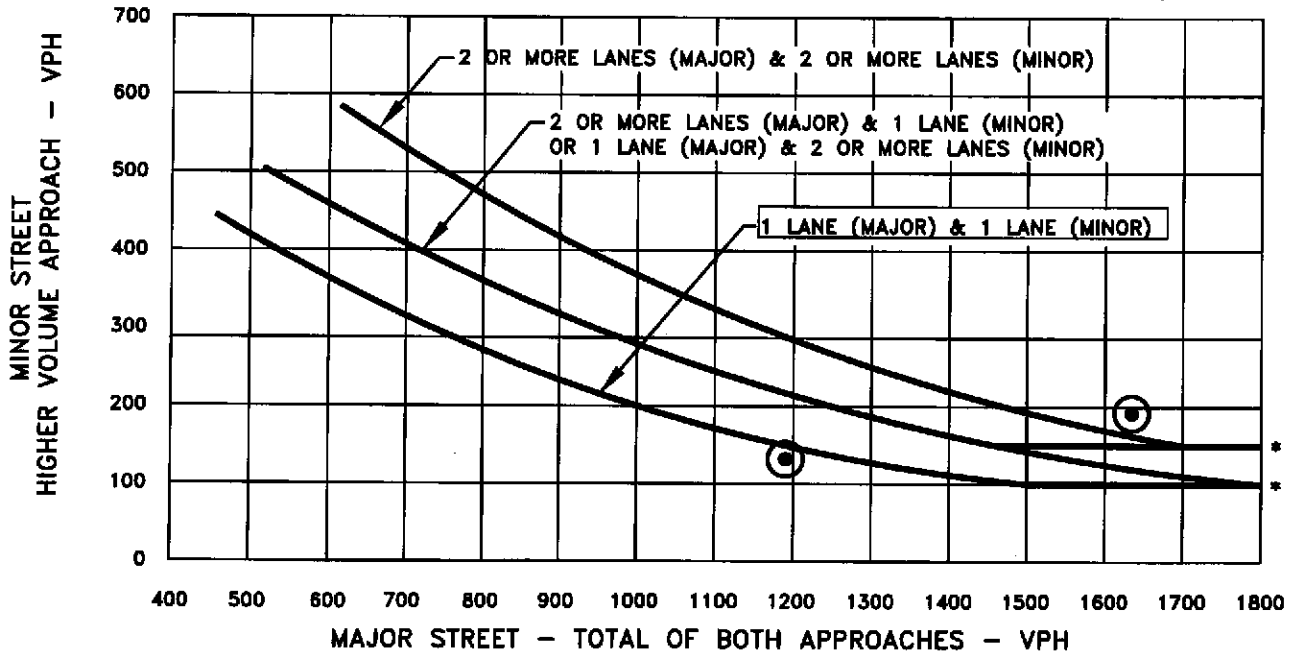
WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM	PM PEAK	Hour
Both Approaches - Major Street	✓		1196	1663	
Highest Approaches - Minor Street	✓		132	192	

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 18 1/2

Critical Approach Speed 35 mph

MINOR STREET: GOLDEN STATE BLVD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

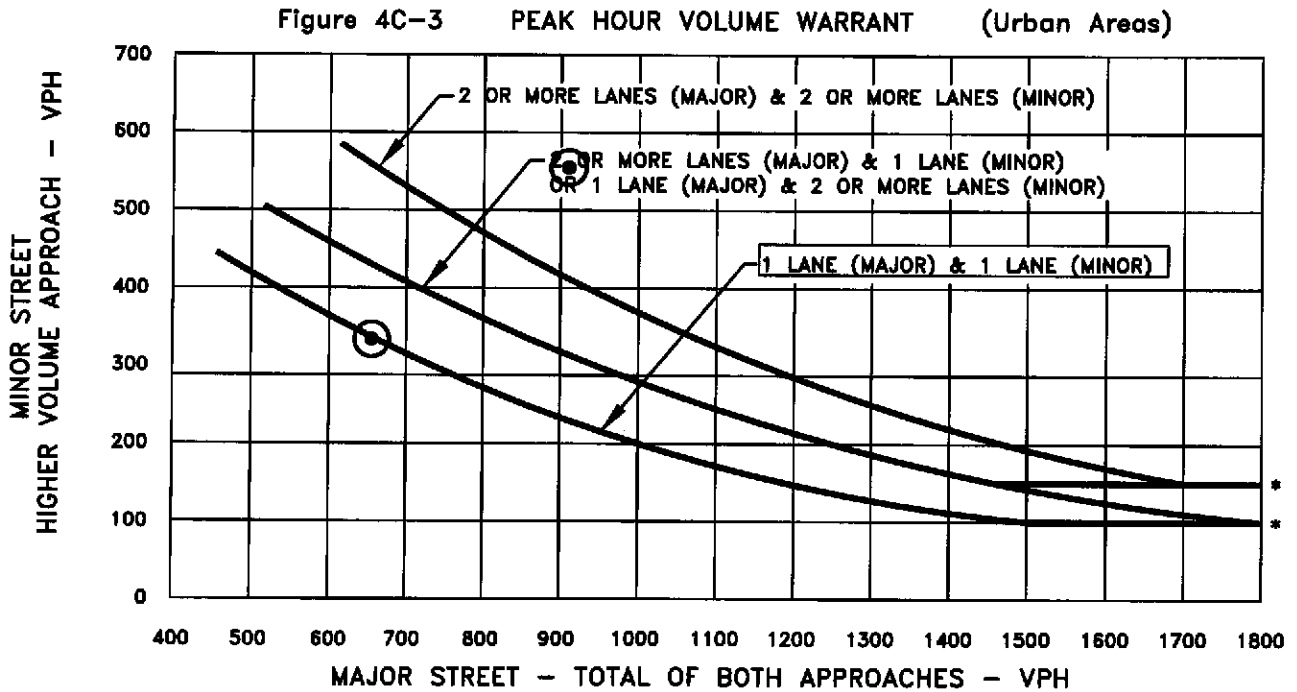
CONDITION: 2030 PROJECT - ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One		2 or more		Hour	
	AM	PM PEAK	AM	PM PEAK	AM	PM PEAK
Both Approaches - Major Street	<input checked="" type="checkbox"/>		656	910		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		346	555		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: ROAD 23

Critical Approach Speed 45 mph

MINOR STREET: AVENUE 18

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

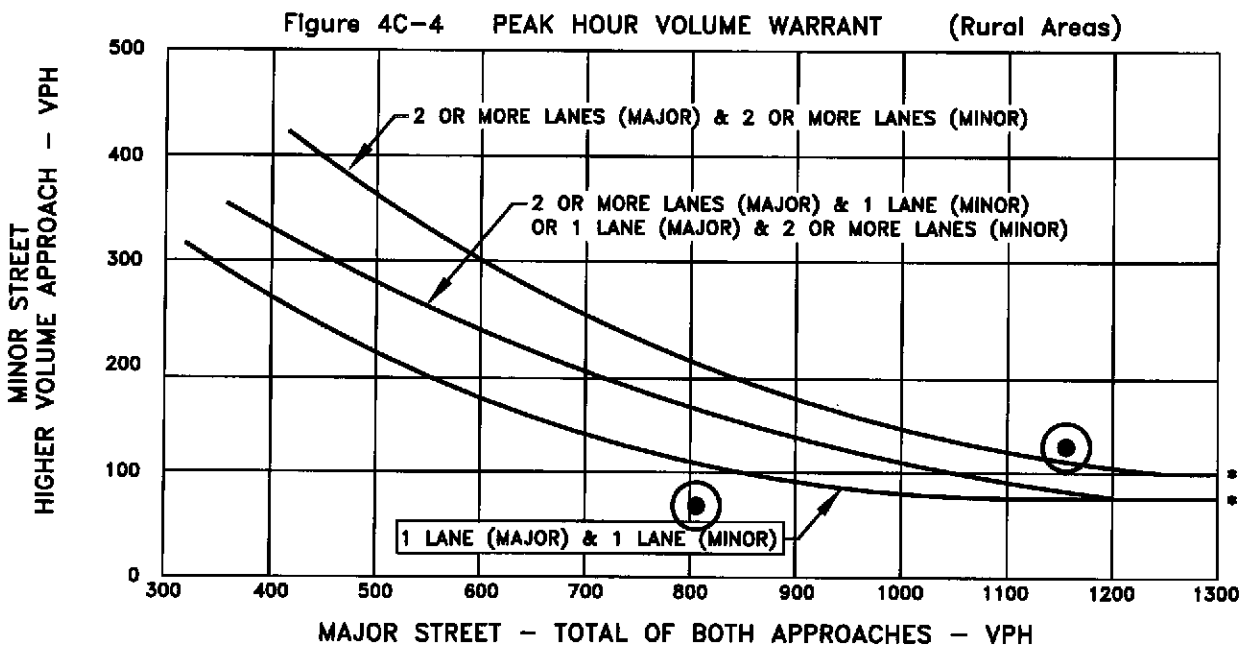
CONDITION: 2030 PROJECT - ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	806	1156		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	68	125		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD _____ DATE 10/06/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 15 1/2

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

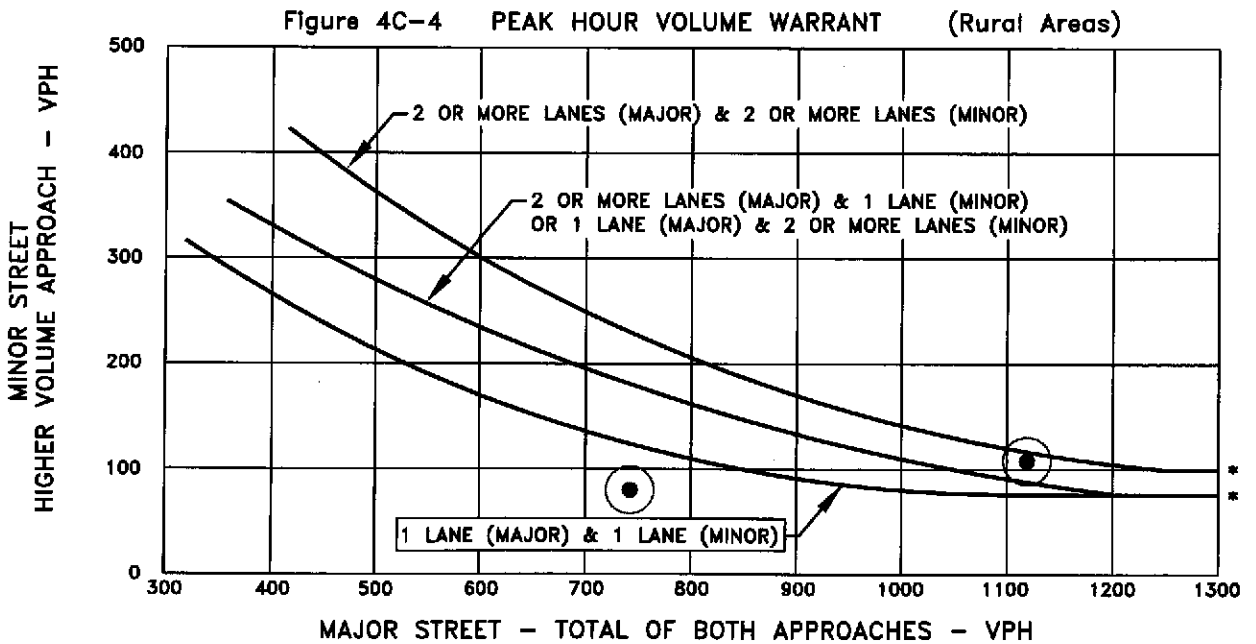
CONDITION: 2030 PROJECT - ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	742	1119		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	80	108		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC RD DATE 10/14/08

CHK _____ DATE _____

MAJOR STREET: AVENUE 14

Critical Approach Speed NPS mph

MINOR STREET: ROAD 23

Critical Approach Speed 45 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

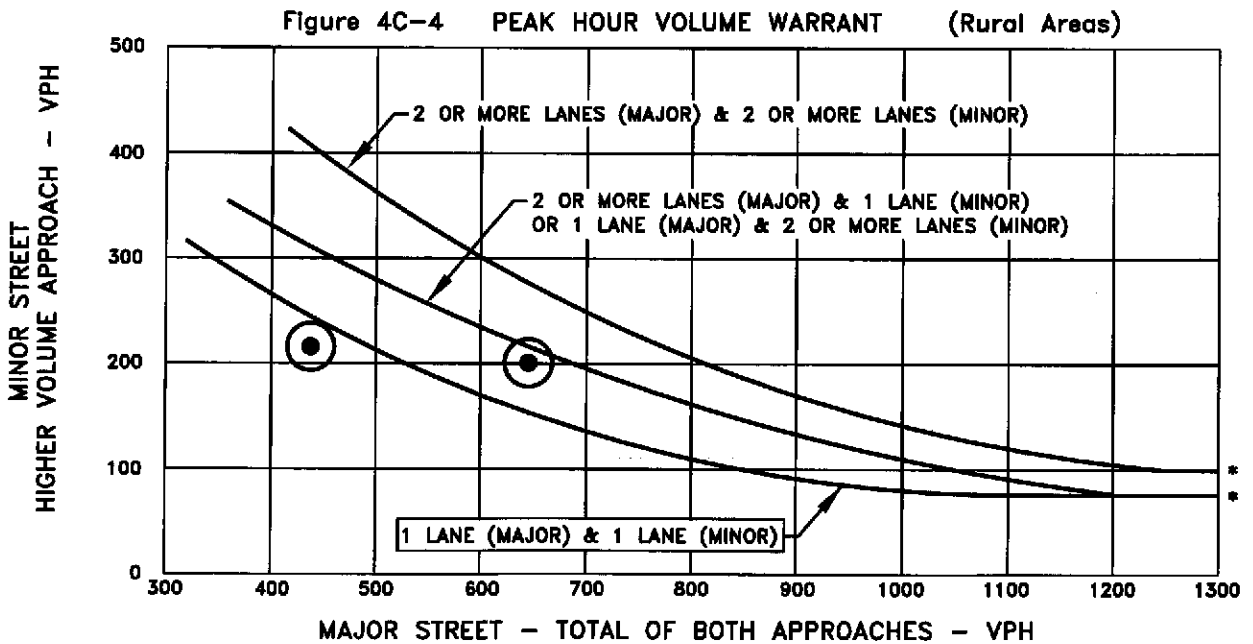
CONDITION: 2030 PROJECT - ALTERNATIVE C

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	438	645		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	216	201		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

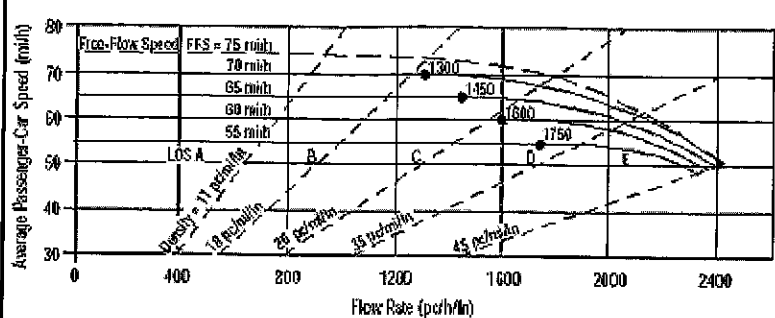
ATTACHMENT VI – C - 35

MITIGATED 2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4241	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P_T
Peak-Hr Prop. of AADT, K			%RVs, P_R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

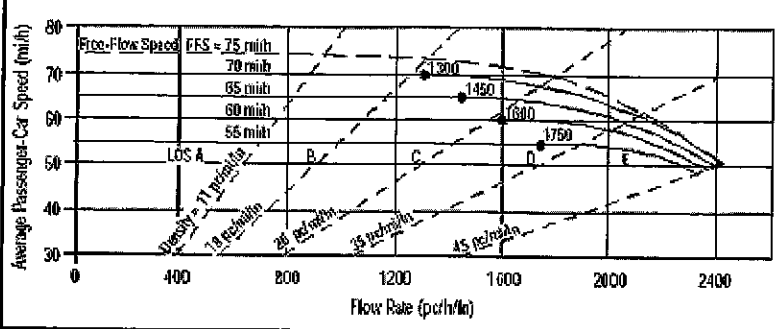
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	4	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$ 1354 pc/h/ln	Design LOS	
S	70.0 mi/h	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$ pc/h
$D = v_p / S$	19.3 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2030 Project Alt A PM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt A																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
Flow Inputs																								
Volume, V	4943	veh/h	Peak-Hour Factor, PHF 0.88																					
AADT		veh/day	%Trucks and Buses, P _T 24																					
Peak-Hr Prop. of AADT, K			%RVs, P _R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV = AADT * K * D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW} mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC} mi/h																					
Interchange Density	0.50	l/mi	f _{ID} mi/h																					
Number of Lanes, N	4		f _N mi/h																					
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF * N * f _p)	HV * 1578 pc/h/ln	Design LOS																						
S	69.5 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h																					
D = v _p / S	22.7 pc/mi/ln	f _p	mi/h																					
LOS	C	S	mi/h																					
		D = v _p / S	pc/mi/ln																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
--	----------------------------------	--

Flow Inputs			
Volume, V	3912	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

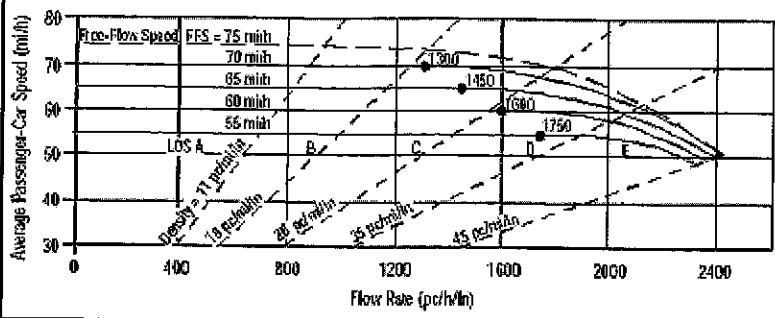
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * 1249 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h
D = v _p / S	17.8 pc/mi/ln	f _p	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different Free-Flow Speeds (FFS) and Levels of Service (LOS). The curves are labeled with FFS values: 75 mi/h, 70 mi/h, 65 mi/h, 60 mi/h, and 55 mi/h. Corresponding LOS values are also indicated: LOS A, B, C, D, and E. A dashed line represents Density = 11 pc/mi. Other density markers include 18 pc/mi, 20 pc/mi, 25 pc/mi, and 45 pc/mi. Specific flow rate points are marked: 1300, 1450, 1600, and 1750.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt A PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	5502	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00		E_R																			
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	4		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or } DDHV) / (PHF * K * D)$	$HV * X$	Design LOS	$v_p = (V \text{ or } DDHV) / (PHF * K * D)$																			
f_p	1757	pc/h/ln	f_p																			
S	68.3	mi/h	S																			
$D = v_p / S$	25.7	pc/mi/ln	$D = v_p / S$																			
LOS	C		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibit 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibit 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibit 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information **Site Information**

Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt A AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	4210	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P _T	24
Peak-Hr Prop. of AADT, K			%RVs, P _R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT * K * D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	4		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

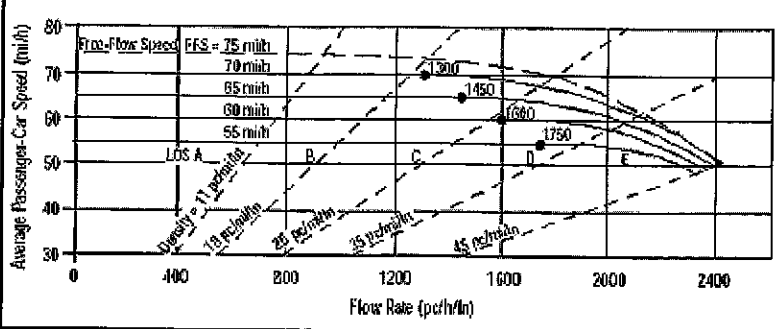
LOS and Performance Measures **Design (N)**

Operational (LOS)			Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)		HV * 1344	Design LOS	
S	70.0	mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h
D = v _p / S	19.2	pc/mi/ln	S	mi/h
LOS	C		D = v _p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt A PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt A			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4752	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P_T
Peak-Hr Prop. of AADT, K			%RVs, P_R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	4	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF * K * D)$	$HV * X$	Design LOS	
f_p	1517 pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF * K * D)$	$HV * X$
S	69.8 mi/h	f_p	pc/h
$D = v_p / S$	21.7 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different levels of service (LOS) and free-flow speeds (FFS). The curves are labeled with LOS A, B, C, D, and E, and FFS values of 75, 70, 65, 60, and 55 mi/h. Specific points on the curves are marked with flow rates: 1300, 1450, 1600, and 1750 pc/h/ln.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt A AM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
Flow Inputs																						
Volume, V	3830	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade %																			
Driver type adjustment	1.00		Length mi																			
			Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	1/mi	f_{ID}																			
Number of Lanes, N	4		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$	Design LOS																				
	1223	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$																			
S	70.0	f_p	pc/h																			
$D = v_p / S$	17.5	S	mi/h																			
LOS	B	$D = v_p / S$	pc/mi/ln																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different density levels: 11 pc/mi/ln, 18 pc/mi/ln, 28 pc/mi/ln, 35 pc/mi/ln, and 45 pc/mi/ln. A horizontal line at 75 mi/h is labeled 'Free-Flow Speed'. Points on the curves are labeled with flow rates: 1300, 1450, 1600, and 1750. A vertical line at 1000 pc/h/ln is labeled 'LOS A'. The graph is divided into regions B, C, D, and E.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt A PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	5409	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade %																			
Driver type adjustment	1.00		Length																			
			Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1/P_T [E_T - 1] + P_R [E_R - 1]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	4		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	HV^X	Design LOS	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$																			
S	68.6	mi/h	S																			
$D = v_p / S$	25.2	pc/mi/ln	$D = v_p / S$																			
LOS	C		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibit 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibit 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibit 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2030 Project Alt A AM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt A																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	5525	veh/h	Peak-Hour Factor, PHF 0.88																					
AADT		veh/day	%Trucks and Buses, P _T 24																					
Peak-Hr Prop. of AADT, K			%RVs, P _R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV = AADT * K * D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = 1/P _T * [(E _T - 1) * P _R + (E _R - 1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																					
Interchange Density	0.50	l/mi	f _{ID}																					
Number of Lanes, N	4		f _N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X 1764	pc/h/ln	v _p = (V or DDHV) / (PHF * N * f _p)																					
S	68.2	mi/h	S																					
D = v _p / S	25.9	pc/mi/ln	D = v _p / S																					
LOS	C		Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 75, 70, 65, 60, 55, 50, 45, 40, 35, 30, 25, 20, 15, 10, 5 pc/h/ln. The curves generally show a decrease in speed as flow rate increases, with a peak in speed at intermediate flow rates. Labels A through F are placed along the curves.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt A PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	7308	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade %																			
Driver type adjustment	1.00		Length mi																			
			Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	4		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	$HV * X$	$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	$HV * X$																			
S	55.8	S																				
$D = v_p / S$	41.8	$D = v_p / S$																				
LOS	E	Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Ekibits 23-8, 23-10	f_{LW} - Ekibit 23-4																			
V - Hourly volume	D - Density	E_T - Ekibits 23-8, 23-10, 23-11	f_{LC} - Ekibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Ekibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Ekibits 23-2, 23-3	f_{ID} - Ekibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 11 pc/h/ln, 13 pc/h/ln, 16 pc/h/ln, 19 pc/h/ln, 23 pc/h/ln, 28 pc/h/ln, 35 pc/h/ln, and 45 pc/h/ln. A horizontal line is drawn at 50 mi/h, intersecting the curves at various flow rates. A vertical line is drawn at 1600 pc/h/ln, intersecting the curves at various speeds. A point is marked at approximately (1450, 70).</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt A AM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4622	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade %																			
Driver type adjustment	1.00		Length mi																			
			Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)}$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	4		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$	Design LOS	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$																			
S	1476	pc/h/ln	$HV * X$																			
$D = v_p / S$	69.9	mi/h	f_p																			
LOS	21.1	pc/mi/ln	S																			
	C		$D = v_p / S$																			
			Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibit 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibit 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibit 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different flow rates: 75, 70, 65, 60, and 55 mi/h. The curves are labeled with LOS A, B, C, D, and E. A legend in the top right corner of the graph area lists applications and their corresponding inputs and outputs.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mt 2030 Project Alt A PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt A																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input checked="" type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	7630	veh/h	Peak-Hour Factor, PHF 0.88																			
AADT		veh/day	%Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AADT, K			%RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AADT * K * D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1/P_T [E_T - 1] + P_R(E_R - 1)$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	4		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	HV^X 2436	Design LOS	$v_p = V \text{ or DDHV} / (PHF * N * f_p)$																			
S	mi/h	f_p	pc/h																			
$D = v_p / S$	pc/mi/ln	S	mi/h																			
LOS	F	$D = v_p / S$	pc/mi/ln																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
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DDHV - Directional design hour volume																						

ATTACHMENT VI – C - 36

MITIGATED 2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE A

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.981			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2466	1338	0	0	1566	0	1388	1253	0	0	0	0
Flt Permitted	0.593						0.950					
Satd. Flow (perm)	1539	1338	0	0	1566	0	1388	1253	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					16			66				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	348	99	0	0	179	29	227	3	61	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	378	108	0	0	195	32	247	3	66	0	0	0
Lane Group Flow (vph)	378	108	0	0	227	0	247	69	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	37.4	37.4	0.0	0.0	37.4	0.0	32.6	32.6	0.0	0.0	0.0	0.0
Total Split (%)	53.4%	53.4%	0.0%	0.0%	53.4%	0.0%	46.6%	46.6%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.8	32.8			32.8		28.0	28.0				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	44.8	44.8			44.8		17.2	17.2				
Actuated g/C Ratio	0.64	0.64			0.64		0.25	0.25				
v/c Ratio	0.38	0.13			0.23		0.72	0.19				
Control Delay	6.5	5.8			6.8		35.7	6.7				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	6.5	5.8			6.8		35.7	6.7				
LOS	A	A			A		D	A				
Approach Delay		6.4			6.8			29.4				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative A

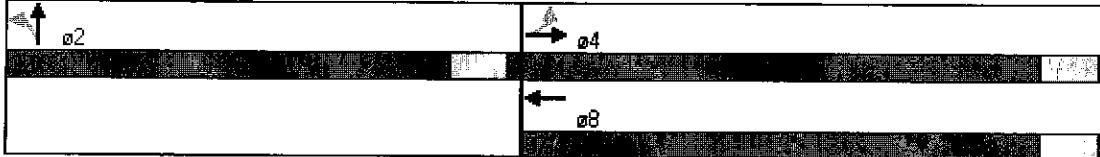
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	26	10			32		98	1				
Queue Length 95th (ft)	57	m35			83		148	25				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	984	856			1007		567	551				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.38	0.13			0.23		0.44	0.13				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 10 (14%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 13.5
 Intersection Capacity Utilization 43.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



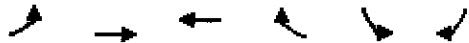
3: Ave 18.5 & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

	↖	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frnt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1418	1545	0	1327	1187
Flt Permitted					0.950	
Satd. Flow (perm)	0	1418	1545	0	1327	1187
Right Turn on Red				#s		#s
Satd. Flow (RTOR)						322
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	582	303	0	107	296
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	23%	23%	36%	36%
Adj. Flow (vph)	0	633	329	0	116	322
Lane Group Flow (vph)	0	633	329	0	116	322
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.6	20.6		21.3	21.3
Total Split (s)	0.0	47.0	47.0	0.0	23.0	23.0
Total Split (%)	0.0%	67.1%	67.1%	0.0%	32.9%	32.9%
Maximum Green (s)		42.4	42.4		17.7	17.7
Yellow Time (s)		3.6	3.6		4.3	4.3
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.3	49.3		12.7	12.7
Actuated g/C Ratio		0.70	0.70		0.18	0.18
v/c Ratio		0.63	0.30		0.48	0.67
Control Delay		8.8	2.5		31.3	10.7
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		8.8	2.5		31.3	10.7
LOS		A	A		C	B
Approach Delay		8.8	2.5		16.2	

3: Ave 18.5 & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		B	
Queue Length 50th (ft)		75	16		46	0
Queue Length 95th (ft)		230	m33		82	61
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		999	1088		360	557
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.63	0.30		0.32	0.58

Intersection Summary











Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 66 (94%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 9.6
 Intersection Capacity Utilization 43.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2030 Project AM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	567	438	181	0	132
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	616	476	197	0	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)		683	295			
pX, platoon unblocked						
vC, conflicting volume	673				1134	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	673				1134	476
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				100	73
cM capacity (veh/h)	788				191	532
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	637	476	197	143		
Volume Left	21	0	0	0		
Volume Right	0	0	197	143		
cSH	788	1700	1700	532		
Volume to Capacity	0.03	0.28	0.12	0.27		
Queue Length 95th (ft)	2	0	0	27		
Control Delay (s)	0.7	0.0	0.0	14.2		
Lane LOS	A			B		
Approach Delay (s)	0.7	0.0		14.2		
Approach LOS				B		
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization		48.8%		ICU Level of Service	A	
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.912			0.972			0.850	0.850
Fit Protected		0.994		0.950			0.950	0.961		0.950		
Satd. Flow (prot)	0	1760	0	3433	1220	0	1068	1547	0	1770	1583	1583
Fit Permitted		0.956		0.667			0.950	0.961		0.950		
Satd. Flow (perm)	0	1693	0	2410	1220	0	1068	1547	0	1770	1583	1583
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		34			102			16				260
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35		45		
Link Distance (ft)		412			683			1621		2125		
Travel Time (s)		8.0			13.3			31.6		32.2		
Volume (vph)	15	70	40	365	75	107	110	71	17	39	61	239
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	2%	2%	42%	42%	69%	2%	69%	2%	2%	2%
Adj. Flow (vph)	16	76	43	397	82	116	120	77	18	42	66	260
Lane Group Flow (vph)	0	135	0	397	198	0	120	95	0	42	66	260
Turn Type	Perm			Perm			Prot			Prot		custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								8
Detector Phases	4	4		8	8		1	6		5	2	8
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	20.6		21.3	20.6	21.3
Total Split (s)	24.1	24.1	0.0	24.1	24.1	0.0	23.3	22.6	0.0	23.3	22.6	24.1
Total Split (%)	34.4%	34.4%	0.0%	34.4%	34.4%	0.0%	33.3%	32.3%	0.0%	33.3%	32.3%	34.4%
Maximum Green (s)	18.8	18.8		18.8	18.8		18.0	18.0		18.0	18.0	18.8
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	3.6		4.3	3.6	4.3
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Min	C-Min		C-Min	C-Min		Min	None		Min	None	C-Min
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		37.9		37.9	37.9		15.7	13.5		8.6	8.6	37.9
Actuated g/C Ratio		0.54		0.54	0.54		0.22	0.19		0.12	0.12	0.54
v/c Ratio		0.14		0.30	0.28		0.50	0.30		0.19	0.34	0.27
Control Delay		9.6		10.7	6.4		30.4	20.7		29.4	32.1	3.0
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		9.6		10.7	6.4		30.4	20.7		29.4	32.1	3.0
LOS		A		B	A		C	C		C	C	A
Approach Delay		9.6			9.2			26.1		11.2		

5: Ave 18.5 & Golden State
 Mitigated 2030 Project AM Alternative A

10/22/2008

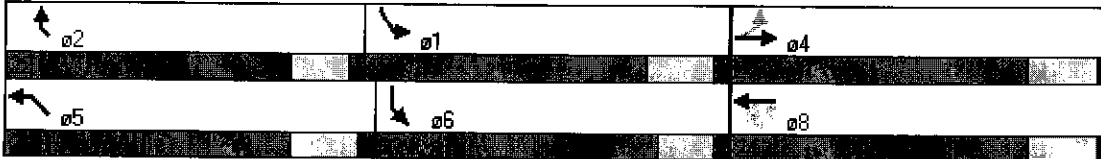
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Approach LOS		A			A			C		B		
Queue Length 50th (ft)		21		40	15		47	29		17	26	0
Queue Length 95th (ft)		65		86	m57		85	56		42	58	43
Internal Link Dist (ft)		332			603			1541		2045		
Turn Bay Length (ft)												
Base Capacity (vph)		932		1305	707		299	439		488	421	976
Starvation Cap Reductn		0		0	0		0	0		0	0	0
Spillback Cap Reductn		0		0	0		0	0		0	0	0
Storage Cap Reductn		0		0	0		0	0		0	0	0
Reduced v/c Ratio		0.14		0.30	0.28		0.40	0.22		0.09	0.16	0.27

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 12 (17%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 12.6
 Intersection Capacity Utilization 38.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A













Splits and Phases: 5: Ave 18.5 & Golden State



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966			0.896			0.999				
Flt Protected					0.990						0.992	
Satd. Flow (prot)	0	1684	0	0	1491	0	0	1471	0	0	1439	0
Flt Permitted					0.959			0.999			0.878	
Satd. Flow (perm)	0	1684	0	0	1445	0	0	1470	0	0	1273	0
Right Turn on Red			rs			rs			rs			rs
Satd. Flow (RTOR)		3			51			1				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1863			2105			5263			1327	
Travel Time (s)		28.2			31.9			79.7			20.1	
Volume (vph)	0	8	3	12	2	47	1	388	4	72	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	13%	13%	13%	29%	29%	29%	31%	31%	31%
Adj. Flow (vph)	0	9	3	13	2	51	1	422	4	78	390	0
Lane Group Flow (vph)	0	12	0	0	66	0	0	427	0	0	468	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	21.3	21.3	0.0	21.3	21.3	0.0	38.7	38.7	0.0	38.7	38.7	0.0
Total Split (%)	35.5%	35.5%	0.0%	35.5%	35.5%	0.0%	64.5%	64.5%	0.0%	64.5%	64.5%	0.0%
Maxnum Green (s)	16.0	16.0		16.0	16.0		33.4	33.4		33.4	33.4	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Efect Green (s)		9.6			9.6			61.5			61.5	
Actuated g/C Ratio		0.12			0.12			0.81			0.81	
v/c Ratio		0.06			0.30			0.36			0.45	
Control Delay		14.0			10.6			3.9			5.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.0			10.6			3.9			5.1	
LOS		B			B			A			A	
Approach Delay		14.0			10.6			3.9			5.1	

6: Ave 18 & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		3			5			39			48	
Queue Length 95th (ft)		13			30			96			127	
Internal Link Dist (ft)		1783			2025			5183			1247	
Turn Bay Length (ft)												
Base Capacity (vph)		373			358			1203			1041	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.03			0.18			0.35			0.45	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 75.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 63.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 6: Ave 18 & Road 23



7: Ave 17 & SR 99 NB ramps
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	0.94	0.91	0.91	1.00	1.00	1.00
Frts					0.986			0.856	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2968	4396	0	0	4871	0	4802	1396	2773	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	2968	4396	0	0	4871	0	4802	1396	2773	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)					24			183	366			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	250	538	0	0	1252	124	1252	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	272	585	0	0	1361	135	1361	7	549	0	0	0
Lane Group Flow (vph)	272	585	0	0	1496	0	1361	190	366	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3		20.6	20.6	20.6			
Total Split (s)	15.0	49.0	0.0	0.0	34.0	0.0	31.0	31.0	31.0	0.0	0.0	0.0
Total Split (%)	18.8%	61.3%	0.0%	0.0%	42.5%	0.0%	38.8%	38.8%	38.8%	0.0%	0.0%	0.0%
Maximum Green (s)	9.7	43.7			28.7		26.4	26.4	26.4			
Yellow Time (s)	4.3	4.3			4.3		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lag				Lead							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	11.0	45.2			30.2		26.8	26.8	26.8			
Actuated g/C Ratio	0.14	0.56			0.38		0.34	0.34	0.34			
v/c Ratio	0.67	0.24			0.81		0.85	0.32	0.31			
Control Delay	32.4	4.4			26.1		30.8	5.3	3.1			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	32.4	4.4			26.1		30.8	5.3	3.1			
LOS	C	A			C		C	A	A			
Approach Delay		13.3			26.1			23.0				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			C				
Queue Length 50th (ft)	70	22			237		220	2	0			
Queue Length 95th (ft)	93	28			295		275	49	29			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	408	2485			1855		1621	592	1178			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.67	0.24			0.81		0.84	0.32	0.31			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 76 (95%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 22.2
 Intersection Capacity Utilization 67.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.86	0.91	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	5634	4940	0	2870	2330
Flt Permitted					0.950	
Satd. Flow (perm)	0	5634	4940	0	2870	2330
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						16
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1699	1979	0	299	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	1847	2151	0	325	117
Lane Group Flow (vph)	0	1847	2151	0	325	117
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	53.4	53.4	0.0	26.6	26.6
Total Split (%)	0.0%	66.8%	66.8%	0.0%	33.3%	33.3%
Maximum Green (s)		48.1	48.1		22.0	22.0
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.5	57.5		14.5	14.5
Actuated g/C Ratio		0.72	0.72		0.18	0.18
v/c Ratio		0.46	0.61		0.62	0.27
Control Delay		2.6	1.7		35.2	24.7
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		2.6	1.7		35.2	24.7
LOS		A	A		D	C
Approach Delay		2.6	1.7		32.5	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative A

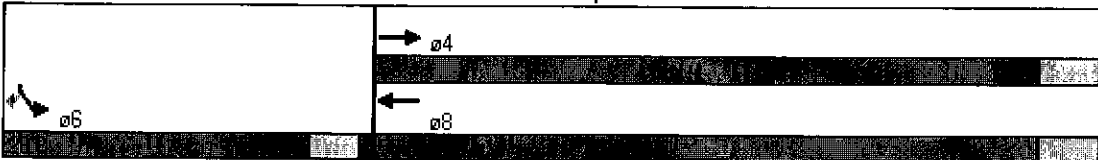
10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		46	10		78	25
Queue Length 95th (ft)		90	56		110	46
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		4048	3549		811	670
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.46	0.61		0.40	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 67 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Frt		0.990			0.948				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3183	4668	0	3155	4430	0	1433	1508	2256	3155	1712	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3183	4668	0	3155	4430	0	1433	1508	2256	3155	1712	1455
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		13			202				468			7
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	8	886	61	613	960	515	82	85	431	318	36	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	9	963	66	666	1043	560	89	92	468	346	39	7
Lane Group Flow (vph)	9	1029	0	666	1603	0	89	92	468	346	39	7
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.3	21.3		9.3	21.3		8.6	20.6	20.6	8.6	20.6	20.6
Total Split (s)	9.3	23.4	0.0	22.0	36.1	0.0	12.1	20.6	20.6	14.0	22.5	22.5
Total Split (%)	11.6%	29.3%	0.0%	27.5%	45.1%	0.0%	15.1%	25.8%	25.8%	17.5%	28.1%	28.1%
Maximum Green (s)	4.0	18.1		16.7	30.8		7.5	16.0	16.0	9.4	17.9	17.9
Yellow Time (s)	4.3	4.3		4.3	4.3		3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	vs	vs		vs	vs		vs	vs	vs	vs	vs	vs
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	6.7	25.0		18.0	45.0		12.4	11.0	11.0	10.0	10.7	10.7
Actuated g/C Ratio	0.08	0.31		0.22	0.56		0.16	0.14	0.14	0.12	0.13	0.13
v/c Ratio	0.03	0.70		0.94	0.62		0.40	0.44	0.65	0.88	0.17	0.03
Control Delay	34.4	28.3		43.8	6.4		34.7	37.2	7.8	59.4	34.5	19.2
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	28.3		43.8	6.5		34.7	37.2	7.8	59.4	34.5	19.2
LOS	C	C		D	A		C	D	A	E	C	B
Approach Delay		28.3			17.4			15.7			56.2	

10: Ave 17 & GS Blvd
 Mitigated 2030 Project AM Alternative A

10/22/2008

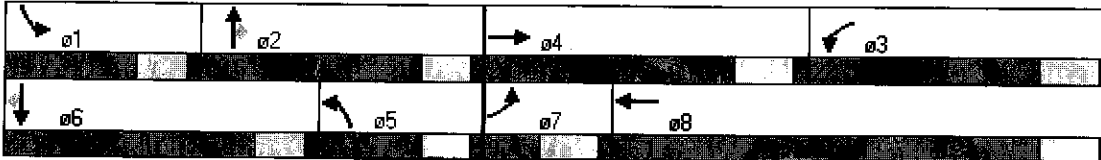
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			E	
Queue Length 50th (ft)	2	160		163	69		40	43	0	89	18	0
Queue Length 95th (ft)	9	#253		#270	262		80	81	41	#162	46	11
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	265	1465		710	2580		228	313	839	394	405	349
Starvation Cap Reductn	0	0		0	100		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.70		0.94	0.65		0.39	0.29	0.56	0.88	0.10	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 10 (13%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 23.3
 Intersection Capacity Utilization 61.7%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗	↘	↕↕		↘	↕			↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.984				0.850
Flt Protected		0.998		0.950			0.950				0.997	
Satd. Flow (prot)	0	3498	1568	1656	3305	0	1504	1558	0	0	1515	1292
Flt Permitted		0.902		0.347			0.531				0.960	
Satd. Flow (perm)	0	3161	1568	605	3305	0	841	1558	0	0	1459	1292
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			150		2			15				13
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	27	512	138	42	607	7	138	392	47	19	270	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	29	557	150	46	660	8	150	426	51	21	293	13
Lane Group Flow (vph)	0	586	150	46	668	0	150	477	0	0	314	13
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phases	4	4	4	8	8		2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3	21.3	21.3	21.3		21.3	21.3		21.3	21.3	21.3
Total Split (s)	24.9	24.9	24.9	24.9	24.9	0.0	35.1	35.1	0.0	35.1	35.1	35.1
Total Split (%)	41.5%	41.5%	41.5%	41.5%	41.5%	0.0%	58.5%	58.5%	0.0%	58.5%	58.5%	58.5%
Maximum Green (s)	19.6	19.6	19.6	19.6	19.6		29.8	29.8		29.8	29.8	29.8
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	0
Act Effct Green (s)		15.3	15.3	15.3	15.3		19.1	19.1			19.1	19.1
Actuated g/C Ratio		0.35	0.35	0.35	0.35		0.44	0.44			0.44	0.44
v/c Ratio		0.52	0.23	0.21	0.57		0.40	0.68			0.49	0.02
Control Delay		14.1	4.0	15.1	14.5		12.3	15.2			11.6	4.2
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		14.1	4.0	15.1	14.5		12.3	15.2			11.6	4.2
LOS		B	A	B	B		B	B			B	A
Approach Delay		12.0			14.5			14.5			11.3	

11: Ave 17 & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

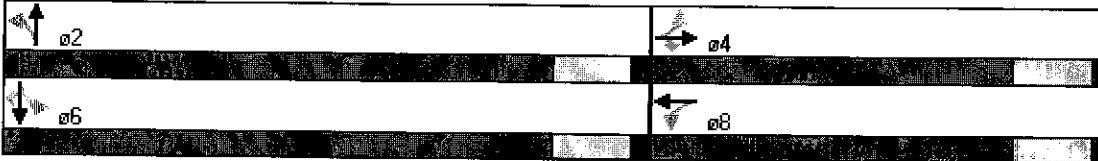
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		54	0	7	62		22	80			49	0
Queue Length 95th (ft)		131	31	34	148		65	187			116	7
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1393	775	267	1457		483	902			839	748
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.42	0.19	0.17	0.46		0.31	0.53			0.37	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 43.1
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.3
 Intersection Capacity Utilization 83.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↘	↕		↘	↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.967			0.997	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3325	0	1752	3494	0
Flt Permitted		0.815			0.721		0.950			0.950		
Satd. Flow (perm)	0	1518	1583	0	1343	1583	1719	3325	0	1752	3494	0
Right Turn on Red			↘s			↘s		↘s			↘s	
Satd. Flow (RTOR)			15			57		72			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	52	10	382	109	31	608	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	57	11	415	118	34	661	12
Lane Group Flow (vph)	0	11	15	0	176	57	11	533	0	34	673	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	21.9	21.9	21.9	21.9	21.9	21.9	9.9	22.7	0.0	10.4	23.2	0.0
Total Split (%)	39.8%	39.8%	39.8%	39.8%	39.8%	39.8%	18.0%	41.3%	0.0%	18.9%	42.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	5.0	17.8		5.5	18.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							↘s	↘s		↘s	↘s	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		13.0	13.0		13.2	13.2	6.3	25.4		6.8	27.7	
Actuated g/C Ratio		0.25	0.25		0.26	0.26	0.11	0.52		0.12	0.57	
v/c Ratio		0.03	0.04		0.51	0.13	0.06	0.30		0.16	0.34	
Control Delay		11.9	7.2		17.6	5.3	22.3	8.9		21.2	8.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.9	7.2		17.6	5.3	22.3	8.9		21.2	8.5	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		9.2			14.6			9.1			9.1	

12: Ellis OC & Road 26
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1	0		21	0	1	23		4	36	
Queue Length 95th (ft)		11	10		90	19	15	96		32	134	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		522	554		462	582	190	1855		217	2049	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.03		0.38	0.10	0.06	0.29		0.16	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 55

Actuated Cycle Length: 49

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 9.9

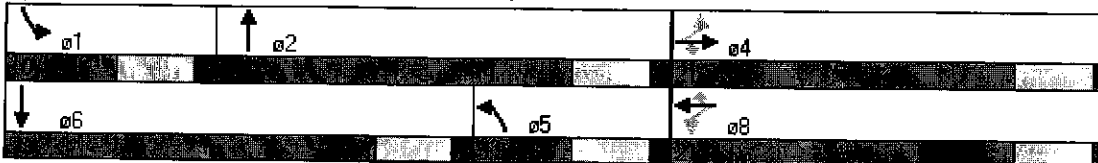
Intersection Capacity Utilization 46.1%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						165		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	485	315	0	0	240	152	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	527	342	0	0	261	165	222	2	95	0	0	0
Lane Group Flow (vph)	527	342	0	0	261	165	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.45	0.17			0.42	0.40	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.2			17.3			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

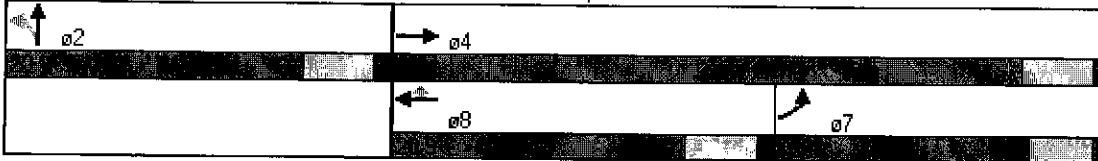
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	47	12			44	0	31	1				
Queue Length 95th (ft)	131	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	564	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.45	0.17			0.26	0.29	0.23	0.19				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 39.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						478
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	637	368	0	163	440
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	692	400	0	177	478
Lane Group Flow (vph)	0	692	400	0	177	478
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
ℳlow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.45	0.26		0.12	0.32
Control Delay		13.1	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.1	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.1	2.7		4.2	
Approach LOS		B	A		A	

17: Ellis OC & Aviation Drive
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	0.95	0.97	0.97	0.95	1.00	1.00	0.88
Frt			0.850		0.899			0.978			0.850	0.850
Flt Protected	0.950			0.950			0.950	0.959		0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3182	0	3433	3389	0	1770	1583	2787
Flt Permitted	0.950			0.950			0.950	0.959		0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3182	0	3433	3389	0	1770	1583	2787
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			129		197			22				626
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	47	122	119	444	89	181	193	259	44	121	401	576
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	133	129	483	97	197	210	282	48	132	436	626
Lane Group Flow (vph)	51	133	129	483	294	0	210	330	0	132	436	626
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4	4		8						2	2
Detector Phases	7	4	4	3	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	20.9	20.9	8.5	20.9		8.5	20.9		20.9	20.9	20.9
Total Split (s)	10.6	21.9	21.9	16.3	27.6	0.0	10.0	20.9	0.0	20.9	31.8	31.8
Total Split (%)	13.3%	27.4%	27.4%	20.4%	34.5%	0.0%	12.5%	26.1%	0.0%	26.1%	39.8%	39.8%
Maxum Green (s)	6.1	17.0	17.0	11.8	22.7		5.5	16.0		16.0	26.9	26.9
Yellow Time (s)	3.5	3.9	3.9	3.5	3.9		3.5	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		Max	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0		0	0	0
Act Effct Green (s)	6.5	9.0	9.0	12.3	19.0		6.0	16.9		16.9	27.8	27.8
Actuated g/C Ratio	0.09	0.13	0.13	0.17	0.27		0.08	0.24		0.24	0.39	0.39
v/c Ratio	0.33	0.30	0.41	0.81	0.30		0.72	0.40		0.31	0.70	0.43
Control Delay	37.6	29.9	10.3	41.5	9.2		48.4	23.2		25.3	26.2	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	37.6	29.9	10.3	41.5	9.2		48.4	23.2		25.3	26.2	2.5
LOS	D	C	B	D	A		D	C		C	C	A
Approach Delay		23.1			29.3			33.0		13.7		
Approach LOS		C			C			C		B		

17: Ellis OC & Aviation Drive
 Mitigated 2030 Project AM Alternative A

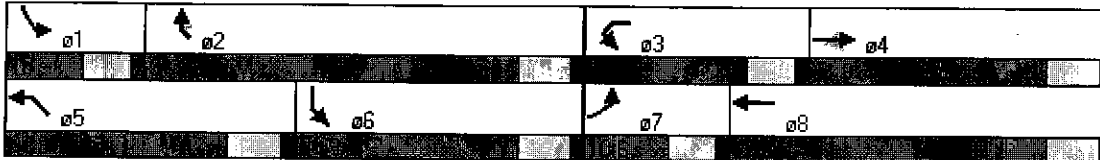
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	21	28	0	106	18		47	58		48	156	0
Queue Length 95th (ft)	54	52	44	#186	48		#98	97		96	#279	32
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	156	792	454	594	1136		290	823		421	620	1472
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.33	0.17	0.28	0.81	0.26		0.72	0.40		0.31	0.70	0.43

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 71.1
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 22.7
 Intersection LOS: C
 Intersection Capacity Utilization Err%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3367	3471	0	0	3471	1553	1618	1618	2682	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3367	3471	0	0	3471	1553	1618	1618	2682	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)						533			205			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	197	988	0	0	931	490	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	214	1074	0	0	1012	533	390	0	384	0	0	0
Lane Group Flow (vph)	214	1074	0	0	1012	533	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	13.9	48.4	0.0	0.0	34.5	34.5	21.6	21.6	21.6	0.0	0.0	0.0
Total Split (%)	19.9%	69.1%	0.0%	0.0%	49.3%	49.3%	30.9%	30.9%	30.9%	0.0%	0.0%	0.0%
Maximum Green (s)	9.3	43.8			29.9	29.9	17.1	17.1	17.1			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.3	44.4			31.1	31.1	17.6	17.6	17.6			
Actuated g/C Ratio	0.13	0.63			0.44	0.44	0.25	0.25	0.25			
v/c Ratio	0.48	0.49			0.66	0.54	0.48	0.48	0.46			
Control Delay	39.4	1.1			17.9	3.6	27.0	27.0	12.1			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	39.4	1.2			17.9	3.6	27.0	27.0	12.1			
LOS	D	A			B	A	C	C	B			
Approach Delay		7.5			13.0			19.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	44	4			175	0	74	74	35			
Queue Length 95th (ft)	m63	16			238	51	137	137	74			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	476	2202			1544	986	407	407	828			
Starvation Cap Reductn	0	214			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.45	0.54			0.66	0.54	0.48	0.48	0.46			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 66 (94%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 73.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↘	↑↑					↘↘	↓	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	
Trailing Detector (ft)		0	0	0	0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850								0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	3099	1429	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	3099	1429	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)			458								144	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391				1434		886	
Travel Time (s)		23.6			7.6				32.6		20.1	
Volume (vph)	0	762	421	414	921	0	0	0	0	423	0	227
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	828	458	450	1001	0	0	0	0	460	0	247
Lane Group Flow (vph)	0	828	458	450	1001	0	0	0	0	460	247	0
Turn Type			Perm	Prot						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4							6		
Detector Phases		4	4	3	8					6	6	
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	
Total Split (s)	0.0	24.5	24.5	25.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	0.0%	35.0%	35.0%	35.7%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)		19.9	19.9	20.4	44.9					16.0	16.0	
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Recall Mode		C-Max	C-Max	None	C-Max					None	None	
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0					0	0	
Act Effct Green (s)		22.1	22.1	21.0	47.1					14.9	14.9	
Actuated g/C Ratio		0.32	0.32	0.30	0.67					0.21	0.21	
v/c Ratio		0.78	0.58	0.87	0.43					0.70	0.59	
Control Delay		28.9	5.6	34.5	2.2					31.3	16.8	
Queue Delay		0.0	0.0	0.0	0.2					0.0	0.0	
Total Delay		28.9	5.6	34.5	2.3					31.3	16.8	
LOS		C	A	C	A					C	B	
Approach Delay		20.6			12.3						26.2	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						C	
Queue Length 50th (ft)		174	0	163	12					91	37	
Queue Length 95th (ft)		#268	62	#337	43					137	103	
Internal Link Dist (ft)		1134			311			1354				806
Turn Bay Length (ft)												
Base Capacity (vph)		1063	789	516	2311					730	447	
Starvation Cap Reductn		0	0	0	473					0	0	
Spillback Cap Reductn		0	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.78	0.58	0.87	0.54					0.63	0.55	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 18.3
 Intersection Capacity Utilization 73.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

	↖	→	↗	↙	←	↖	↙	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇄			⇄			⇄			⇄	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.941			0.988				
Flt Protected					0.973						0.995	
Satd. Flow (prot)	0	1863	0	0	1706	0	0	1577	0	0	1589	0
Flt Permitted					0.872						0.942	
Satd. Flow (perm)	0	1863	0	0	1528	0	0	1577	0	0	1504	0
Right Turn on Red			↘s			↘s			↘s			↘s
Satd. Flow (RTOR)					38			11				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2755			2781			7924			7936	
Travel Time (s)		47.0			47.4			120.1			120.2	
Volume (vph)	0	0	0	44	1	35	0	374	38	30	304	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	19%	19%	19%	19%	19%	19%
Adj. Flow (vph)	0	0	0	48	1	38	0	407	41	33	330	0
Lane Group Flow (vph)	0	0	0	0	87	0	0	448	0	0	363	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	27.9	27.9	0.0	27.9	27.9	0.0	42.1	42.1	0.0	42.1	42.1	0.0
Total Split (%)	39.9%	39.9%	0.0%	39.9%	39.9%	0.0%	60.1%	60.1%	0.0%	60.1%	60.1%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		36.8	36.8		36.8	36.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)					10.1			48.6			48.6	
Actuated g/C Ratio					0.15			0.74			0.74	
v/c Ratio					0.34			0.39			0.33	
Control Delay					11.0			5.0			4.7	
Queue Delay					0.0			0.0			0.0	
Total Delay					11.0			5.0			4.7	
LOS					B			A			A	
Approach Delay					11.0			5.0			4.7	

20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

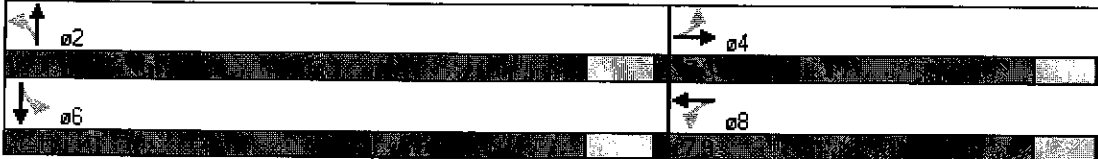
Lane Group												
Approach LOS					B			A				A
Queue Length 50th (ft)					12			42				33
Queue Length 95th (ft)					38			104				83
Internal Link Dist (ft)		2675			2701			7844				7856
Turn Bay Length (ft)												
Base Capacity (vph)					517			1219				1160
Starvation Cap Reductn					0			0				0
Spillback Cap Reductn					0			0				0
Storage Cap Reductn					0			0				0
Reduced v/c Ratio					0.17			0.37				0.31

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 66
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 5.4
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 20: Ave 15.5/Cleveland & Road 23



21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Fr						0.850					0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3374	1509	0	0	0	3400	1568	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3213	3312	0	0	3374	1509	0	0	0	3400	1568	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						229					310	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	836	580	0	0	568	211	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	909	630	0	0	617	229	0	0	0	355	0	168
Lane Group Flow (vph)	909	630	0	0	617	229	0	0	0	355	168	0
Turn Type	Prot					Perm				Perm		
Protected Phases	5	2			6						8	
Permitted Phases						6				8		
Detector Phases	5	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	8.5	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	23.5	44.9			16.9	16.9				16.0	16.0	
Yellow Time (s)	3.5	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	None	C-Max			C-Max	C-Max				None	None	
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0				0	0	
Act Effct Green (s)	24.0	49.1			21.1	21.1				12.9	12.9	
Actuated g/C Ratio	0.34	0.70			0.30	0.30				0.18	0.18	
v/c Ratio	0.82	0.27			0.61	0.37				0.56	0.31	
Control Delay	21.8	2.3			24.7	5.4				29.2	1.5	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	21.8	2.3			24.7	5.4				29.2	1.5	
LOS	C	A			C	A				C	A	
Approach Delay		13.8			19.5						20.3	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			B						C	
Queue Length 50th (ft)	170	16			117	0				73	0	
Queue Length 95th (ft)	#251	33			184	49				104	0	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1102	2321			1015	614				801	607	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.82	0.27			0.61	0.37				0.44	0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 52 (74%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 16.6
 Intersection Capacity Utilization 59.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVE 14/Olive & SR 145/Madera
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15			15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.95	1.00
Frt		0.917	0.850					0.991				0.850
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3335	3020	1400	0	0	0	3213	4716	0	1736	3471	1553
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3335	3020	1400	0	0	0	3213	4716	0	1736	3471	1553
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)		377	378					16				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	434	278	695	0	0	0	254	981	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	472	302	755	0	0	0	276	1066	71	130	374	468
Lane Group Flow (vph)	472	679	378	0	0	0	276	1137	0	130	374	468
Turn Type	Perm		Perm				Prot			Prot		Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		8.5	20.6	20.6
Total Split (s)	25.4	25.4	25.4	0.0	0.0	0.0	20.6	28.7	0.0	15.9	24.0	24.0
Total Split (%)	36.3%	36.3%	36.3%	0.0%	0.0%	0.0%	29.4%	41.0%	0.0%	22.7%	34.3%	34.3%
Maximum Green (s)	20.9	20.9	20.9				16.0	24.1		11.4	19.4	19.4
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.5	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max	None	Max	Max	
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	21.4	21.4	21.4				16.6	28.9		9.8	20.0	20.0
Actuated g/C Ratio	0.31	0.31	0.31				0.24	0.41		0.14	0.29	0.29
v/c Ratio	0.46	0.57	0.55				0.36	0.58		0.53	0.38	0.60
Control Delay	20.3	10.7	7.1				23.9	18.3		39.4	7.8	7.1
Queue Delay	1.6	0.9	0.6				0.1	0.0		0.0	0.0	0.0
Total Delay	21.9	11.5	7.7				24.0	18.3		39.4	7.8	7.1
LOS	C	B	A				C	B		D	A	A
Approach Delay		13.8						19.4			11.7	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						B			B	
Queue Length 50th (ft)	74	46	21				51	140		46	36	25
Queue Length 95th (ft)	123	104	m83				82	192		m81	60	74
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	1020	1185	690				762	1958		295	992	778
Starvation Cap Reductn	359	247	96				0	0		0	0	0
Spillback Cap Reductn	0	0	0				50	0		0	0	7
Storage Cap Reductn	0	0	0				0	0		0	0	0
Reduced v/c Ratio	0.71	0.72	0.64				0.39	0.58		0.44	0.38	0.61

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 11 (16%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 15.3
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVe 14/Olive & SR 99 SB off-ramp
Mitigated 2030 Project AM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Flt Protected					0.992	0.850
Satd. Flow (prot)	0	3505	3505	0	3233	1361
Flt Permitted					0.955	
Satd. Flow (perm)	0	3505	3505	0	3233	1361
Right Turn on Red				Ⓢ		Ⓢ
Satd. Flow (RTOR)					10	121
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	824	685	0	583	319
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	896	745	0	634	347
Lane Group Flow (vph)	0	896	745	0	669	312
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	35.3	35.3	0.0	34.7	34.7
Total Split (%)	0.0%	50.4%	50.4%	0.0%	49.6%	49.6%
Maximum Green (s)		30.8	30.8		30.2	30.2
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effect Green (s)		41.5	41.5		20.5	20.5
Actuated g/C Ratio		0.59	0.59		0.29	0.29
v/c Ratio		0.43	0.36		0.70	0.64
Control Delay		9.6	2.5		25.2	18.4
Queue Delay		0.0	0.4		0.0	0.0
Total Delay		9.6	2.9		25.2	18.4
LOS		A	A		C	B
Approach Delay		9.6	2.9		23.1	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative A

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		98	2		129	75
Queue Length 95th (ft)		180	116		154	137
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2077	2077		1424	665
Starvation Cap Reductn		0	792		0	0
Spillback Cap Reductn		1	0		2	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.43	0.58		0.47	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 51 (73%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.7
 Intersection Capacity Utilization 49.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.986			0.927			0.994			0.956	
Fl _t Protected	0.950				0.998			0.997		0.950		
Satd. Flow (prot)	1671	1735	0	0	1542	0	0	1569	0	1543	1552	0
Fl _t Permitted	0.597				0.992			0.985		0.658		
Satd. Flow (perm)	1050	1735	0	0	1533	0	0	1550	0	1069	1552	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		7			113			4			37	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2632			2680			5376			7924	
Travel Time (s)		44.9			45.7			81.5			120.1	
Volume (vph)	43	61	6	9	90	117	8	140	6	103	130	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	14%	14%	14%	20%	20%	20%	17%	17%	17%
Adj. Flow (vph)	47	66	7	10	98	127	9	152	7	112	141	58
Lane Group Flow (vph)	47	73	0	0	235	0	0	168	0	112	199	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	36.4	36.4	0.0	36.4	36.4	0.0	33.6	33.6	0.0	33.6	33.6	0.0
Total Split (%)	52.0%	52.0%	0.0%	52.0%	52.0%	0.0%	48.0%	48.0%	0.0%	48.0%	48.0%	0.0%
Maxnum Green (s)	31.5	31.5		31.5	31.5		28.3	28.3		28.3	28.3	
ℳlow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.4	10.4			10.4			17.5		17.5	17.5	
Actuated g/C Ratio	0.28	0.28			0.28			0.51		0.51	0.51	
v/c Ratio	0.16	0.15			0.45			0.21		0.21	0.25	
Control Delay	8.2	7.0			7.1			7.1		7.8	6.3	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	8.2	7.0			7.1			7.1		7.8	6.3	
LOS	A	A			A			A		A	A	
Approach Delay		7.5			7.1			7.1			6.8	

24: Ave 14/Olive & Road 23
 Mitigated 2030 Project AM Alternative A

10/22/2008

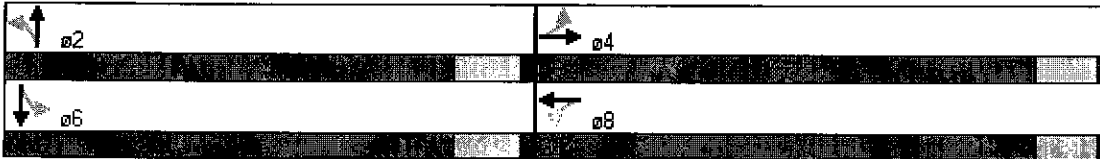
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	4	5			10			13		9	13	
Queue Length 95th (ft)	18	22			44			45		35	47	
Internal Link Dist (ft)		2552			2600			5296			7844	
Turn Bay Length (ft)												
Base Capacity (vph)	602	998			927			1089		750	1100	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.08	0.07			0.25			0.15		0.15	0.18	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 34.4
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.0
 Intersection Capacity Utilization 47.6%
 Analysis Period (min) 15

















Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 24: Ave 14/Olive & Road 23



25: SB Ramps & GS Blvd
 Mitigated 2030 Project AM Alternative A

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 				 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.672	
Satd. Flow (perm)	3303	1524	1696	1442	1240	1845
Right Turn on Red						
Satd. Flow (RTOR)		82		497		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	791		408			1104
Travel Time (s)	18.0		9.3			25.1
Volume (vph)	1043	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	1134	82	117	497	303	74
Lane Group Flow (vph)	1134	82	117	497	303	74
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	63.8	63.8	56.2	56.2	56.2	56.2
Total Split (%)	53.2%	53.2%	46.8%	46.8%	46.8%	46.8%
Maximum Green (s)	59.3	59.3	51.7	51.7	51.7	51.7
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	79.1	79.1	32.9	32.9	32.9	32.9
Actuated g/C Ratio	0.66	0.66	0.27	0.27	0.27	0.27
v/c Ratio	0.52	0.08	0.25	0.66	0.89	0.15
Control Delay	13.1	2.6	33.0	7.0	68.5	30.7
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	13.1	2.6	33.0	7.1	68.5	30.7
LOS	B	A	C	A	E	C
Approach Delay	12.4		12.0			61.1

25: SB Ramps & GS Blvd
 Mitigated 2030 Project AM Alternative A

10/22/2008

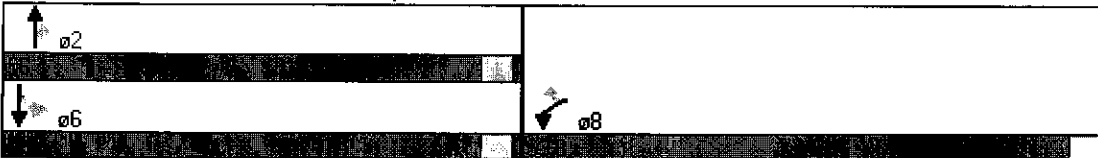
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			E
Queue Length 50th (ft)	213	0	71	0	227	44
Queue Length 95th (ft)	359	23	104	74	297	71
Internal Link Dist (ft)	711		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2178	1033	738	908	539	803
Starvation Cap Reductn	0	0	0	28	0	0
Spillback Cap Reductn	24	0	0	0	0	15
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.08	0.16	0.56	0.56	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 64 (53%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 20.6
 Intersection Capacity Utilization 58.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd

Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.94	1.00	1.00
Frt		0.994				0.850		0.867			0.866	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	4631	1442	1656	1511	0	4757	1538	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	4631	1442	1656	1511	0	4757	1538	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		4				405		24			91	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	189	360	16	19	603	373	16	3	22	1017	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1105	11	91
Lane Group Flow (vph)	205	408	0	21	655	405	17	27	0	1105	102	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						
Detector Phases	7	4		3	8	8	2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.6	20.6		8.6	20.6	20.6	20.5	20.5		20.5	20.5	
Total Split (s)	25.0	37.5	0.0	17.0	29.5	29.5	20.5	20.5	0.0	35.0	35.0	0.0
Total Split (%)	22.7%	34.1%	0.0%	15.5%	26.8%	26.8%	18.6%	18.6%	0.0%	31.8%	31.8%	0.0%
Maximum Green (s)	20.4	32.9		12.4	24.9	24.9	16.3	16.3		30.8	30.8	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	
Act Effct Green (s)	18.1	45.3		7.6	28.4	28.4	16.5	16.5		31.0	31.0	
Actuated g/C Ratio	0.16	0.41		0.07	0.26	0.26	0.15	0.15		0.28	0.28	
v/c Ratio	0.77	0.31		0.19	0.55	0.60	0.07	0.11		0.82	0.20	
Control Delay	63.1	23.7		53.2	31.5	16.4	41.1	18.4		43.1	8.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.5	0.0	
Total Delay	63.1	23.7		53.2	31.5	16.4	41.1	18.4		43.7	8.9	
LOS	E	C		D	C	B	D	B		D	A	
Approach Delay		36.8			26.3			27.2			40.7	

26: Ave 12 & GS Blvd
 Mitigated 2030 Project AM Alternative A

10/22/2008

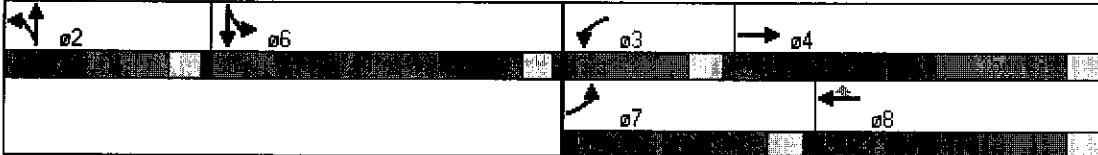
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	138	90		14	164	130	10	2		258	6	
Queue Length 95th (ft)	218	157		m27	208	231	31	28		313	46	
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	308	1322		191	1195	673	248	247		1341	499	
Starvation Cap Reductn	0	0		0	0	0	0	0		49	0	
Spillback Cap Reductn	0	0		0	0	5	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.67	0.31		0.11	0.55	0.61	0.07	0.11		0.86	0.20	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 11 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 34.4
 Intersection Capacity Utilization 58.1%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.86	0.86	0.97	0.95	0.95	1.00	1.00	1.00
Frt					0.935	0.850		0.850	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3213	4759	0	0	4324	1310	3099	1358	1358	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3213	4759	0	0	4324	1310	3099	1358	1358	0	0	0
Right Turn on Red			¶s			¶s		¶s			¶s	
Satd. Flow (RTOR)					210	500		71	71			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	198	1201	0	0	598	920	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	215	1305	0	0	650	1000	432	0	283	0	0	0
Lane Group Flow (vph)	215	1305	0	0	1150	500	432	141	142	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	26.0	74.0	0.0	0.0	48.0	48.0	36.0	36.0	36.0	0.0	0.0	0.0
Total Split (%)	23.6%	67.3%	0.0%	0.0%	43.6%	43.6%	32.7%	32.7%	32.7%	0.0%	0.0%	0.0%
Maximum Green (s)	21.5	69.5			43.5	43.5	31.5	31.5	31.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	¶s				¶s	¶s						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	22.0	80.8			54.8	54.8	21.2	21.2	21.2			
Actuated g/C Ratio	0.20	0.73			0.50	0.50	0.19	0.19	0.19			
v/c Ratio	0.33	0.37			0.51	0.55	0.72	0.44	0.44			
Control Delay	46.4	4.4			16.4	4.3	48.3	23.3	23.4			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	46.4	4.4			16.4	4.3	48.3	23.3	23.4			
LOS	D	A			B	A	D	C	C			
Approach Delay		10.4			12.7			38.4				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2030 Project AM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			D				
Queue Length 50th (ft)	80	25			164	0	148	45	45			
Queue Length 95th (ft)	m104	306			237	76	187	101	102			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	643	3494			2258	903	902	445	445			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.33	0.37			0.51	0.55	0.48	0.32	0.32			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 94 (85%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 16.5
 Intersection Capacity Utilization 59.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps















1: Ave 18.5 & SR 99 NB ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.986			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2847	1545	0	0	1643	0	1504	1346	0	0	0	0
Flt Permitted	0.556						0.950					
Satd. Flow (perm)	1666	1545	0	0	1643	0	1504	1346	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)					11			755				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	478	140	0	0	222	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	520	152	0	0	241	28	277	0	91	0	0	0
Lane Group Flow (vph)	520	152	0	0	269	0	277	91	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	46.1	46.1	0.0	0.0	46.1	0.0	33.9	33.9	0.0	0.0	0.0	0.0
Total Split (%)	57.6%	57.6%	0.0%	0.0%	57.6%	0.0%	42.4%	42.4%	0.0%	0.0%	0.0%	0.0%
Maxnum Green (s)	41.5	41.5			41.5		29.3	29.3				
Flow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	52.6	52.6			52.6		19.4	19.4				
Actuated g/C Ratio	0.66	0.66			0.66		0.24	0.24				
v/c Ratio	0.48	0.15			0.25		0.76	0.10				
Control Delay	5.5	3.9			7.1		40.9	0.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.5	3.9			7.1		40.9	0.2				
LOS	A	A			A		D	A				
Approach Delay		5.1			7.1			30.9				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

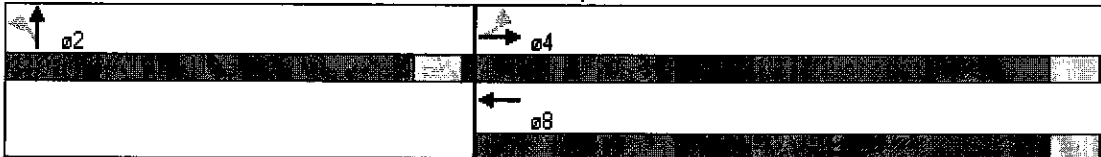
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	26	13			46		129	0				
Queue Length 95th (ft)	m67	m24			104		188	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	1094	1015			1083		562	976				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.48	0.15			0.25		0.49	0.09				

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 10 (13%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 51.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



2: Ave 18.5 & SB Ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	618	368	0	369	108	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	672	400	0	401	117	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		223			717							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	518			1072			1073	1190	672	1073	1473	401
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497			1072			1076	1199	672	1076	1494	374
tC, single (s)	4.3			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	929			587			190	179	459	190	119	647
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	672	400	401	117								
Volume Left	0	0	0	0								
Volume Right	0	400	0	117								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.40	0.24	0.24	0.07								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			35.9%		ICU Level of Service				A			
Analysis Period (min)			15									

3: Ave 18.5 & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frnt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1583	1597	0	1289	1154
Flt Permitted					0.950	
Satd. Flow (perm)	0	1583	1597	0	1289	1154
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						466
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	849	350	0	137	429
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	19%	19%	40%	40%
Adj. Flow (vph)	0	923	380	0	149	466
Lane Group Flow (vph)	0	923	380	0	149	466
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.6	20.6		20.6	20.6
Total Split (s)	0.0	58.0	58.0	0.0	22.0	22.0
Total Split (%)	0.0%	72.5%	72.5%	0.0%	27.5%	27.5%
Maximum Green (s)		53.4	53.4		17.4	17.4
ℳlow Time (s)		3.6	3.6		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.7	57.7		14.3	14.3
Actuated g/C Ratio		0.72	0.72		0.18	0.18
v/c Ratio		0.81	0.33		0.65	0.79
Control Delay		14.2	2.6		43.2	14.2
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		14.2	2.6		43.2	14.2
LOS		B	A		D	B
Approach Delay		14.2	2.6		21.2	

3: Ave 18.5 & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		186	23		70	0
Queue Length 95th (ft)		#624	m41		124	#119
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		1143	1153		290	621
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.81	0.33		0.51	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 62 (78%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 58.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2030 Project PM Alternative A

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗		↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	837	537	224	0	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	910	584	243	0	209
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		683	295			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	827				1622	584
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	825				1631	578
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	91				100	57
cM capacity (veh/h)	722				93	485
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	974	584	243	209		
Volume Left	64	0	0	0		
Volume Right	0	0	243	209		
cSH	722	1700	1700	485		
Volume to Capacity	0.09	0.34	0.14	0.43		
Queue Length 95th (ft)	7	0	0	53		
Control Delay (s)	2.6	0.0	0.0	17.9		
Lane LOS	A			C		
Approach Delay (s)	2.6	0.0		17.9		
Approach LOS				C		
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			82.2%		ICU Level of Service	E
Analysis Period (min)			15			

5: Ave 18.5 & Golden State
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↕		↗	↖		↗	↖		↗	↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.950			0.911			0.982			0.850	0.850
Flt Protected		0.995		0.950			0.950	0.958		0.950		
Satd. Flow (prot)	0	1761	0	3433	1194	0	1195	1659	0	1770	1583	1583
Flt Permitted		0.963		0.599			0.950	0.958		0.950		
Satd. Flow (perm)	0	1704	0	2165	1194	0	1195	1659	0	1770	1583	1583
Right Turn on Red			↘s			↘s			↘s		↘s	
Satd. Flow (RTOR)		43			108			8				424
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35		45		
Link Distance (ft)		412			683			1621		2125		
Travel Time (s)		8.0			13.3			31.6		32.2		
Volume (vph)	18	97	67	544	74	109	125	111	15	49	109	390
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	45%	45%	51%	2%	51%	2%	2%	2%
Adj. Flow (vph)	20	105	73	591	80	118	136	121	16	53	118	424
Lane Group Flow (vph)	0	198	0	591	198	0	136	137	0	53	118	424
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								2
Detector Phases	4	4		8	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	20.5	20.5
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	22.0	23.7	0.0	21.3	23.0	23.0
Total Split (%)	43.8%	43.8%	0.0%	43.8%	43.8%	0.0%	27.5%	29.6%	0.0%	26.6%	28.8%	28.8%
Maximum Green (s)	29.7	29.7		29.7	29.7		16.7	18.4		16.0	18.5	18.5
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							↘s	↘s		↘s	↘s	↘s
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Min	C-Min		C-Min	C-Min		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Efect Green (s)		41.3		41.3	41.3		14.7	17.6		9.0	12.0	12.0
Actuated g/C Ratio		0.52		0.52	0.52		0.18	0.22		0.11	0.15	0.15
v/c Ratio		0.22		0.53	0.30		0.62	0.37		0.26	0.50	0.71
Control Delay		11.0		15.1	6.7		41.9	25.9		35.1	37.4	10.3
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		11.0		15.1	6.7		41.9	25.9		35.1	37.4	10.3
LOS		B		B	A		D	C		D	D	B
Approach Delay		11.0			13.0			33.8		17.9		

5: Ave 18.5 & Golden State
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Approach LOS		B			B			C		B		
Queue Length 50th (ft)		39		72	13		63	55		25	55	0
Queue Length 95th (ft)		99		m178	m66		115	91		56	96	71
Internal Link Dist (ft)		332			603			1541		2045		
Turn Bay Length (ft)												
Base Capacity (vph)		901		1118	669		271	446		383	376	699
Starvation Cap Reductn		0		0	0		0	0		0	0	0
Spillback Cap Reductn		0		0	0		0	0		0	0	0
Storage Cap Reductn		0		0	0		0	0		0	0	0
Reduced v/c Ratio		0.22		0.53	0.30		0.50	0.31		0.14	0.31	0.61

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 24 (30%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 17.4
 Intersection Capacity Utilization 49.4%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 5: Ave 18.5 & Golden State



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.955			0.884			0.998				
Flt Protected		0.998			0.998						0.993	
Satd. Flow (prot)	0	1631	0	0	1596	0	0	1607	0	0	1626	0
Flt Permitted		0.991			0.993			0.996			0.853	
Satd. Flow (perm)	0	1620	0	0	1588	0	0	1601	0	0	1397	0
Right Turn on Red			vs			vs		vs			vs	
Satd. Flow (RTOR)		7			110			2				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1863			2105			5263			1327	
Travel Time (s)		28.2			31.9			79.7			20.1	
Volume (vph)	1	12	6	5	12	101	5	525	6	92	523	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	5%	5%	5%	18%	18%	18%	16%	16%	16%
Adj. Flow (vph)	1	13	7	5	13	110	5	571	7	100	568	2
Lane Group Flow (vph)	0	21	0	0	128	0	0	583	0	0	670	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5		20.5	20.5	
Total Split (s)	20.5	20.5	0.0	20.5	20.5	0.0	39.5	39.5	0.0	39.5	39.5	0.0
Total Split (%)	34.2%	34.2%	0.0%	34.2%	34.2%	0.0%	65.8%	65.8%	0.0%	65.8%	65.8%	0.0%
Maximum Green (s)	16.0	16.0		16.0	16.0		35.0	35.0		35.0	35.0	
Flow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.8			8.8			50.8			50.8	
Actuated g/C Ratio		0.13			0.13			0.76			0.76	
v/c Ratio		0.10			0.43			0.48			0.63	
Control Delay		15.4			10.4			5.3			8.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.4			10.4			5.3			8.3	
LOS		B			B			A			A	
Approach Delay		15.4			10.4			5.3			8.3	

6: Ave 18 & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		3			4			54			76	
Queue Length 95th (ft)		18			41			147			235	
Internal Link Dist (ft)		1783			2025			5183			1247	
Turn Bay Length (ft)												
Base Capacity (vph)		390			461			1225			1068	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.05			0.28			0.48			0.63	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 66.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 7.4

Intersection Capacity Utilization 79.7%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service D

Splits and Phases: 6: Ave 18 & Road 23



7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗↗			↖↖↖		↖↖↖	↖	↖↖			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	0.94	0.91	0.91	1.00	1.00	1.00
Frt					0.983			0.855	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3335	4940	0	0	4999	0	4894	1421	2826	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3335	4940	0	0	4999	0	4894	1421	2826	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)					22			36	65			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	385	1300	0	0	2052	256	2047	17	1413	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	418	1413	0	0	2230	278	2225	18	1536	0	0	0
Lane Group Flow (vph)	418	1413	0	0	2508	0	2225	530	1024	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5		20.5	20.5	20.5			
Total Split (s)	17.0	71.0	0.0	0.0	54.0	0.0	49.0	49.0	49.0	0.0	0.0	0.0
Total Split (%)	14.2%	59.2%	0.0%	0.0%	45.0%	0.0%	40.8%	40.8%	40.8%	0.0%	0.0%	0.0%
Maxum Green (s)	12.5	66.5			49.5		44.5	44.5	44.5			
ℳlow Time (s)	3.5	3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	ℳs				ℳs							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	13.0	67.0			50.0		45.0	45.0	45.0			
Actuated g/C Ratio	0.11	0.56			0.42		0.38	0.38	0.38			
v/c Ratio	1.16	0.51			1.20		1.21	0.95	0.93			
Control Delay	130.0	17.8			125.8		135.1	63.4	49.1			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	130.0	17.8			125.8		135.1	63.4	49.1			
LOS	F	B			F		F	E	D			
Approach Delay		43.4			125.8			101.7				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

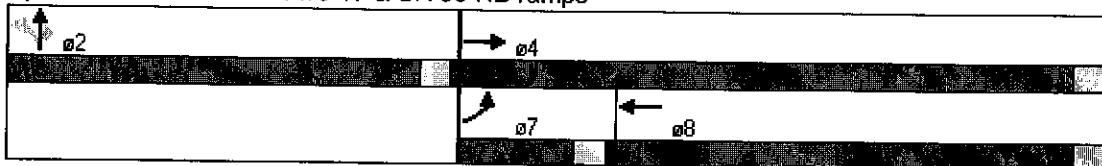
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			F			F				
Queue Length 50th (ft)	495	283			862		747	412	393			
Queue Length 95th (ft) m#281		m339			#955		#838	#664	#541			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	361	2758			2096		1835	555	1100			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	1.16	0.51			1.20		1.21	0.95	0.93			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 64 (53%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.21
 Intersection Signal Delay: 96.0
 Intersection Capacity Utilization 105.3%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service G

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



8: Ave 17 & SR 99 SB on-ramp
 Mitigated 2030 Project PM Alternative A

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗		↑↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1595	2262	0	3199	900	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1734	2459	0	3477	978	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		213			717							
pX, platoon unblocked	0.24						0.24	0.24		0.24	0.24	0.24
vC, conflicting volume	4455			4192			2893	6189	578	4544	8159	1648
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9115			4192			2549	16399	578	9488	24674	0
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	0			36			3	0	464	0	0	260
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3					
Volume Total	578	578	578	2459	1391	1391	1674					
Volume Left	0	0	0	0	0	0	0					
Volume Right	0	0	0	2459	0	0	978					
cSH	1700	1700	1700	1700	1700	1700	1700					
Volume to Capacity	0.34	0.34	0.34	1.45	0.82	0.82	0.98					
Queue Length 95th (ft)	0	0	0	0	0	0	0					
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Lane LOS												
Approach Delay (s)	0.0				0.0							
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		143.4%			ICU Level of Service				H			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.86	0.91	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	6285	4988	0	3273	2656
Flt Permitted					0.950	
Satd. Flow (perm)	0	6285	4988	0	3273	2656
Right Turn on Red				¶s		¶s
Satd. Flow (RTOR)						3
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	3440	3199	0	506	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	3739	3477	0	550	209
Lane Group Flow (vph)	0	3739	3477	0	550	209
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	93.0	93.0	0.0	27.0	27.0
Total Split (%)	0.0%	77.5%	77.5%	0.0%	22.5%	22.5%
Maximum Green (s)		87.7	87.7		22.4	22.4
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effect Green (s)		89.5	89.5		22.5	22.5
Actuated g/C Ratio		0.75	0.75		0.19	0.19
v/c Ratio		0.80	0.93		0.90	0.42
Control Delay		7.6	4.3		66.1	45.1
Queue Delay		3.0	2.3		0.0	0.0
Total Delay		10.6	6.6		66.1	45.1
LOS		B	A		E	D
Approach Delay		10.6	6.6		60.3	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative A

10/22/2008



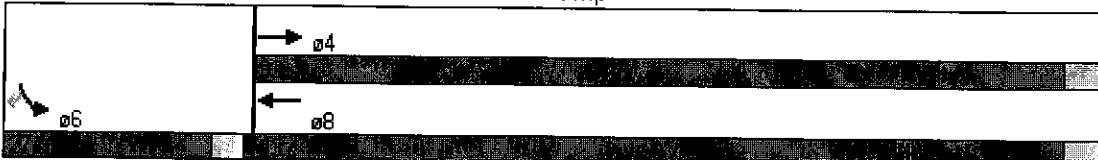
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		E	
Queue Length 50th (ft)		263	265		215	80
Queue Length 95th (ft)		m213	m119		#308	122
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		4687	3720		627	511
Starvation Cap Reductn		827	152		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.97	0.97		0.88	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 87 (73%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 13.6
 Intersection Capacity Utilization 82.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Frnt		0.987			0.955				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	4923	0	3335	4718	0	1752	1845	2760	3099	1681	1429
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	4923	0	3335	4718	0	1752	1845	2760	3099	1681	1429
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		14			131				488			11
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	14	1987	181	682	1897	811	174	125	741	712	103	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	15	2160	197	741	2062	882	189	136	805	774	112	11
Lane Group Flow (vph)	15	2357	0	741	2944	0	189	136	805	774	112	11
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5
Total Split (s)	8.5	49.5	0.0	24.0	65.0	0.0	25.8	20.5	20.5	26.0	20.7	20.7
Total Split (%)	7.1%	41.3%	0.0%	20.0%	54.2%	0.0%	21.5%	17.1%	17.1%	21.7%	17.3%	17.3%
Maxnum Green (s)	4.0	45.0		19.5	60.5		21.3	16.0	16.0	21.5	16.2	16.2
Flow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	4.5	45.5		20.0	66.1		25.3	16.5	16.5	22.0	13.2	13.2
Actuated g/C Ratio	0.04	0.38		0.17	0.55		0.21	0.14	0.14	0.18	0.11	0.11
v/c Ratio	0.12	1.26		1.33	1.11		0.51	0.54	1.01	1.36	0.61	0.07
Control Delay	58.0	153.3		197.9	74.3		48.6	56.7	54.0	212.4	64.3	23.1
Queue Delay	0.0	0.0		0.0	39.6		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	153.3		197.9	113.9		48.6	56.7	54.0	212.4	64.3	23.1
LOS	E	F		F	F		D	E	D	F	E	C
Approach Delay		152.7			130.8			53.4			191.6	

10: Ave 17 & GS Blvd
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	6	#40		#383	#891		131	99	#459	#407	84	0
Queue Length 95th (ft)	18	#935		m#431	#1084		215	166	#311	#530	141	18
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	126	1875		556	2658		369	254	800	568	234	208
Starvation Cap Reductn	0	0		0	199		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.12	1.26		1.33	1.20		0.51	0.54	1.01	1.36	0.48	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 114 (95%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.36
 Intersection Signal Delay: 133.2
 Intersection Capacity Utilization 102.1%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service G

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗	↖	↕↕		↖	↗			↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989			0.965				0.850
Flt Protected		0.997		0.950			0.950				0.998	
Satd. Flow (prot)	0	3529	1583	1687	3337	0	1597	1623	0	0	1663	1417
Flt Permitted		0.849		0.220			0.543				0.977	
Satd. Flow (perm)	0	3005	1583	391	3337	0	913	1623	0	0	1628	1417
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)			342		18			32				96
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	50	772	315	107	730	59	122	414	125	9	243	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	54	839	342	116	793	64	133	450	136	10	264	326
Lane Group Flow (vph)	0	893	342	116	857	0	133	586	0	0	274	326
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phases	4	4	4	8	8		2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3	21.3	21.3	21.3		21.3	21.3		21.3	21.3	21.3
Total Split (s)	30.0	30.0	30.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%
Maximum Green (s)	24.7	24.7	24.7	24.7	24.7		24.7	24.7		24.7	24.7	24.7
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	0
Act Effct Green (s)		21.7	21.7	21.7	21.7		22.0	22.0			22.0	22.0
Actuated g/C Ratio		0.42	0.42	0.42	0.42		0.42	0.42			0.42	0.42
v/c Ratio		0.71	0.40	0.72	0.61		0.34	0.83			0.40	0.50
Control Delay		16.9	3.1	42.8	14.3		14.3	26.4			13.3	11.3
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		16.9	3.1	42.8	14.3		14.3	26.4			13.3	11.3
LOS		B	A	D	B		B	C			B	B
Approach Delay		13.1			17.7			24.1			12.2	

11: Ave 17 & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

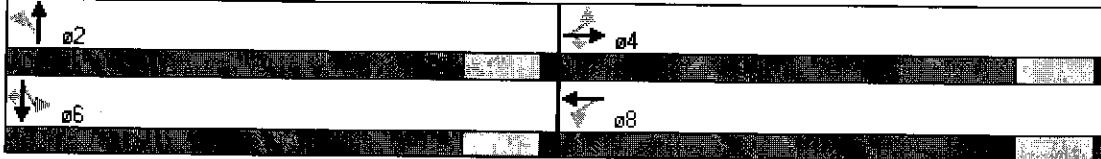
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		130	0	32	115		30	166			64	53
Queue Length 95th (ft)		189	39	#112	166		68	#341			116	115
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1403	922	182	1568		429	779			764	716
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.64	0.37	0.64	0.55		0.31	0.75			0.36	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 52.2
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 16.4
 Intersection Capacity Utilization 100.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service G

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.969			0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.734			0.705		0.950			0.950		
Satd. Flow (perm)	0	1367	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			34			134		62			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	123	27	790	207	192	885	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	134	29	859	225	209	962	45
Lane Group Flow (vph)	0	41	34	0	242	134	29	1084	0	209	1007	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	26.1	0.0	13.0	30.2	0.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	34.8%	34.8%	14.8%	43.5%	0.0%	21.7%	50.3%	0.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.0	21.2		8.1	25.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		14.6	14.6		14.6	14.6	4.9	21.5		9.0	31.1	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.08	0.38		0.16	0.54	
v/c Ratio		0.12	0.08		0.72	0.27	0.21	0.82		0.75	0.52	
Control Delay		17.1	7.1		33.5	5.4	30.4	22.1		44.3	11.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.1	7.1		33.5	5.4	30.4	22.1		44.3	11.1	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.6			23.5			22.3			16.8	
Approach LOS		B			C			C			B	

12: Ellis OC & Road 26
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		11	0		77	0	10	172		74	96	
Queue Length 95th (ft)		31	17		#164	34	32	#280		#172	200	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		390	476		375	547	140	1355		281	1919	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.11	0.07		0.65	0.24	0.21	0.80		0.74	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 57.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 19.8
 Intersection Capacity Utilization 68.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.868				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						223		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	791	452	0	0	378	205	276	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	860	491	0	0	411	223	300	18	130	0	0	0
Lane Group Flow (vph)	860	491	0	0	411	223	300	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.64	0.21			0.58	0.45	0.37	0.31				
Control Delay	13.4	1.2			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.4	1.2			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.7			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative A

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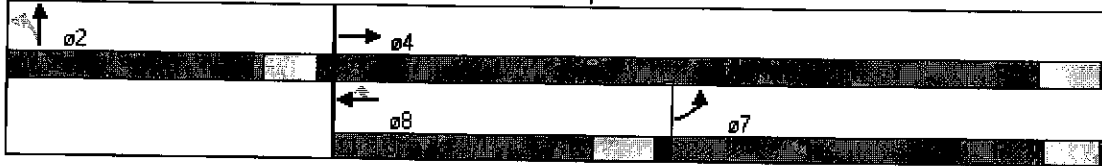
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	157	6			85	0	55	6				
Queue Length 95th (ft)	239	14			118	48	89	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	563	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.64	0.21			0.46	0.40	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 53.6%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



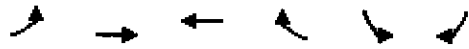
15: Ellis OC & SR 99 SB ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frts						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Fit Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				∅s		∅s
Satd. Flow (RTOR)						351
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1013	572	0	230	715
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1101	622	0	250	777
Lane Group Flow (vph)	0	1101	622	0	250	777
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.5	37.5	0.0	32.5	32.5
Total Split (%)	0.0%	53.6%	53.6%	0.0%	46.4%	46.4%
Maximum Green (s)		32.6	32.6		28.0	28.0
Yellow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.5	33.5		28.5	28.5
Actuated g/C Ratio		0.48	0.48		0.41	0.41
v/c Ratio		0.65	0.37		0.18	0.58
Control Delay		16.1	1.2		13.7	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.1	1.2		13.7	10.3
LOS		B	A		B	B
Approach Delay		16.1	1.2		11.2	
Approach LOS		B	A		B	

15: Ellis OC & SR 99 SB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008



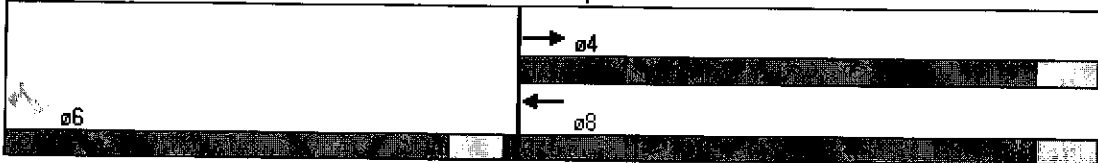
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		177	0		34	71
Queue Length 95th (ft)		241	7		56	127
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1694	1694		1398	1343
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.37		0.18	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 53.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps



17: Ellis OC & Aviation Drive
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	0.95	0.97	0.97	0.95	1.00	1.00	0.88
Frt			0.850		0.902			0.987			0.850	0.850
Flt Protected	0.950			0.950			0.950	0.956		0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3192	0	3433	3410	0	1770	1583	2787
Flt Permitted	0.950			0.950			0.950	0.956		0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3192	0	3433	3410	0	1770	1583	2787
Right Turn on Red			⊘s			⊘s		⊘s			⊘s	
Satd. Flow (RTOR)			175		251			7				718
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			1080			1293		1356		
Travel Time (s)		18.2			18.4			22.0		23.1		
Volume (vph)	54	170	161	809	121	231	382	631	58	175	628	1014
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	185	175	879	132	251	415	686	63	190	683	1102
Lane Group Flow (vph)	59	185	175	879	383	0	415	749	0	190	683	1102
Turn Type	Prot		Perm	Prot			Prot			Prot		custom
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases			4								2	2
Detector Phases	7	4	4	3	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	20.9	20.9	8.5	20.9		8.5	20.9		20.9	20.9	20.9
Total Split (s)	14.6	22.0	22.0	41.0	48.4	0.0	22.0	56.7	0.0	30.3	65.0	65.0
Total Split (%)	9.7%	14.7%	14.7%	27.3%	32.3%	0.0%	14.7%	37.8%	0.0%	20.2%	43.3%	43.3%
Maximum Green (s)	10.1	17.1	17.1	36.5	43.5		17.5	51.8		25.4	60.1	60.1
Yellow Time (s)	3.5	3.9	3.9	3.5	3.9		3.5	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s	⊘s
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		Max	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0		0	0	0
Act Effect Green (s)	9.5	13.8	13.8	37.0	43.5		18.0	52.7		26.3	61.0	61.0
Actuated g/C Ratio	0.06	0.09	0.09	0.25	0.30		0.12	0.36		0.18	0.42	0.42
v/c Ratio	0.52	0.55	0.57	1.01	0.34		0.98	0.61		0.60	1.03	0.70
Control Delay	82.5	69.5	15.7	86.2	14.6		101.7	40.5		64.0	84.6	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	82.5	69.5	15.7	86.2	14.6		101.7	40.5		64.0	84.6	13.7
LOS	F	E	B	F	B		F	D		E	F	B
Approach Delay		48.8			64.5			62.3		43.1		
Approach LOS		D			E			E		D		

17: Ellis OC & Aviation Drive
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	55	90	0	440	50		205	296		168	693	169
Queue Length 95th (ft)	107	132	74	#605	94		#327	377		260	#975	270
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	126	425	344	871	1161		424	1237		319	662	1584
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.44	0.51	1.01	0.33		0.98	0.61		0.60	1.03	0.70

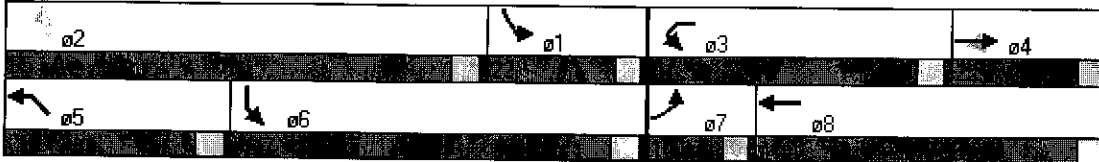
Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 145.8
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 53.8
 Intersection Capacity Utilization Err%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service H

- Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	3400	3505	0	0	3539	1583	1681	1686	2787	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	3400	3505	0	0	3539	1583	1681	1686	2787	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)						785			34			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	305	1687	0	0	1458	825	522	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	332	1834	0	0	1585	897	567	7	807	0	0	0
Lane Group Flow (vph)	332	1834	0	0	1585	897	284	290	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	13.8	59.7	0.0	0.0	45.9	45.9	30.3	30.3	30.3	0.0	0.0	0.0
Total Split (%)	15.3%	66.3%	0.0%	0.0%	51.0%	51.0%	33.7%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	9.2	55.1			41.3	41.3	25.8	25.8	25.8			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.8	55.7			41.9	41.9	26.3	26.3	26.3			
Actuated g/C Ratio	0.11	0.62			0.47	0.47	0.29	0.29	0.29			
v/c Ratio	0.90	0.85			0.96	0.78	0.58	0.59	0.96			
Control Delay	49.5	13.1			39.1	8.2	32.7	33.0	54.7			
Queue Delay	0.0	1.7			0.0	0.0	0.0	0.0	0.0			
Total Delay	49.5	14.8			39.1	8.2	32.7	33.0	54.7			
LOS	D	B			D	A	C	C	D			
Approach Delay		20.2			27.9			45.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

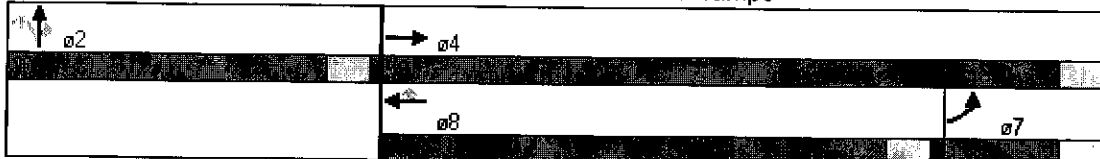
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D				
Queue Length 50th (ft)	95	241			442	35	144	147	246			
Queue Length 95th (ft)	m100	m264			#613	180	231	235	#383			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	370	2169			1648	1157	491	493	838			
Starvation Cap Reductn	0	184			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.90	0.92			0.96	0.78	0.58	0.59	0.96			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 29.2
 Intersection Capacity Utilization 143.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↘	↑↑					↘↘	↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	
Trailing Detector (ft)		0	0	0	0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850								0.854	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	3273	1516	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	3273	1516	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			673								21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1208	702	290	1690	0	0	0	0	784	9	324
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1313	763	315	1837	0	0	0	0	852	10	352
Lane Group Flow (vph)	0	1313	763	315	1837	0	0	0	0	852	362	0
Turn Type			Perm	Prot						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4							6		
Detector Phases		4	4	3	8					6	6	
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	
Total Split (s)	0.0	40.0	40.0	21.0	61.0	0.0	0.0	0.0	0.0	29.0	29.0	0.0
Total Split (%)	0.0%	44.4%	44.4%	23.3%	67.8%	0.0%	0.0%	0.0%	0.0%	32.2%	32.2%	0.0%
Maximum Green (s)		35.4	35.4	16.4	56.4					24.5	24.5	
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Recall Mode		C-Max	C-Max	None	C-Max					None	None	
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0					0	0	
Act Effect Green (s)		36.0	36.0	17.0	57.0					25.0	25.0	
Actuated g/C Ratio		0.40	0.40	0.19	0.63					0.28	0.28	
v/c Ratio		0.93	0.74	0.94	0.82					0.94	0.83	
Control Delay		38.6	8.1	70.9	5.2					50.9	46.8	
Queue Delay		0.6	0.0	0.0	1.1					0.0	0.0	
Total Delay		39.1	8.1	70.9	6.3					50.9	46.8	
LOS		D	A	E	A					D	D	
Approach Delay		27.7			15.8						49.7	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						D	
Queue Length 50th (ft)		366	32	191	151					243	182	
Queue Length 95th (ft)		#511	157	m#234	m164					#360	#334	
Internal Link Dist (ft)		1134			311			1354				806
Turn Bay Length (ft)												
Base Capacity (vph)		1416	1037	334	2241					909	436	
Starvation Cap Reductn		0	0	0	192					0	0	
Spillback Cap Reductn		14	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.94	0.74	0.94	0.90					0.94	0.83	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 27.9
 Intersection Capacity Utilization 143.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H













95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.937			0.978				
Flt Protected					0.975						0.995	
Satd. Flow (prot)	0	1736	0	0	1653	0	0	1689	0	0	1630	0
Flt Permitted					0.859						0.901	
Satd. Flow (perm)	0	1736	0	0	1456	0	0	1689	0	0	1476	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		1			48			22			490	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2755			2781			7924			7936	
Travel Time (s)		47.0			47.4			120.1			120.2	
Volume (vph)	0	1	1	56	1	51	0	477	92	53	490	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	10%	10%	10%	16%	16%	16%
Adj. Flow (vph)	0	1	1	61	1	55	0	518	100	58	533	0
Lane Group Flow (vph)	0	2	0	0	117	0	0	618	0	0	591	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	27.9	27.9	0.0	27.9	27.9	0.0	62.1	62.1	0.0	62.1	62.1	0.0
Total Split (%)	31.0%	31.0%	0.0%	31.0%	31.0%	0.0%	69.0%	69.0%	0.0%	69.0%	69.0%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		56.8	56.8		56.8	56.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.5			10.5			47.6			47.6	
Actuated g/C Ratio		0.16			0.16			0.74			0.74	
v/c Ratio		0.01			0.43			0.49			0.54	
Control Delay		15.5			15.8			6.0			7.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.5			15.8			6.0			7.2	
LOS		B			B			A			A	
Approach Delay		15.5			15.8			6.0			7.2	

20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A				A
Queue Length 50th (ft)		0			17			68				73
Queue Length 95th (ft)		5			62			174				194
Internal Link Dist (ft)		2675			2701			7844				7856
Turn Bay Length (ft)												
Base Capacity (vph)		549			493			1375				1198
Starvation Cap Reductn		0			0			0				0
Spillback Cap Reductn		0			0			0				0
Storage Cap Reductn		0			0			0				0
Reduced v/c Ratio		0.00			0.24			0.45				0.49

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 64.7
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 82.4%
 Analysis Period (min) 15
























Intersection LOS: A
 ICU Level of Service E

Splits and Phases: 20: Ave 15.5/Cleveland & Road 23



21: SR 145/Madera & SR 99 NB ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 	 			 					 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Fr						0.850					0.853	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3539	1583	0	0	0	3433	1589	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3400	3505	0	0	3539	1583	0	0	0	3433	1589	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						354					168	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	1213	810	0	0	838	326	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1318	880	0	0	911	354	0	0	0	397	3	168
Lane Group Flow (vph)	1318	880	0	0	911	354	0	0	0	397	171	0
Turn Type	Prot					Perm				Perm		
Protected Phases	5	2			6						8	
Permitted Phases						6					8	
Detector Phases	5	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	20.6	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	23.4	44.9			16.9	16.9				16.0	16.0	
Yellow Time (s)	3.6	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	MaxC-Max				C-MaxC-Max					None	None	
Walk Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0	0				0	0	
Act Effct Green (s)	27.0	48.5			17.5	17.5				13.5	13.5	
Actuated g/C Ratio	0.39	0.69			0.25	0.25				0.19	0.19	
v/c Ratio	1.01	0.36			1.03	0.54				0.60	0.39	
Control Delay	36.2	0.6			66.4	6.2				29.3	7.1	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	36.2	0.6			66.4	6.2				29.3	7.1	
LOS	D	A			E	A				C	A	
Approach Delay		21.9			49.6						22.6	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		C			D						C	
Queue Length 50th (ft)	100	3			216	0				81	1	
Queue Length 95th (ft) m#392		m8			#336	59				115	45	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1309	2426			885	661				809	503	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	1.01	0.36			1.03	0.54				0.49	0.34	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 44 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 30.7
 Intersection Capacity Utilization 78.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.95	1.00
Frt		0.909	0.850					0.998				0.850
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3367	3022	1413	0	0	0	3433	5075	0	1752	3505	1568
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3367	3022	1413	0	0	0	3433	5075	0	1752	3505	1568
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		539	588					4				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	545	358	1146	0	0	0	343	1474	24	214	462	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	592	389	1246	0	0	0	373	1602	26	233	502	573
Lane Group Flow (vph)	592	995	640	0	0	0	373	1628	0	233	502	573
Turn Type	Perm		Perm				Prot			Prot		Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		20.6	20.6	20.6
Total Split (s)	21.4	21.4	21.4	0.0	0.0	0.0	20.6	28.0	0.0	20.6	28.0	28.0
Total Split (%)	30.6%	30.6%	30.6%	0.0%	0.0%	0.0%	29.4%	40.0%	0.0%	29.4%	40.0%	40.0%
Maximum Green (s)	16.9	16.9	16.9				16.0	23.4		16.0	23.4	23.4
Flow Time (s)	3.5	3.5	3.5				3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		Max	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0		0	0	0
Act Effct Green (s)	17.4	17.4	17.4				16.6	24.0		16.6	24.0	24.0
Actuated g/C Ratio	0.25	0.25	0.25				0.24	0.34		0.24	0.34	0.34
v/c Ratio	0.71	0.86	0.81				0.46	0.93		0.56	0.42	0.63
Control Delay	26.7	17.5	11.7				25.0	34.1		20.1	4.3	5.5
Queue Delay	15.7	11.3	2.1				0.0	0.0		0.0	0.0	3.0
Total Delay	42.3	28.8	13.8				25.0	34.1		20.1	4.3	8.6
LOS	D	C	B				C	C		C	A	A
Approach Delay		28.1						32.4			9.0	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project PM Alternative A

10/22/2008

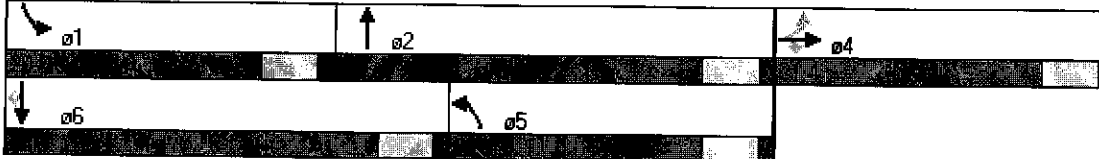
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			A	
Queue Length 50th (ft)	107	84	64				71	243		46	3	1
Queue Length 95th (ft)	m161	#219	m#142				108	#344		m60	m17	m0
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	837	1156	793				814	1743		415	1202	914
Starvation Cap Reductn	237	154	64				0	0		0	0	234
Spillback Cap Reductn	0	0	0				0	0		0	0	3
Storage Cap Reductn	0	0	0				0	0		0	0	0
Reduced v/c Ratio	0.99	0.99	0.88				0.46	0.93		0.56	0.42	0.84

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 37 (53%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 25.1
 Intersection Capacity Utilization 73.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVe 14/Olive & SR 99 SB off-ramp
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1361
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1361
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						69
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1112	870	0	937	392
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1209	946	0	1018	426
Lane Group Flow (vph)	0	1209	946	0	1018	426
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	36.0	36.0	0.0	34.0	34.0
Total Split (%)	0.0%	51.4%	51.4%	0.0%	48.6%	48.6%
Maximum Green (s)		31.5	31.5		29.5	29.5
Flow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effect Green (s)		34.4	34.4		27.6	27.6
Actuated g/C Ratio		0.49	0.49		0.39	0.39
v/c Ratio		0.70	0.54		0.80	0.74
Control Delay		17.1	4.2		23.8	23.1
Queue Delay		0.1	0.6		0.2	0.0
Total Delay		17.3	4.8		23.9	23.1
LOS		B	A		C	C
Approach Delay		17.3	4.8		23.7	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative A

10/22/2008

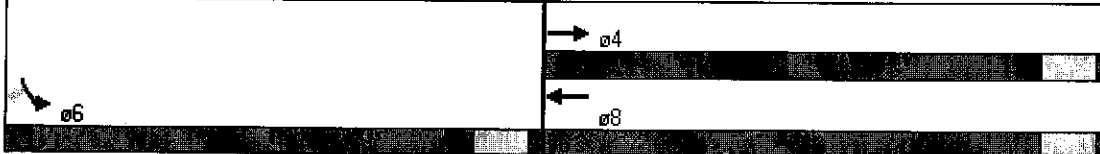
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		214	38		180	130
Queue Length 95th (ft)		290	74		248	242
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1738	1738		1389	623
Starvation Cap Reductn		0	390		0	0
Spillback Cap Reductn		70	0		40	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.72	0.70		0.75	0.68

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 16.6
 Intersection Capacity Utilization 68.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.894			0.990			0.958	
Flt Protected	0.950				0.997			0.999		0.950		
Satd. Flow (prot)	1752	1808	0	0	1540	0	0	1693	0	1556	1569	0
Flt Permitted	0.642				0.986			0.994		0.584		
Satd. Flow (perm)	1184	1808	0	0	1523	0	0	1684	0	957	1569	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			140			8			38	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2632			2680			5376			7924	
Travel Time (s)		44.9			45.7			81.5			120.1	
Volume (vph)	110	77	12	10	26	129	5	211	17	142	193	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	10%	10%	10%	11%	11%	11%	16%	16%	16%
Adj. Flow (vph)	120	84	13	11	28	140	5	229	18	154	210	82
Lane Group Flow (vph)	120	97	0	0	179	0	0	252	0	154	292	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	32.9	32.9	0.0	32.9	32.9	0.0	37.1	37.1	0.0	37.1	37.1	0.0
Total Split (%)	47.0%	47.0%	0.0%	47.0%	47.0%	0.0%	53.0%	53.0%	0.0%	53.0%	53.0%	0.0%
Maximum Green (s)	28.0	28.0		28.0	28.0		31.8	31.8		31.8	31.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.6	13.6			13.3			31.5		31.5	31.5	
Actuated g/C Ratio	0.26	0.26			0.25			0.65		0.65	0.65	
v/c Ratio	0.39	0.20			0.36			0.23		0.25	0.28	
Control Delay	12.6	8.3			5.4			5.8		7.1	5.7	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	12.6	8.3			5.4			5.8		7.1	5.7	
LOS	B	A			A			A		A	A	
Approach Delay		10.7			5.4			5.8			6.2	

24: Ave 14/Olive & Road 23
 Mitigated 2030 Project PM Alternative A

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)	12	8			4			22		14	23	
Queue Length 95th (ft)	50	36			36			68		53	75	
Internal Link Dist (ft)		2552			2600			5296			7844	
Turn Bay Length (ft)												
Base Capacity (vph)	579	891			816			1313		746	1230	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.21	0.11			0.22			0.19		0.21	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 48.1

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 6.9

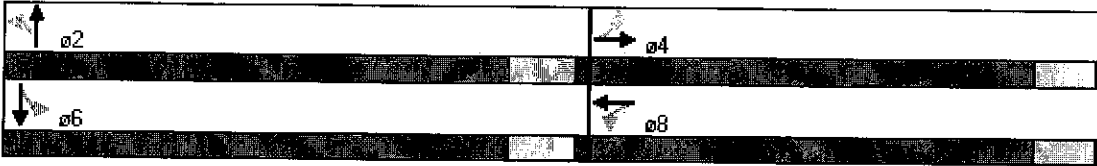
Intersection Capacity Utilization 56.4%

Analysis Period (min) 15

Intersection LOS: A

















ICU Level of Service B

Splits and Phases: 24: Ave 14/Olive & Road 23



25: SB Ramps & GS Blvd
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 			 	 	 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.676	
Satd. Flow (perm)	3335	1538	1759	1495	1235	1827
Right Turn on Red		ℳs		ℳs		
Satd. Flow (RTOR)		127		633		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	806		408			1104
Travel Time (s)	18.3		9.3			25.1
Volume (vph)	1368	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	1487	153	124	633	241	208
Lane Group Flow (vph)	1487	153	124	633	241	208
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	51.7	51.7	58.3	58.3	58.3	58.3
Total Split (%)	47.0%	47.0%	53.0%	53.0%	53.0%	53.0%
Maximum Green (s)	47.2	47.2	53.8	53.8	53.8	53.8
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	77.3	77.3	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.70	0.70	0.22	0.22	0.22	0.22
v/c Ratio	0.63	0.14	0.31	0.77	0.87	0.51
Control Delay	11.6	2.4	25.7	7.0	68.6	40.2
Queue Delay	0.2	0.0	0.0	0.4	0.0	0.0
Total Delay	11.8	2.4	25.7	7.4	68.6	40.2
LOS	B	A	C	A	E	D
Approach Delay	10.9		10.4			55.4

25: SB Ramps & GS Blvd
 Mitigated 2030 Project PM Alternative A

10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			E
Queue Length 50th (ft)	253	5	47	39	166	130
Queue Length 95th (ft)	445	32	m48	m38	231	178
Internal Link Dist (ft)	726		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2342	1118	868	1059	610	902
Starvation Cap Reductn	0	0	0	121	0	0
Spillback Cap Reductn	197	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.14	0.14	0.67	0.40	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 53 (48%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 17.8
 Intersection Capacity Utilization 64.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.94	1.00	1.00
Frt		0.990				0.850		0.872			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3309	0	1687	4848	1509	1752	1609	0	4848	1594	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	4848	1509	1752	1609	0	4848	1594	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		6				476		104			114	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1426	28	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1550	30	114
Lane Group Flow (vph)	261	446	0	21	703	476	47	122	0	1550	144	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						
Detector Phases	7	4		3	8	8	2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.6	20.6		20.6	20.6	20.6	20.5	20.5		20.5	20.5	
Total Split (s)	24.0	26.9	0.0	20.6	23.5	23.5	20.5	20.5	0.0	42.0	42.0	0.0
Total Split (%)	21.8%	24.5%	0.0%	18.7%	21.4%	21.4%	18.6%	18.6%	0.0%	38.2%	38.2%	0.0%
Maximum Green (s)	19.4	22.3		16.0	18.9	18.9	16.0	16.0		37.5	37.5	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	19.3	38.4		7.4	20.2	20.2	16.5	16.5		38.0	38.0	
Actuated g/C Ratio	0.18	0.35		0.07	0.18	0.18	0.15	0.15		0.35	0.35	
v/c Ratio	0.89	0.38		0.18	0.79	0.72	0.18	0.37		0.93	0.23	
Control Delay	75.3	29.0		48.8	37.1	13.4	42.9	14.7		37.9	3.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		12.7	0.0	
Total Delay	75.3	29.0		48.8	37.1	13.4	42.9	14.7		50.6	3.8	
LOS	E	C		D	D	B	D	B		D	A	
Approach Delay		46.1			27.9			22.5			46.6	

26: Ave 12 & GS Blvd
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	180	112		15	129	68	29	11		379	21	
Queue Length 95th (ft)	#324	187		m21	196	153	65	64		#454	m10	
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	304	1160		255	888	665	263	330		1675	625	
Starvation Cap Reductn	0	0		0	0	0	0	0		147	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.86	0.38		0.08	0.79	0.72	0.18	0.37		1.01	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 10 (9%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 39.5
 Intersection Capacity Utilization 71.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.86	0.86	0.97	0.95	0.95	1.00	1.00	1.00
Fr					0.932	0.850		0.852	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3367	4988	0	0	4393	1335	3273	1437	1434	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3367	4988	0	0	4393	1335	3273	1437	1434	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)					237	633		36	36			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	361	1577	0	0	714	1172	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	392	1714	0	0	776	1274	424	2	392	0	0	0
Lane Group Flow (vph)	392	1714	0	0	1413	637	424	198	196	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	20.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	26.8	78.3	0.0	0.0	51.5	51.5	31.7	31.7	31.7	0.0	0.0	0.0
Total Split (%)	24.4%	71.2%	0.0%	0.0%	46.8%	46.8%	28.8%	28.8%	28.8%	0.0%	0.0%	0.0%
Maximum Green (s)	22.3	73.8			47.0	47.0	27.2	27.2	27.2			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0			
Act Effct Green (s)	18.5	81.2			58.8	58.8	20.8	20.8	20.8			
Actuated g/C Ratio	0.17	0.74			0.53	0.53	0.19	0.19	0.19			
v/c Ratio	0.69	0.47			0.57	0.63	0.69	0.66	0.65			
Control Delay	51.6	3.6			16.3	4.9	47.0	43.6	43.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	51.6	3.6			16.3	4.9	47.0	43.6	43.3			
LOS	D	A			B	A	D	D	D			
Approach Delay		12.5			12.7			45.3				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2030 Project PM Alternative A

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			D				
Queue Length 50th (ft)	150	88			203	1	145	113	111			
Queue Length 95th (ft)	m171	m115			316	98	182	182	180			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	698	3684			2458	1008	824	389	388			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.56	0.47			0.57	0.63	0.51	0.51	0.51			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 59 (54%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 18.0
 Intersection Capacity Utilization 76.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 37

MITIGATED 2030 PROJECT CONDITIONS

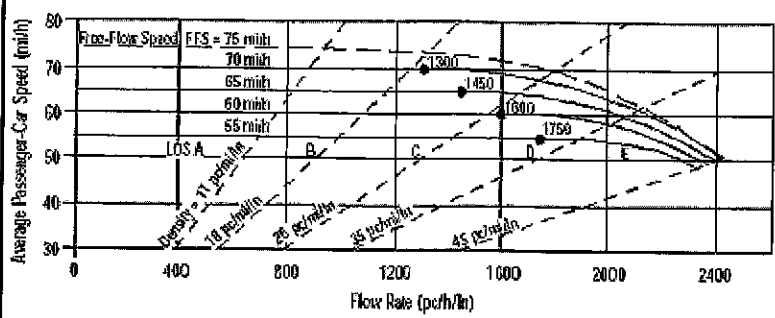
MADERA SITE - ALTERNATIVE B

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET																								
		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>		Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	7/19/06	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2030 Project Alt B AM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt B																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	4243	veh/h	Peak-Hour Factor, PHF 0.88																					
AADT		veh/day	%Trucks and Buses, P _T 24																					
Peak-Hr Prop. of AADT, K			%RVs, P _R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV = AADT * K * D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW} mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC} mi/h																					
Interchange Density	0.50	l/mi	f _{ID} mi/h																					
Number of Lanes, N	4		f _N mi/h																					
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF * N * f _p)	HV * 1355 pc/h/ln	Design LOS																						
S	70.0 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h																					
D = v _p / S	19.4 pc/mi/ln	f _p	mi/h																					
LOS	C	S	mi/h																					
		D = v _p / S	pc/mi/ln																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET																						
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v _p	LOS, S, D																				
Design (N)	FFS, LOS, v _p	N, S, D																				
Design (v _p)	FFS, LOS, N	v _p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v _p)	FFS, LOS, N	v _p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																			
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt B PM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt b																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4998	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P _T																			
Peak-Hr Prop. of AADT, K			%RVs, P _R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade %																			
Driver type adjustment	1.00		Length mi																			
			Up/Down %																			
Calculate Flow Adjustments																						
f _p	1.00	E _R	1.2																			
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f _{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																			
Interchange Density	0.50	l/mi	f _{ID}																			
Number of Lanes, N	4		f _N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
v _p = (V or DDHV) / (PHF * N * f _p)		Design LOS																				
f _p	1596	v _p = (V or DDHV) / (PHF * N * f _p)																				
S	69.5	f _p																				
D = v _p / S	23.0	S																				
LOS	C	D = v _p / S																				
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E _R - Ekibits 23-8, 23-10	f _{LW} - Ekibit 23-4																			
V - Hourly volume	D - Density	E _T - Ekibits 23-8, 23-10, 23-11	f _{LC} - Ekibit 23-5																			
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Ekibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Ekibits 23-2, 23-3	f _{ID} - Ekibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt B AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3903	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

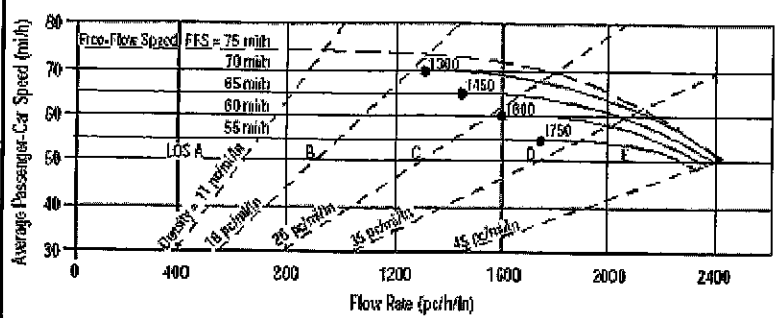
Calculate Flow Adjustments			
f_p	1.00		E_R 1.2
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$ 0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	4	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$ 1246 pc/h/ln	Design LOS	
S	70.0 mi/h	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$ pc/h
$D = v_p / S$	17.8 pc/mi/ln	S	mi/h
LOS	B	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt B PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5542	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P_T
Peak-Hr Prop. of AADT, K			%RVs, P_R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT * K * D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

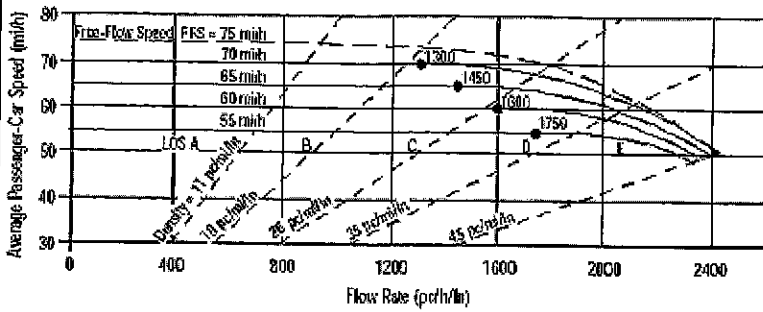
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T + (E_T - 1) * P_R * (E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	4	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	$HV * X$ 1770 pc/h/ln	Design LOS	
S	68.2 mi/h	$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	$HV * X$ pc/h
$D = v_p / S$	26.0 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibit 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibit 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibit 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt B AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4226	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT * K * D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

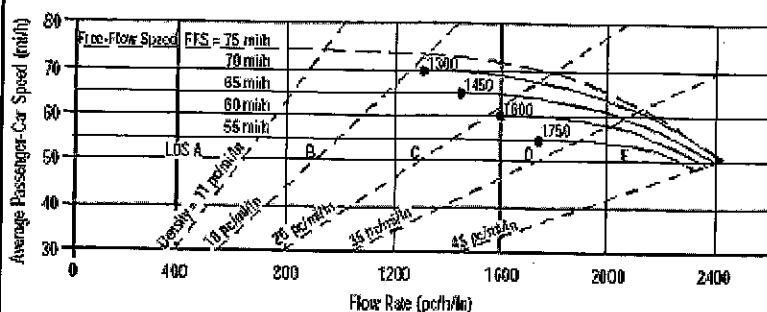
LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X 1349 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * X pc/h
D = v _p / S	19.3 pc/mi/ln	f _p	
LOS	C	S	mi/h
		D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibit 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibit 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibit 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																										
			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																								
Operational (LOS)	FFS, N, v_p	LOS, S, D																								
Design (N)	FFS, LOS, v_p	N, S, D																								
Design (v_p)	FFS, LOS, N	v_p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v_p)	FFS, LOS, N	v_p , S, D																								
General Information			Site Information																							
Analyst	R Davis		Highway/Direction of Travel	SR 99 Northbound																						
Agency or Company	TPG Consulting, Inc.		From/To	between Ave 18 1/2 & Ave 17																						
Date Performed	9/22/08		Jurisdiction	Caltrans																						
Analysis Time Period	Mit 2030 Project Alt B PM		Analysis Year	2030																						
Project Description 04-837.2 Northfork Casino Alt B																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	4850	veh/h	Peak-Hour Factor, PHF	0.88																						
AAADT		veh/day	%Trucks and Buses, P_T	24																						
Peak-Hr Prop. of AAADT, K			%RVs, P_R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AAADT * K * D		veh/h	Grade %	Length	mi																					
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f_p	1.00		E_R	1.2																						
E_T	1.5		$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f_{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h																						
Interchange Density	0.50	l/mi	f_{ID}	mi/h																						
Number of Lanes, N	4		f_N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$	1549	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$																					
S		69.6	mi/h	f_p	mi/h																					
$D = v_p / S$		22.2	pc/mi/ln	S	mi/h																					
LOS		C		$D = v_p / S$	pc/mi/ln																					
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E_R - Ekbibits 23-8, 23-10	f_{LW} - Ekbibit 23-4																						
V - Hourly volume	D - Density		E_T - Ekbibits 23-8, 23-10, 23-11	f_{LC} - Ekbibit 23-5																						
v_p - Flow rate	FFS - Free-flow speed		f_p - Page 23-12	f_N - Ekbibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v_p - Ekbibits 23-2, 23-3	f_{ID} - Ekbibit 23-7																						
DDHV - Directional design hour volume																										

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different levels of service (LOS) and free-flow speeds (FFS). The curves are labeled with LOS A, B, C, D, and E, and FFS values of 75, 70, 65, 60, and 55 mi/h. Dashed lines indicate density values of 71, 70, 65, 60, 55, and 45 pc/mi/ln.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
Design (v_p)	FFS, LOS, N	v_p , S, D																				
Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt B AM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt B																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	3855	veh/h	Peak-Hour Factor, PHF 0.88																			
AAADT		veh/day	%Trucks and Buses, P_T 24																			
Peak-Hr Prop. of AAADT, K			%RVs, P_R 2																			
Peak-Hr Direction Prop, D			General Terrain: Level																			
DDHV = AAADT * K * D		veh/h	Grade % Length mi																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_p	1.00	E_R	1.2																			
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW} mi/h																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC} mi/h																			
Interchange Density	0.50	l/mi	f_{ID} mi/h																			
Number of Lanes, N	4		f_N mi/h																			
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																			
Base free-flow Speed, BFFS		mi/h																				
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	$HV * X$ 1231 pc/h/ln	Design LOS																				
S	70.0 mi/h	$v_p = V \text{ or DDHV} / (PHF * N * f_p)$	$HV * X$ pc/h																			
$D = v_p / S$	17.6 pc/mi/ln	f_p	mi/h																			
LOS	B	$D = v_p / S$	pc/mi/ln																			
		Required Number of Lanes, N																				
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																			
DDHV - Directional design hour volume																						

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information

Analyst: R Davis
 Agency or Company: TPG Consulting, Inc.
 Date Performed: 9/22/08
 Analysis Time Period: Mit 2030 Project Alt B PM

Site Information

Highway/Direction of Travel: SR 99 Southbound
 From/To: between Ave 18 1/2 & Ave 17
 Jurisdiction: Caltrans
 Analysis Year: 2030

Project Description: 04-837.2 Northfork Casino Alt B

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	5499	veh/h	Peak-Hour Factor, PHF	0.88
AADT		veh/day	%Trucks and Buses, P_T	24
Peak-Hr Prop. of AADT, K			%RVs, P_R	2
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT * K * D		veh/h	Grade %	Length mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	l/mi
Number of Lanes, N	4	
FFS (measured)	70.0	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	70.0	mi/h

LOS and Performance Measures

Operational (LOS)			
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$	1756	pc/h/ln
S		68.3	mi/h
$D = v_p / S$		25.7	pc/mi/ln
LOS		C	

Design (N)

Design (N)			
Design LOS			
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$		pc/h
S			mi/h
$D = v_p / S$			pc/mi/ln
Required Number of Lanes, N			

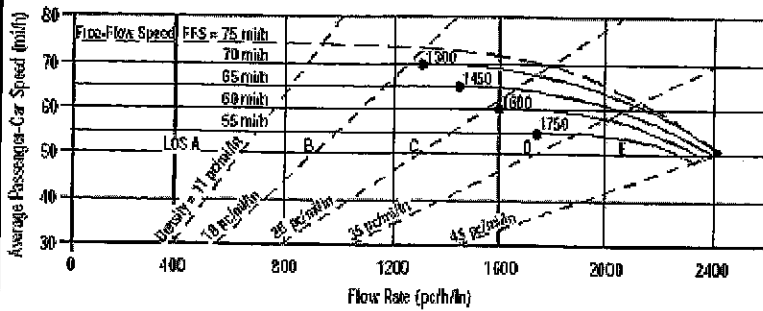
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt B AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5465	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

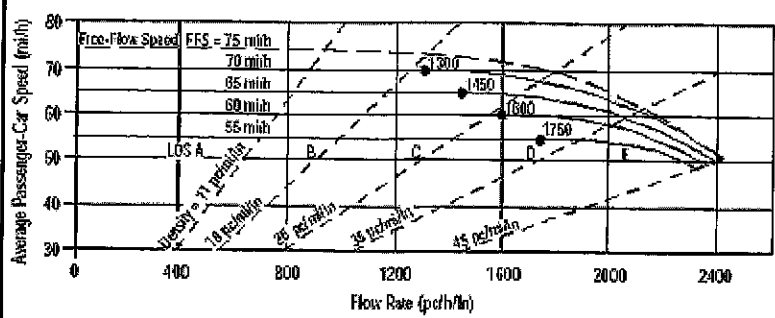
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	4	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$ 1745 pc/h/ln	Design LOS	
S	68.4 mi/h	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$ pc/h
$D = v_p / S$	25.5 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt B PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt B			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7239	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P_T 24
Peak-Hr Prop. of AADT, K			%RVs, P_R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	4	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	HV^x 2312 pc/h/ln	Design LOS	
S	56.6 mi/h	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	HV^x pc/h
$D = v_p / S$	40.9 pc/mi/ln	f_p	mi/h
LOS	E	S	mi/h
		$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
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Application	Input	Output																						
Operational (LOS)	FFS, N, v_p	LOS, S, D																						
Design (N)	FFS, LOS, v_p	N, S, D																						
Design (v_p)	FFS, LOS, N	v_p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v_p)	FFS, LOS, N	v_p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																					
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2030 Project Alt B AM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt B																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	4593	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P_T																					
Peak-Hr Prop. of AADT, K			%RVs, P_R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT * K * D		veh/h	Grade %																					
Driver type adjustment	1.00		Length																					
			Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00	E_R	1.2																					
E_T	1.5	$f_{HV} = 1 / [P_T(E_T - 1) + P_R(E_R - 1)]$	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																					
Interchange Density	0.50	l/mi	f_{ID}																					
Number of Lanes, N	4		f_N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = (V \text{ or DDHV}) / (PHF * K * D * f_p)$	HV^X 1467	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF * K * D * f_p)$																					
S	69.9	mi/h	f_p																					
$D = v_p / S$	21.0	pc/mi/ln	S																					
LOS	C		$D = v_p / S$																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET																								
		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>		Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																					
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2030 Project Alt B PM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt B																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	7570	veh/h	Peak-Hour Factor, PHF 0.88																					
AADT		veh/day	%Trucks and Buses, P _T 24																					
Peak-Hr Prop. of AADT, K			%RVs, P _R 2																					
Peak-Hr Direction Prop, D			General Terrain: Level																					
DDHV = AADT * K * D		veh/h	Grade % Length mi																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00	E _R	1.2																					
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW} mi/h																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC} mi/h																					
Interchange Density	0.50	l/mi	f _{ID} mi/h																					
Number of Lanes, N	4		f _N mi/h																					
FFS (measured)	70.0	mi/h	FFS 70.0 mi/h																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X 2417 pc/h/ln	Design LOS																						
S	mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * X pc/h																					
D = v _p / S	pc/mi/ln	f _p	mi/h																					
LOS	F	S	pc/mi/ln																					
		D = v _p / S	pc/mi/ln																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Ekibits 23-8, 23-10	f _{LW} - Ekibit 23-4																					
V - Hourly volume	D - Density	E _T - Ekibits 23-8, 23-10, 23-11	f _{LC} - Ekibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Ekibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Ekibits 23-2, 23-3	f _{ID} - Ekibit 23-7																					
DDHV - Directional design hour volume																								

ATTACHMENT VI – C - 38

MITIGATED 2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE B

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.981			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2466	1338	0	0	1566	0	1388	1253	0	0	0	0
Flt Permitted	0.596						0.950					
Satd. Flow (perm)	1547	1338	0	0	1566	0	1388	1253	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					16			66				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	344	99	0	0	177	29	227	3	61	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	374	108	0	0	192	32	247	3	66	0	0	0
Lane Group Flow (vph)	374	108	0	0	224	0	247	69	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	37.4	37.4	0.0	0.0	37.4	0.0	32.6	32.6	0.0	0.0	0.0	0.0
Total Split (%)	53.4%	53.4%	0.0%	0.0%	53.4%	0.0%	46.6%	46.6%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.8	32.8			32.8		28.0	28.0				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	44.8	44.8			44.8		17.2	17.2				
Actuated g/C Ratio	0.64	0.64			0.64		0.25	0.25				
v/c Ratio	0.38	0.13			0.22		0.72	0.19				
Control Delay	5.3	4.1			6.7		35.7	6.7				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.3	4.1			6.7		35.7	6.7				
LOS	A	A			A		D	A				
Approach Delay		5.0			6.7			29.4				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

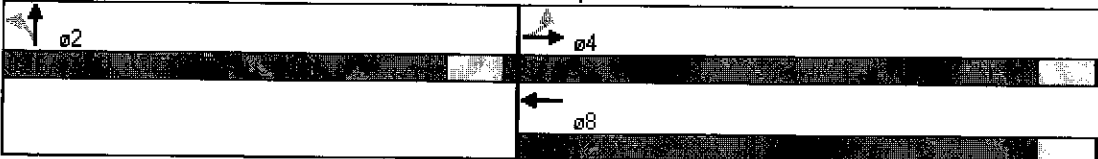
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	18	10			32		98	1				
Queue Length 95th (ft)	35	m16			82		148	25				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	989	856			1007		567	551				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.38	0.13			0.22		0.44	0.13				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 38 (54%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 43.5%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.











Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps



3: Ave 18.5 & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	1418	1545	0	1327	1187
Flt Permitted					0.950	
Satd. Flow (perm)	0	1418	1545	0	1327	1187
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						312
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	578	301	0	107	287
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	23%	23%	36%	36%
Adj. Flow (vph)	0	628	327	0	116	312
Lane Group Flow (vph)	0	628	327	0	116	312
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.6	20.6		21.3	21.3
Total Split (s)	0.0	48.0	48.0	0.0	22.0	22.0
Total Split (%)	0.0%	68.6%	68.6%	0.0%	31.4%	31.4%
Maximum Green (s)		43.4	43.4		16.7	16.7
Yellow Time (s)		3.6	3.6		4.3	4.3
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.5	49.5		12.5	12.5
Actuated g/C Ratio		0.71	0.71		0.18	0.18
v/c Ratio		0.63	0.30		0.49	0.67
Control Delay		8.4	3.3		32.0	10.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		8.4	3.3		32.0	10.8
LOS		A	A		C	B
Approach Delay		8.4	3.3		16.5	

3: Ave 18.5 & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

	↗	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		B	
Queue Length 50th (ft)		80	16		46	0
Queue Length 95th (ft)		243	63		84	61
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		1003	1093		341	537
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.63	0.30		0.34	0.58

Intersection Summary







Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 12 (17%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 43.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2030 Project AM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗		↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	563	427	181	0	132
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	612	464	197	0	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)		683	295			
pX, platoon unblocked						
vC, conflicting volume	661				1117	464
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	661				1117	464
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				100	73
cM capacity (veh/h)	797				196	541
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	633	464	197	143		
Volume Left	21	0	0	0		
Volume Right	0	0	197	143		
cSH	797	1700	1700	541		
Volume to Capacity	0.03	0.27	0.12	0.27		
Queue Length 95th (ft)	2	0	0	27		
Control Delay (s)	0.7	0.0	0.0	14.0		
Lane LOS	A			B		
Approach Delay (s)	0.7	0.0		14.0		
Approach LOS				B		
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization		48.6%		ICU Level of Service	A	
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958			0.912			0.971			0.850	0.850
Flt Protected		0.994		0.950			0.950	0.961		0.950		
Satd. Flow (prot)	0	1762	0	3433	1220	0	1068	1542	0	1770	1583	1583
Flt Permitted		0.957		0.665			0.950	0.961		0.950		
Satd. Flow (perm)	0	1696	0	2403	1220	0	1068	1542	0	1770	1583	1583
Right Turn on Red												
Satd. Flow (RTOR)		32			101			17				255
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35		45		
Link Distance (ft)		412			683			1621		2125		
Travel Time (s)		8.0			13.3			31.6		32.2		
Volume (vph)	15	70	39	354	75	107	110	69	17	38	60	235
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	2%	2%	42%	42%	69%	2%	69%	2%	2%	2%
Adj. Flow (vph)	16	76	42	385	82	116	120	75	18	41	65	255
Lane Group Flow (vph)	0	134	0	385	198	0	120	93	0	41	65	255
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								2
Detector Phases	4	4		8	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6		20.6	20.6		21.3	21.3		21.3	21.3	21.3
Total Split (s)	23.4	23.4	0.0	23.4	23.4	0.0	23.3	23.3	0.0	23.3	23.3	23.3
Total Split (%)	33.4%	33.4%	0.0%	33.4%	33.4%	0.0%	33.3%	33.3%	0.0%	33.3%	33.3%	33.3%
Maximum Green (s)	18.8	18.8		18.8	18.8		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.6	3.6		3.6	3.6		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		34.5		34.5	34.5		13.8	15.2		8.3	9.7	9.7
Actuated g/C Ratio		0.49		0.49	0.49		0.20	0.22		0.12	0.14	0.14
v/c Ratio		0.16		0.33	0.30		0.57	0.27		0.20	0.30	0.58
Control Delay		10.2		11.7	7.0		35.2	19.0		29.5	29.6	9.7
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		10.2		11.7	7.0		35.2	19.0		29.5	29.6	9.7
LOS		B		B	A		D	B		C	C	A
Approach Delay		10.2			10.1			28.1		15.5		

5: Ave 18.5 & Golden State
 Mitigated 2030 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Approach LOS		B			B			C		B		
Queue Length 50th (ft)		22		36	12		47	27		16	26	0
Queue Length 95th (ft)		66		97	m67		88	54		42	55	55
Internal Link Dist (ft)		332			603			1541		2045		
Turn Bay Length (ft)												
Base Capacity (vph)		852		1184	652		294	453		488	436	621
Starvation Cap Reductn		0		0	0		0	0		0	0	0
Spillback Cap Reductn		0		0	0		0	0		0	0	0
Storage Cap Reductn		0		0	0		0	0		0	0	0
Reduced v/c Ratio		0.16		0.33	0.30		0.41	0.21		0.08	0.15	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 48 (69%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 38.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ave 18.5 & Golden State



6: Ave 18 & Road 23













Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.966			0.896			0.999				
Flt Protected					0.990						0.993	
Satd. Flow (prot)	0	1684	0	0	1491	0	0	1471	0	0	1440	0
Flt Permitted					0.960			0.999			0.902	
Satd. Flow (perm)	0	1684	0	0	1446	0	0	1470	0	0	1308	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		3			46			1				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1863			2105			5263			1327	
Travel Time (s)		28.2			31.9			79.7			20.1	
Volume (vph)	0	8	3	11	2	42	1	388	3	58	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	13%	13%	13%	29%	29%	29%	31%	31%	31%
Adj. Flow (vph)	0	9	3	12	2	46	1	422	3	63	390	0
Lane Group Flow (vph)	0	12	0	0	60	0	0	426	0	0	453	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	21.3	21.3	0.0	21.3	21.3	0.0	38.7	38.7	0.0	38.7	38.7	0.0
Total Split (%)	35.5%	35.5%	0.0%	35.5%	35.5%	0.0%	64.5%	64.5%	0.0%	64.5%	64.5%	0.0%
Maximum Green (s)	16.0	16.0		16.0	16.0		33.4	33.4		33.4	33.4	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		9.7			9.7			62.7			62.7	
Actuated g/C Ratio		0.12			0.12			0.81			0.81	
v/c Ratio		0.06			0.28			0.36			0.43	
Control Delay		13.2			10.3			3.9			4.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.2			10.3			3.9			4.7	
LOS		B			B			A			A	
Approach Delay		13.2			10.3			3.9			4.7	

6: Ave 18 & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		3			5			38			45	
Queue Length 95th (ft)		13			28			94			115	
Internal Link Dist (ft)		1783			2025			5183			1247	
Turn Bay Length (ft)												
Base Capacity (vph)		371			353			1203			1070	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.03			0.17			0.35			0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 77
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 62.7%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 6: Ave 18 & Road 23



7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	0.94	0.91	0.91	1.00	1.00	1.00
Frt					0.986			0.856	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2968	4396	0	0	4871	0	4802	1396	2773	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	2968	4396	0	0	4871	0	4802	1396	2773	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					24			183	366			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	250	530	0	0	1239	124	1192	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	272	576	0	0	1347	135	1296	7	549	0	0	0
Lane Group Flow (vph)	272	576	0	0	1482	0	1296	190	366	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3		20.6	20.6	20.6			
Total Split (s)	15.0	50.0	0.0	0.0	35.0	0.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	18.8%	62.5%	0.0%	0.0%	43.8%	0.0%	37.5%	37.5%	37.5%	0.0%	0.0%	0.0%
Maxum Green (s)	9.7	44.7			29.7		25.4	25.4	25.4			
Flow Time (s)	4.3	4.3			4.3		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lag				Lead							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effect Green (s)	11.0	46.2			31.2		25.8	25.8	25.8			
Actuated g/C Ratio	0.14	0.58			0.39		0.32	0.32	0.32			
v/c Ratio	0.67	0.23			0.77		0.84	0.33	0.32			
Control Delay	32.7	4.1			24.4		31.1	5.5	3.2			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	32.7	4.1			24.4		31.1	5.5	3.2			
LOS	C	A			C		C	A	A			
Approach Delay		13.3			24.4			23.0				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

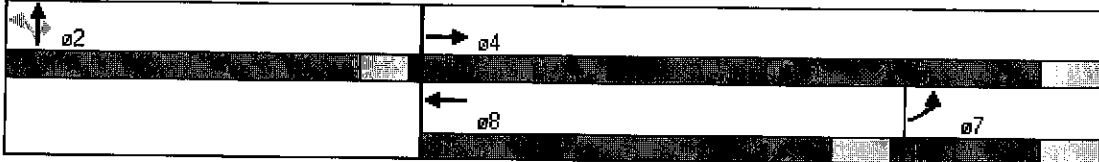
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			C				
Queue Length 50th (ft)	70	22			228		209	2	0			
Queue Length 95th (ft)	#94	27			285		264	50	29			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	408	2539			1914		1561	577	1148			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.67	0.23			0.77		0.83	0.33	0.32			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 78 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 21.5
 Intersection Capacity Utilization 66.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps









9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↘↘	↗↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.86	0.91	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	5634	4940	0	2870	2330
Flt Permitted					0.950	
Satd. Flow (perm)	0	5634	4940	0	2870	2330
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						17
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1662	1906	0	299	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	1807	2072	0	325	117
Lane Group Flow (vph)	0	1807	2072	0	325	117
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	52.4	52.4	0.0	27.6	27.6
Total Split (%)	0.0%	65.5%	65.5%	0.0%	34.5%	34.5%
Maximum Green (s)		47.1	47.1		23.0	23.0
ℳlow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.5	57.5		14.5	14.5
Actuated g/C Ratio		0.72	0.72		0.18	0.18
v/c Ratio		0.45	0.58		0.62	0.27
Control Delay		2.5	1.4		35.2	24.4
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		2.5	1.4		35.2	24.4
LOS		A	A		D	C
Approach Delay		2.5	1.4		32.4	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		47	10		78	24
Queue Length 95th (ft)		83	28		110	46
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		4048	3549		847	699
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.58		0.38	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 71 (89%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 52.0%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Frt		0.990			0.953				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3183	4668	0	3155	4453	0	1433	1508	2256	3155	1712	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3183	4668	0	3155	4453	0	1433	1508	2256	3155	1712	1455
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		13			177				468			7
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	7	886	61	613	960	442	83	66	431	281	30	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	8	963	66	666	1043	480	90	72	468	305	33	7
Lane Group Flow (vph)	8	1029	0	666	1523	0	90	72	468	305	33	7
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.3	21.3		9.3	21.3		8.6	20.6	20.6	8.6	20.6	20.6
Total Split (s)	9.3	24.4	0.0	22.0	37.1	0.0	12.1	20.6	20.6	13.0	21.5	21.5
Total Split (%)	11.6%	30.5%	0.0%	27.5%	46.4%	0.0%	15.1%	25.8%	25.8%	16.3%	26.9%	26.9%
Maximum Green (s)	4.0	19.1		16.7	31.8		7.5	16.0	16.0	8.4	16.9	16.9
Yellow Time (s)	4.3	4.3		4.3	4.3		3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	6.6	26.3		18.0	46.4		11.6	10.7	10.7	9.0	10.2	10.2
Actuated g/C Ratio	0.08	0.33		0.22	0.58		0.14	0.13	0.13	0.11	0.13	0.13
v/c Ratio	0.03	0.67		0.94	0.57		0.43	0.36	0.66	0.86	0.15	0.04
Control Delay	34.7	26.6		44.4	5.3		36.6	34.9	8.0	59.5	34.4	19.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	26.6		44.4	5.3		36.6	34.9	8.0	59.5	34.4	19.5
LOS	C	C		D	A		D	C	A	E	C	B
Approach Delay		26.6			17.2			15.2			56.3	

10: Ave 17 & GS Blvd
 Mitigated 2030 Project AM Alternative B

10/22/2008

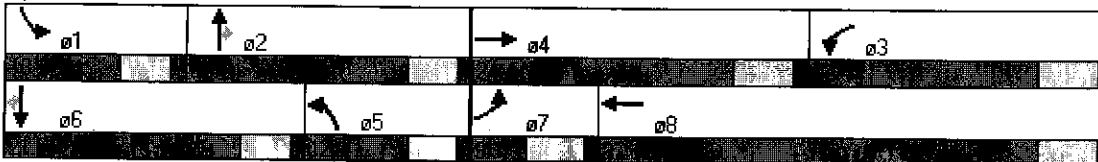
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			E	
Queue Length 50th (ft)	2	155		169	44		42	34	0	78	16	0
Queue Length 95th (ft)	8	#247		#271	224		81	66	40	#147	41	11
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	261	1543		710	2659		214	313	839	355	382	330
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.67		0.94	0.57		0.42	0.23	0.56	0.86	0.09	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 12 (15%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 22.4
 Intersection Capacity Utilization 60.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23

Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗	↘	↕↕		↘	↗			↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.984				0.850
Flt Protected		0.998		0.950			0.950				0.997	
Satd. Flow (prot)	0	3498	1568	1656	3305	0	1504	1558	0	0	1515	1292
Flt Permitted		0.915		0.351			0.534				0.960	
Satd. Flow (perm)	0	3207	1568	612	3305	0	845	1558	0	0	1459	1292
Right Turn on Red			↘s			↘s			↘s			↘s
Satd. Flow (RTOR)			150		2			15				10
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	21	512	138	42	607	7	138	386	47	19	267	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	23	557	150	46	660	8	150	420	51	21	290	10
Lane Group Flow (vph)	0	580	150	46	668	0	150	471	0	0	311	10
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phases	4	4	4	8	8		2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3	21.3	21.3	21.3		21.3	21.3		21.3	21.3	21.3
Total Split (s)	24.9	24.9	24.9	24.9	24.9	0.0	35.1	35.1	0.0	35.1	35.1	35.1
Total Split (%)	41.5%	41.5%	41.5%	41.5%	41.5%	0.0%	58.5%	58.5%	0.0%	58.5%	58.5%	58.5%
Maximum Green (s)	19.6	19.6	19.6	19.6	19.6		29.8	29.8		29.8	29.8	29.8
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	0
Act Effct Green (s)		15.3	15.3	15.3	15.3		18.9	18.9			18.9	18.9
Actuated g/C Ratio		0.36	0.36	0.36	0.36		0.44	0.44			0.44	0.44
v/c Ratio		0.51	0.23	0.21	0.57		0.40	0.68			0.48	0.02
Control Delay		13.8	4.0	15.0	14.4		12.3	15.0			11.6	4.3
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		13.8	4.0	15.0	14.4		12.3	15.0			11.6	4.3
LOS		B	A	B	B		B	B			B	A
Approach Delay		11.8			14.4			14.4			11.4	

11: Ave 17 & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		52	0	7	62		22	78			48	0
Queue Length 95th (ft)		128	31	34	148		65	183			115	6
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1418	777	271	1462		486	902			839	747
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.41	0.19	0.17	0.46		0.31	0.52			0.37	0.01

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 42.9
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 83.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26

Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.967			0.997	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3325	0	1752	3494	0
Flt Permitted		0.815			0.721		0.950			0.950		
Satd. Flow (perm)	0	1518	1583	0	1343	1583	1719	3325	0	1752	3494	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			15			54		73			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	50	10	380	109	31	606	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	54	11	413	118	34	659	12
Lane Group Flow (vph)	0	11	15	0	176	54	11	531	0	34	671	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	21.9	21.9	21.9	21.9	21.9	21.9	9.9	22.7	0.0	10.4	23.2	0.0
Total Split (%)	39.8%	39.8%	39.8%	39.8%	39.8%	39.8%	18.0%	41.3%	0.0%	18.9%	42.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	5.0	17.8		5.5	18.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		13.0	13.0		13.2	13.2	6.3	25.4		6.8	27.7	
Actuated g/C Ratio		0.25	0.25		0.26	0.26	0.11	0.52		0.12	0.57	
v/c Ratio		0.03	0.04		0.51	0.12	0.06	0.30		0.16	0.34	
Control Delay		11.9	7.2		17.5	5.4	22.3	8.9		21.1	8.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.9	7.2		17.5	5.4	22.3	8.9		21.1	8.4	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		9.2			14.7			9.1			9.1	

12: Ellis OC & Road 26
 Mitigated 2030 Project AM Alternative B

10/22/2008

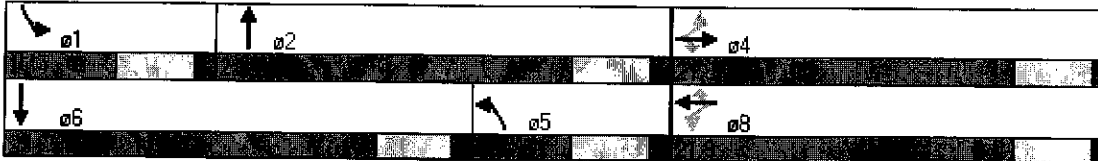
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1	0		20	0	1	23		4	36	
Queue Length 95th (ft)		11	10		90	19	15	95		32	134	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		523	555		463	581	190	1859		217	2049	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.03		0.38	0.09	0.06	0.29		0.16	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 55
 Actuated Cycle Length: 49
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 9.9
 Intersection Capacity Utilization 46.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26















13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						164		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	482	314	0	0	240	151	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	524	341	0	0	261	164	222	2	95	0	0	0
Lane Group Flow (vph)	524	341	0	0	261	164	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.44	0.16			0.42	0.40	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.1			17.3			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

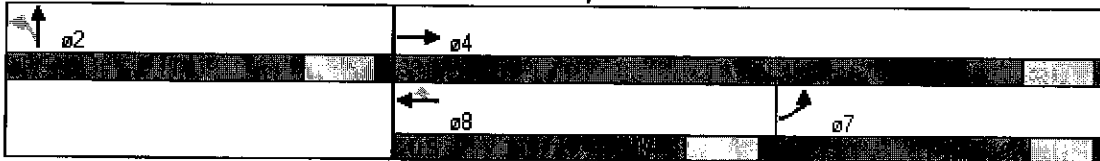
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	47	12			44	0	31	1				
Queue Length 95th (ft)	130	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	564	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.44	0.16			0.26	0.29	0.23	0.19				

Intersection Summary







Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						477
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	634	368	0	162	439
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	689	400	0	176	477
Lane Group Flow (vph)	0	689	400	0	176	477
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
Yellow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.45	0.26		0.12	0.32
Control Delay		13.1	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.1	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.1	2.7		4.2	
Approach LOS		B	A		A	

15: Ellis OC & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative B

10/22/2008

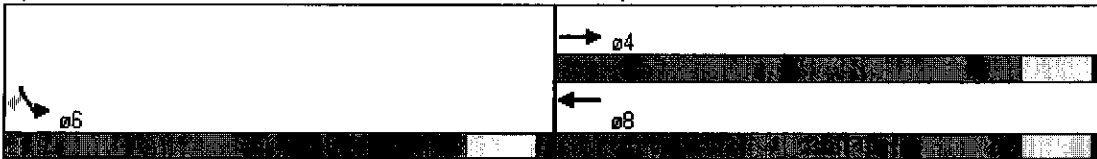
	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		87	0		18	0
Queue Length 95th (ft)		126	3		34	24
Internal Link Dist (ft)		1000	630		1324	
Turn Bay Length (ft)						
Base Capacity (vph)		1539	1539		1482	1474
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.26		0.12	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB off-ramp



17: Ellis OC & Aviation Drive
Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	0.95	0.97	0.97	0.95	1.00	1.00	0.88
Frt			0.850		0.899			0.978			0.850	0.850
Flt Protected	0.950			0.950			0.950	0.959		0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3182	0	3433	3389	0	1770	1583	2787
Flt Permitted	0.950			0.950			0.950	0.959		0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3182	0	3433	3389	0	1770	1583	2787
Right Turn on Red												
Satd. Flow (RTOR)			129		197			23				623
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	46	122	119	443	89	181	193	256	44	121	391	573
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	133	129	482	97	197	210	278	48	132	425	623
Lane Group Flow (vph)	50	133	129	482	294	0	210	326	0	132	425	623
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4	4		8						2	2
Detector Phases	7	4	4	3	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	20.9	20.9	8.5	20.9		8.5	20.9		20.9	20.9	20.9
Total Split (s)	10.5	21.2	21.2	17.0	27.7	0.0	10.0	20.9	0.0	20.9	31.8	31.8
Total Split (%)	13.1%	26.5%	26.5%	21.3%	34.6%	0.0%	12.5%	26.1%	0.0%	26.1%	39.8%	39.8%
Maximum Green (s)	6.0	16.3	16.3	12.5	22.8		5.5	16.0		16.0	26.9	26.9
Yellow Time (s)	3.5	3.9	3.9	3.5	3.9		3.5	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		Max	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0		0	0	0
Act Effct Green (s)	6.4	9.0	9.0	12.8	19.6		6.0	16.9		16.9	27.8	27.8
Actuated g/C Ratio	0.08	0.13	0.13	0.18	0.27		0.08	0.24		0.24	0.39	0.39
v/c Ratio	0.33	0.30	0.41	0.78	0.29		0.73	0.40		0.32	0.69	0.43
Control Delay	38.1	30.2	10.4	39.0	9.1		49.2	23.4		25.6	26.0	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	38.1	30.2	10.4	39.0	9.1		49.2	23.4		25.6	26.0	2.5
LOS	D	C	B	D	A		D	C		C	C	A
Approach Delay		23.3			27.7			33.5		13.6		
Approach LOS		C			C			C		B		

17: Ellis OC & Aviation Drive
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	21	28	0	105	18		47	58		48	153	0
Queue Length 95th (ft)	54	53	44	#180	48		#100	96		98	#268	33
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	152	763	443	622	1142		288	818		418	615	1463
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.33	0.17	0.29	0.77	0.26		0.73	0.40		0.32	0.69	0.43

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 71.6
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 22.4
 Intersection LOS: C
 Intersection Capacity Utilization Err%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive















18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3367	3471	0	0	3471	1553	1618	1618	2682	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3367	3471	0	0	3471	1553	1618	1618	2682	0	0	0
Right Turn on Red			ts			ts		ts		ts		
Satd. Flow (RTOR)						516			208			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	195	982	0	0	931	475	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	212	1067	0	0	1012	516	390	0	384	0	0	0
Lane Group Flow (vph)	212	1067	0	0	1012	516	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	13.8	48.4	0.0	0.0	34.6	34.6	21.6	21.6	21.6	0.0	0.0	0.0
Total Split (%)	19.7%	69.1%	0.0%	0.0%	49.4%	49.4%	30.9%	30.9%	30.9%	0.0%	0.0%	0.0%
Maximum Green (s)	9.2	43.8			30.0	30.0	17.1	17.1	17.1			
Flow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	ts				ts	ts						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.2	44.4			31.2	31.2	17.6	17.6	17.6			
Actuated g/C Ratio	0.13	0.63			0.45	0.45	0.25	0.25	0.25			
v/c Ratio	0.48	0.48			0.65	0.53	0.48	0.48	0.46			
Control Delay	39.4	1.0			17.9	3.6	27.0	27.0	12.0			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	39.4	1.1			17.9	3.6	27.0	27.0	12.0			
LOS	D	A			B	A	C	C	B			
Approach Delay		7.5			13.0			19.5				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	44	3			174	0	74	74	34			
Queue Length 95th (ft)	m63	15			238	50	137	137	73			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	471	2202			1547	978	407	407	830			
Starvation Cap Reductn	0	210			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.45	0.54			0.65	0.53	0.48	0.48	0.46			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 66 (94%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 12.4
 Intersection Capacity Utilization 73.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑					↑↑	↓	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	
Trailing Detector (ft)		0	0	0	0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850								0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	3099	1429	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	3099	1429	0
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)			458								144	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	760	421	414	921	0	0	0	0	417	0	226
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	826	458	450	1001	0	0	0	0	453	0	246
Lane Group Flow (vph)	0	826	458	450	1001	0	0	0	0	453	246	0
Turn Type			Perm	Prot						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4							6		
Detector Phases		4	4	3	8					6	6	
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	
Total Split (s)	0.0	24.5	24.5	25.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	0.0%	35.0%	35.0%	35.7%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)		19.9	19.9	20.4	44.9					16.0	16.0	
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		ℳs	ℳs	ℳs								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Recall Mode		C-Max	C-Max	None	C-Max					None	None	
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0					0	0	
Act Effct Green (s)		22.1	22.1	21.0	47.1					14.9	14.9	
Actuated g/C Ratio		0.32	0.32	0.30	0.67					0.21	0.21	
v/c Ratio		0.78	0.58	0.87	0.43					0.69	0.59	
Control Delay		28.8	5.6	34.6	2.2					31.0	16.8	
Queue Delay		0.0	0.0	0.0	0.2					0.0	0.0	
Total Delay		28.8	5.6	34.6	2.4					31.0	16.8	
LOS		C	A	C	A					C	B	
Approach Delay		20.5			12.4						26.0	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						C	
Queue Length 50th (ft)		174	0	163	12					90	36	
Queue Length 95th (ft)		#267	62	#337	43					135	102	
Internal Link Dist (ft)		1134			311			1354				806
Turn Bay Length (ft)												
Base Capacity (vph)		1065	790	516	2313					730	447	
Starvation Cap Reductn		0	0	0	473					0	0	
Spillback Cap Reductn		0	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.78	0.58	0.87	0.54					0.62	0.55	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 18.2
 Intersection Capacity Utilization 73.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps















20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected					0.941			0.987				0.995
Satd. Flow (prot)	0	1863	0	0	1706	0	0	1576	0	0	1589	0
Flt Permitted					0.872						0.942	
Satd. Flow (perm)	0	1863	0	0	1528	0	0	1576	0	0	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					38			12				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2755			2781			7924			7936	
Travel Time (s)		47.0			47.4			120.1			120.2	
Volume (vph)	0	0	0	44	1	35	0	368	38	30	301	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	19%	19%	19%	19%	19%	19%
Adj. Flow (vph)	0	0	0	48	1	38	0	400	41	33	327	0
Lane Group Flow (vph)	0	0	0	0	87	0	0	441	0	0	360	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	27.9	27.9	0.0	27.9	27.9	0.0	42.1	42.1	0.0	42.1	42.1	0.0
Total Split (%)	39.9%	39.9%	0.0%	39.9%	39.9%	0.0%	60.1%	60.1%	0.0%	60.1%	60.1%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		36.8	36.8		36.8	36.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)					10.1			48.3			48.3	
Actuated g/C Ratio					0.15			0.73			0.73	
v/c Ratio					0.33			0.38			0.33	
Control Delay					10.9			4.9			4.7	
Queue Delay					0.0			0.0			0.0	
Total Delay					10.9			4.9			4.7	
LOS					B			A			A	
Approach Delay					10.9			4.9			4.7	

20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

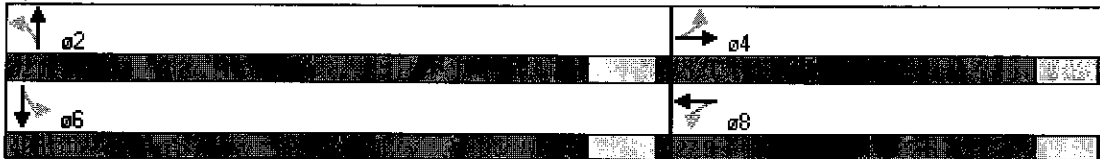
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B			A				A
Queue Length 50th (ft)					12			41				33
Queue Length 95th (ft)					38			102				83
Internal Link Dist (ft)		2675			2701			7844				7856
Turn Bay Length (ft)												
Base Capacity (vph)					519			1217				1159
Starvation Cap Reductn					0			0				0
Spillback Cap Reductn					0			0				0
Storage Cap Reductn					0			0				0
Reduced v/c Ratio					0.17			0.36				0.31

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 65.8
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.38
 Intersection Signal Delay: 5.4
 Intersection Capacity Utilization 52.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 20: Ave 15.5/Cleveland & Road 23



21: SR 145/Madera & SR 99 NB ramps
Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Flt Protected	0.950					0.850				0.950		
Satd. Flow (prot)	3213	3312	0	0	3374	1509	0	0	0	3400	1568	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3213	3312	0	0	3374	1509	0	0	0	3400	1568	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)						226					311	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		491			1298				1379		1837	
Travel Time (s)		9.6			25.3				31.3		41.8	
Volume (vph)	826	579	0	0	568	208	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	898	629	0	0	617	226	0	0	0	355	0	168
Lane Group Flow (vph)	898	629	0	0	617	226	0	0	0	355	168	0
Turn Type	Prot					Perm				Perm		
Protected Phases	5	2			6						8	
Permitted Phases						6				8		
Detector Phases	5	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	8.5	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	23.5	44.9			16.9	16.9				16.0	16.0	
Yellow Time (s)	3.5	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	None	C-Max			C-Max	C-Max				None	None	
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0				0	0	
Act Effct Green (s)	24.0	49.1			21.1	21.1				12.9	12.9	
Actuated g/C Ratio	0.34	0.70			0.30	0.30				0.18	0.18	
v/c Ratio	0.81	0.27			0.61	0.37				0.56	0.31	
Control Delay	18.5	0.7			24.7	5.4				29.2	1.5	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	18.5	0.7			24.7	5.4				29.2	1.5	
LOS	B	A			C	A				C	A	
Approach Delay		11.2			19.6						20.3	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	
Approach LOS		B			B								C
Queue Length 50th (ft)	155	0			117	0				73	0		
Queue Length 95th (ft)	#280	0			184	49				104	0		
Internal Link Dist (ft)		411			1218			1299				1757	
Turn Bay Length (ft)													
Base Capacity (vph)	1102	2321			1015	612				801	607		
Starvation Cap Reductn	0	0			0	0				0	0		
Spillback Cap Reductn	0	0			0	0				0	0		
Storage Cap Reductn	0	0			0	0				0	0		
Reduced v/c Ratio	0.81	0.27			0.61	0.37				0.44	0.28		

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 43 (61%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 15.2 Intersection LOS: B
 Intersection Capacity Utilization 58.9% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps















22: AVE 14/Olive & SR 145/Madera
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.95	1.00
Frnt		0.917	0.850					0.991				0.850
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3335	3020	1400	0	0	0	3213	4716	0	1736	3471	1553
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3335	3020	1400	0	0	0	3213	4716	0	1736	3471	1553
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		375	376					17				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	433	278	691	0	0	0	254	971	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	471	302	751	0	0	0	276	1055	71	130	374	468
Lane Group Flow (vph)	471	677	376	0	0	0	276	1126	0	130	374	468
Turn Type	Perm		Perm				Prot			Prot		Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		8.5	20.6	20.6
Total Split (s)	25.4	25.4	25.4	0.0	0.0	0.0	20.6	28.7	0.0	15.9	24.0	24.0
Total Split (%)	36.3%	36.3%	36.3%	0.0%	0.0%	0.0%	29.4%	41.0%	0.0%	22.7%	34.3%	34.3%
Maximum Green (s)	20.9	20.9	20.9				16.0	24.1		11.4	19.4	19.4
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.5	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max	None	Max	Max	
Walk Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0			0	0
Act Effct Green (s)	21.4	21.4	21.4				16.6	27.9		10.9	20.0	20.0
Actuated g/C Ratio	0.31	0.31	0.31				0.24	0.40		0.16	0.29	0.29
v/c Ratio	0.46	0.57	0.55				0.36	0.60		0.48	0.38	0.60
Control Delay	19.4	10.4	7.2				23.9	19.1		40.0	9.4	9.6
Queue Delay	1.5	0.9	0.6				0.0	0.0		0.0	0.0	0.0
Total Delay	21.0	11.2	7.8				23.9	19.1		40.0	9.4	9.6
LOS	C	B	A				C	B		D	A	A
Approach Delay		13.4						20.0			13.6	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project AM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						C			B	
Queue Length 50th (ft)	70	46	21				51	145		63	47	138
Queue Length 95th (ft)	115	95	m83				82	190		m107	50	247
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	1020	1184	689				762	1888		295	992	778
Starvation Cap Reductn	359	246	97				0	0		0	0	0
Spillback Cap Reductn	0	0	0				0	0		0	0	0
Storage Cap Reductn	0	0	0				0	0		0	0	0
Reduced v/c Ratio	0.71	0.72	0.64				0.36	0.60		0.44	0.38	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 28 (40%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 15.8
 Intersection Capacity Utilization 51.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Flt Protected					0.992	0.850
Satd. Flow (prot)	0	3505	3505	0	3233	1361
Flt Permitted					0.955	
Satd. Flow (perm)	0	3505	3505	0	3233	1361
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)					10	122
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	823	685	0	579	317
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	895	745	0	629	345
Lane Group Flow (vph)	0	895	745	0	664	310
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	35.4	35.4	0.0	34.6	34.6
Total Split (%)	0.0%	50.6%	50.6%	0.0%	49.4%	49.4%
Maximum Green (s)		30.9	30.9		30.1	30.1
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		41.6	41.6		20.4	20.4
Actuated g/C Ratio		0.59	0.59		0.29	0.29
v/c Ratio		0.43	0.36		0.70	0.64
Control Delay		9.5	2.8		25.3	18.3
Queue Delay		0.0	0.3		0.0	0.0
Total Delay		9.5	3.0		25.3	18.3
LOS		A	A		C	B
Approach Delay		9.5	3.0		23.0	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative B

10/22/2008



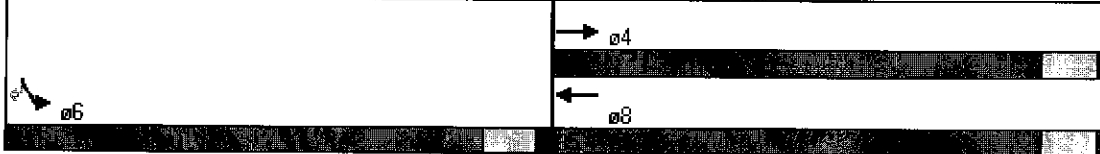
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		97	26		128	73
Queue Length 95th (ft)		178	40		153	136
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2082	2082		1419	664
Starvation Cap Reductn		0	649		0	0
Spillback Cap Reductn		0	0		2	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.43	0.52		0.47	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 65 (93%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.7
 Intersection Capacity Utilization 49.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.986			0.927			0.994			0.956	
Flt Protected	0.950				0.998			0.997		0.950		
Satd. Flow (prot)	1671	1735	0	0	1542	0	0	1569	0	1543	1552	0
Flt Permitted	0.597				0.992			0.985		0.661		
Satd. Flow (perm)	1050	1735	0	0	1533	0	0	1550	0	1073	1552	0
Right Turn on Red			vs			vs			vs		vs	
Satd. Flow (RTOR)		7			113			4			37	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2632			2680			5376			7924	
Travel Time (s)		44.9			45.7			81.5			120.1	
Volume (vph)	42	61	6	9	90	117	8	137	6	102	129	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	14%	14%	14%	20%	20%	20%	17%	17%	17%
Adj. Flow (vph)	46	66	7	10	98	127	9	149	7	111	140	58
Lane Group Flow (vph)	46	73	0	0	235	0	0	165	0	111	198	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	36.4	36.4	0.0	36.4	36.4	0.0	33.6	33.6	0.0	33.6	33.6	0.0
Total Split (%)	52.0%	52.0%	0.0%	52.0%	52.0%	0.0%	48.0%	48.0%	0.0%	48.0%	48.0%	0.0%
Maximum Green (s)	31.5	31.5		31.5	31.5		28.3	28.3		28.3	28.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.4	10.4			10.4			17.5		17.5	17.5	
Actuated g/C Ratio	0.29	0.29			0.29			0.51		0.51	0.51	
v/c Ratio	0.15	0.15			0.45			0.21		0.20	0.25	
Control Delay	8.1	7.0			7.1			7.0		7.8	6.3	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	8.1	7.0			7.1			7.0		7.8	6.3	
LOS	A	A			A			A		A	A	
Approach Delay		7.4			7.1			7.0			6.8	

24: Ave 14/Olive & Road 23
 Mitigated 2030 Project AM Alternative B

10/22/2008

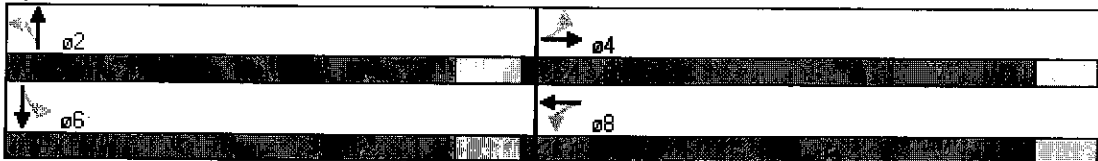
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	4	5			10			13		9	13	
Queue Length 95th (ft)	18	22			44			44		35	47	
Internal Link Dist (ft)		2552			2600			5296			7844	
Turn Bay Length (ft)												
Base Capacity (vph)	602	998			927			1089		753	1100	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.08	0.07			0.25			0.15		0.15	0.18	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 34.4
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.0
 Intersection Capacity Utilization 47.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 24: Ave 14/Olive & Road 23



25: SB Ramps & GS Blvd
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Flt Permitted	0.950				0.682	
Satd. Flow (perm)	3303	1524	1696	1442	1258	1845
Right Turn on Red		8s		8s		
Satd. Flow (RTOR)		82		497		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	791		408			1104
Travel Time (s)	18.0		9.3			25.1
Volume (vph)	1040	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	1130	82	117	497	303	74
Lane Group Flow (vph)	1130	82	117	497	303	74
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	47.5	42.5	42.5	42.5	42.5	42.5
Total Split (%)	52.8%	47.2%	47.2%	47.2%	47.2%	47.2%
Maximum Green (s)	43.0	38.0	38.0	38.0	38.0	38.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	56.1	25.9	25.9	25.9	25.9	25.9
Actuated g/C Ratio	0.62	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.55	0.16	0.24	0.65	0.83	0.14
Control Delay	12.5	5.2	23.9	7.9	48.7	21.5
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	12.5	5.2	23.9	8.2	48.7	21.5
LOS	B	A	C	A	D	C
Approach Delay	12.0		11.2			43.4

25: SB Ramps & GS Blvd
 Mitigated 2030 Project AM Alternative B

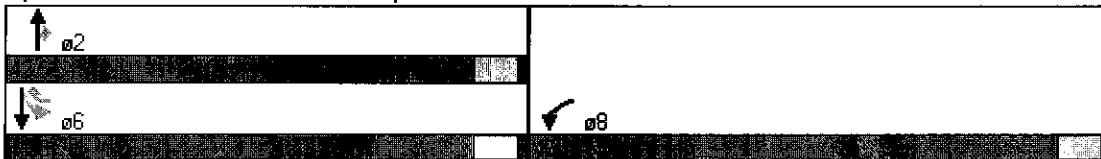
10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			D
Queue Length 50th (ft)	170	0	42	82	162	31
Queue Length 95th (ft)	309	26	m40	m62	219	53
Internal Link Dist (ft)	711		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	2057	699	726	901	538	789
Starvation Cap Reductn	0	0	0	78	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.12	0.16	0.60	0.56	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 52 (58%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 17.1
 Intersection Capacity Utilization 58.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.94	1.00	1.00
Frnt		0.994				0.850		0.867			0.866	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	4631	1442	1656	1511	0	4757	1538	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	4631	1442	1656	1511	0	4757	1538	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		5				405		24			91	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	189	360	16	19	603	373	16	3	22	1014	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1102	11	91
Lane Group Flow (vph)	205	408	0	21	655	405	17	27	0	1102	102	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						
Detector Phases	7	4		3	8	8	2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.6	20.6		8.6	20.6	20.6	20.5	20.5		20.5	20.5	
Total Split (s)	19.4	31.5	0.0	9.7	21.8	21.8	20.5	20.5	0.0	28.3	28.3	0.0
Total Split (%)	21.6%	35.0%	0.0%	10.8%	24.2%	24.2%	22.8%	22.8%	0.0%	31.4%	31.4%	0.0%
Maximum Green (s)	14.8	26.9		5.1	17.2	17.2	16.3	16.3		24.1	24.1	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	
Act Effct Green (s)	14.5	32.5		5.7	17.8	17.8	17.4	17.4		24.3	24.3	
Actuated g/C Ratio	0.16	0.36		0.06	0.20	0.20	0.19	0.19		0.27	0.27	
v/c Ratio	0.79	0.35		0.21	0.72	0.66	0.05	0.09		0.86	0.21	
Control Delay	58.2	22.7		41.2	28.7	12.3	31.0	14.5		30.1	5.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	58.2	22.7		41.2	28.7	12.3	31.0	14.5		30.1	5.1	
LOS	E	C		D	C	B	C	B		C	A	
Approach Delay		34.6			22.8			20.9			28.0	

26: Ave 12 & GS Blvd
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	112	78		12	132	73	8	1		213	23	
Queue Length 95th (ft)	#216	137		m23	145	127	26	24		#202	m9	
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	276	1159		102	916	610	320	311		1284	482	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.74	0.35		0.21	0.72	0.66	0.05	0.09		0.86	0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 7 (8%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 27.3
 Intersection LOS: C
 Intersection Capacity Utilization 58.1%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.86	0.86	0.97	0.95	0.95	1.00	1.00	1.00
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3213	4759	0	0	4324	1310	3099	1358	1358	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3213	4759	0	0	4324	1310	3099	1358	1358	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					282	496		79	79			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	198	1198	0	0	598	913	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	215	1302	0	0	650	992	432	0	283	0	0	0
Lane Group Flow (vph)	215	1302	0	0	1146	496	432	141	142	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	18.0	63.3	0.0	0.0	45.3	45.3	26.7	26.7	26.7	0.0	0.0	0.0
Total Split (%)	20.0%	70.3%	0.0%	0.0%	50.3%	50.3%	29.7%	29.7%	29.7%	0.0%	0.0%	0.0%
Maximum Green (s)	13.5	58.8			40.8	40.8	22.2	22.2	22.2			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	14.0	63.7			45.7	45.7	18.3	18.3	18.3			
Actuated g/C Ratio	0.16	0.71			0.51	0.51	0.20	0.20	0.20			
v/c Ratio	0.43	0.39			0.49	0.55	0.68	0.41	0.42			
Control Delay	29.9	0.7			11.9	4.0	38.6	17.8	18.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	29.9	0.7			11.9	4.0	38.6	17.8	18.0			
LOS	C	A			B	A	D	B	B			
Approach Delay		4.8			9.5			30.4				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2030 Project AM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	66	10			116	0	117	30	31			
Queue Length 95th (ft)	m84	5			171	62	157	83	83			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	500	3367			2334	909	782	402	402			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.43	0.39			0.49	0.55	0.55	0.35	0.35			

Intersection Summary


















Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 80 (89%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 11.5
 Intersection Capacity Utilization 58.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps















1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.986			0.850				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2847	1545	0	0	1643	0	1504	1346	0	0	0	0
Flt Permitted	0.562						0.950					
Satd. Flow (perm)	1684	1545	0	0	1643	0	1504	1346	0	0	0	0
Right Turn on Red			rs			rs			rs		rs	
Satd. Flow (RTOR)					12			748				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	469	139	0	0	220	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	510	151	0	0	239	28	277	0	91	0	0	0
Lane Group Flow (vph)	510	151	0	0	267	0	277	91	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	39.7	39.7	0.0	0.0	39.7	0.0	30.3	30.3	0.0	0.0	0.0	0.0
Total Split (%)	56.7%	56.7%	0.0%	0.0%	56.7%	0.0%	43.3%	43.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	35.1	35.1			35.1		25.7	25.7				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	44.2	44.2			44.2		17.8	17.8				
Actuated g/C Ratio	0.63	0.63			0.63		0.25	0.25				
v/c Ratio	0.48	0.15			0.26		0.72	0.10				
Control Delay	5.3	3.6			7.3		34.2	0.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.3	3.6			7.3		34.2	0.2				
LOS	A	A			A		C	A				
Approach Delay		4.9			7.3			25.8				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative B

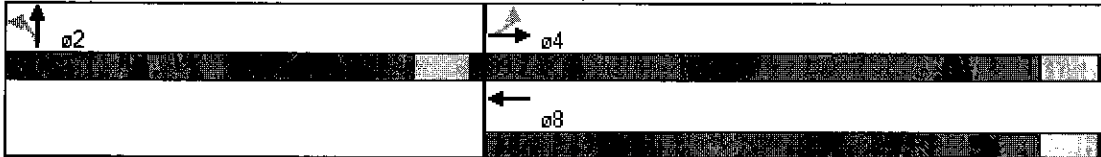
10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	24	10			41		109	0				
Queue Length 95th (ft)	m57	m20			99		162	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	1063	975			1041		565	973				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.48	0.15			0.26		0.49	0.09				

Intersection Summary













Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 32 (46%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 11.3
 Intersection Capacity Utilization 50.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps









2: Ave 18.5 & SB Ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	608	368	0	367	108	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	661	400	0	399	117	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		223			717							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	516			1061			1060	1177	661	1060	1460	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	507			1061			1061	1180	661	1061	1468	388
tC, single (s)	4.3			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	945			593			200	188	466	200	127	653
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	661	400	399	117								
Volume Left	0	0	0	0								
Volume Right	0	400	0	117								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.39	0.24	0.23	0.07								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			35.3%		ICU Level of Service				A			
Analysis Period (min)			15									

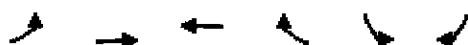
3: Ave 18.5 & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1583	1597	0	1289	1154
Flt Permitted					0.950	
Satd. Flow (perm)	0	1583	1597	0	1289	1154
Right Turn on Red				⊘s		⊘s
Satd. Flow (RTOR)						453
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	839	348	0	137	417
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	19%	19%	40%	40%
Adj. Flow (vph)	0	912	378	0	149	453
Lane Group Flow (vph)	0	912	378	0	149	453
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.6	20.6		20.6	20.6
Total Split (s)	0.0	49.4	49.4	0.0	20.6	20.6
Total Split (%)	0.0%	70.6%	70.6%	0.0%	29.4%	29.4%
Maximum Green (s)		44.8	44.8		16.0	16.0
Yellow Time (s)		3.6	3.6		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		48.9	48.9		13.1	13.1
Actuated g/C Ratio		0.70	0.70		0.19	0.19
v/c Ratio		0.83	0.34		0.62	0.78
Control Delay		16.0	4.6		36.7	13.2
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.0	4.6		36.7	13.2
LOS		B	A		D	B
Approach Delay		16.0	4.6		19.1	

3: Ave 18.5 & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		B	
Queue Length 50th (ft)		164	21		59	0
Queue Length 95th (ft)		#588	m99		109	#107
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		1105	1115		306	619
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.83	0.34		0.49	0.73

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 4 (6%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 58.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2030 Project PM Alternative B

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗		↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	827	523	224	0	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	899	568	243	0	209
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		683	295			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	812				1596	568
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	811				1599	566
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	91				100	58
cM capacity (veh/h)	737				99	497
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	963	568	243	209		
Volume Left	64	0	0	0		
Volume Right	0	0	243	209		
cSH	737	1700	1700	497		
Volume to Capacity	0.09	0.33	0.14	0.42		
Queue Length 95th (ft)	7	0	0	51		
Control Delay (s)	2.5	0.0	0.0	17.4		
Lane LOS	A			C		
Approach Delay (s)	2.5	0.0		17.4		
Approach LOS				C		
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		81.0%		ICU Level of Service		D
Analysis Period (min)		15				

5: Ave 18.5 & Golden State
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.951			0.911			0.982			0.850	0.850
Fl _t Protected		0.995		0.950			0.950	0.958		0.950		
Satd. Flow (prot)	0	1763	0	3433	1194	0	1195	1657	0	1770	1583	1583
Fl _t Permitted		0.963		0.597			0.950	0.958		0.950		
Satd. Flow (perm)	0	1706	0	2157	1194	0	1195	1657	0	1770	1583	1583
Right Turn on Red			∅s			∅s			∅s		∅s	
Satd. Flow (RTOR)		45			116			9				413
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35		45		
Link Distance (ft)		412			683			1621		2125		
Travel Time (s)		8.0			13.3			31.6		32.2		
Volume (vph)	18	97	66	530	74	109	125	109	15	49	105	380
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	45%	45%	51%	2%	51%	2%	2%	2%
Adj. Flow (vph)	20	105	72	576	80	118	136	118	16	53	114	413
Lane Group Flow (vph)	0	197	0	576	198	0	136	134	0	53	114	413
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								2
Detector Phases	4	4		8	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6		20.6	20.6		21.3	21.3		20.6	20.6	20.6
Total Split (s)	28.1	28.1	0.0	28.1	28.1	0.0	21.3	21.3	0.0	20.6	20.6	20.6
Total Split (%)	40.1%	40.1%	0.0%	40.1%	40.1%	0.0%	30.4%	30.4%	0.0%	29.4%	29.4%	29.4%
Maximum Green (s)	23.5	23.5		23.5	23.5		16.0	16.0		16.0	16.0	16.0
Yellow Time (s)	3.6	3.6		3.6	3.6		4.3	4.3		3.6	3.6	3.6
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							∅s	∅s		∅s	∅s	∅s
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	None	None
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		33.3		33.3	33.3		13.6	16.6		8.1	11.1	11.1
Actuated g/C Ratio		0.48		0.48	0.48		0.19	0.24		0.12	0.16	0.16
v/c Ratio		0.24		0.56	0.31		0.58	0.33		0.26	0.45	0.69
Control Delay		11.3		16.2	6.5		35.3	21.1		30.8	31.5	9.6
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		11.3		16.2	6.5		35.3	21.1		30.8	31.5	9.6
LOS		B		B	A		D	C		C	C	A
Approach Delay		11.3			13.7			28.2		15.8		

5: Ave 18.5 & Golden State
 Mitigated 2030 Project PM Alternative B

10/22/2008

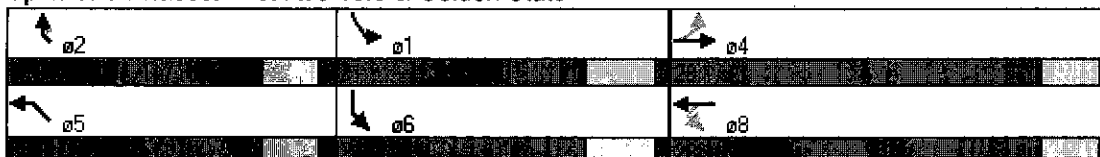
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Approach LOS		B			B			C		B		
Queue Length 50th (ft)		36		75	10		53	44		21	46	0
Queue Length 95th (ft)		94		m#169	m57		101	77		50	82	65
Internal Link Dist (ft)		332			603			1541		2045		
Turn Bay Length (ft)												
Base Capacity (vph)		835		1026	629		295	459		420	375	690
Starvation Cap Reductn		0		0	0		0	0		0	0	0
Spillback Cap Reductn		0		0	0		0	0		0	0	0
Storage Cap Reductn		0		0	0		0	0		0	0	0
Reduced v/c Ratio		0.24		0.56	0.31		0.46	0.29		0.13	0.30	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 33 (47%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 48.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ave 18.5 & Golden State















6: Ave 18 & Road 23
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.955			0.887			0.999				
Flt Protected		0.998			0.998						0.994	
Satd. Flow (prot)	0	1631	0	0	1602	0	0	1609	0	0	1628	0
Flt Permitted		0.991			0.992			0.996			0.877	
Satd. Flow (perm)	0	1620	0	0	1592	0	0	1602	0	0	1436	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		7			95			1				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1863			2105			5263			1327	
Travel Time (s)		28.2			31.9			79.7			20.1	
Volume (vph)	1	12	6	5	12	87	5	525	5	75	523	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	5%	5%	5%	18%	18%	18%	16%	16%	16%
Adj. Flow (vph)	1	13	7	5	13	95	5	571	5	82	568	2
Lane Group Flow (vph)	0	21	0	0	113	0	0	581	0	0	652	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	21.3	21.3	0.0	21.3	21.3	0.0	38.7	38.7	0.0	38.7	38.7	0.0
Total Split (%)	35.5%	35.5%	0.0%	35.5%	35.5%	0.0%	64.5%	64.5%	0.0%	64.5%	64.5%	0.0%
Maximum Green (s)	16.0	16.0		16.0	16.0		33.4	33.4		33.4	33.4	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		9.6			9.6			51.2			51.2	
Actuated g/C Ratio		0.14			0.14			0.76			0.76	
v/c Ratio		0.09			0.38			0.48			0.60	
Control Delay		14.7			9.7			5.6			7.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.7			9.7			5.6			7.7	
LOS		B			A			A			A	
Approach Delay		14.7			9.7			5.6			7.7	

6: Ave 18 & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		3			4			59			78	
Queue Length 95th (ft)		18			38			152			219	
Internal Link Dist (ft)		1783			2025			5183			1247	
Turn Bay Length (ft)												
Base Capacity (vph)		402			461			1214			1087	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.05			0.25			0.48			0.60	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 67.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 7.1

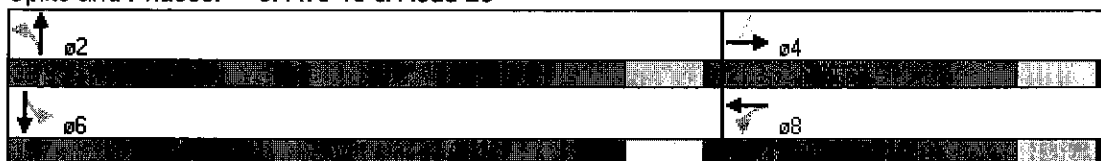
Intersection LOS: A

Intersection Capacity Utilization 77.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Ave 18 & Road 23



7: Ave 17 & SR 99 NB ramps
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	0.94	0.91	0.91	1.00	1.00	1.00
Frnt					0.983			0.855	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3335	4940	0	0	4999	0	4894	1421	2826	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3335	4940	0	0	4999	0	4894	1421	2826	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)					23			45	83			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	385	1233	0	0	2036	256	1983	17	1413	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	418	1340	0	0	2213	278	2155	18	1536	0	0	0
Lane Group Flow (vph)	418	1340	0	0	2491	0	2155	530	1024	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5		20.5	20.5	20.5			
Total Split (s)	17.0	72.0	0.0	0.0	55.0	0.0	48.0	48.0	48.0	0.0	0.0	0.0
Total Split (%)	14.2%	60.0%	0.0%	0.0%	45.8%	0.0%	40.0%	40.0%	40.0%	0.0%	0.0%	0.0%
Maximum Green (s)	12.5	67.5			50.5		43.5	43.5	43.5			
Yellow Time (s)	3.5	3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	ℳs				ℳs							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	13.0	68.0			51.0		44.0	44.0	44.0			
Actuated g/C Ratio	0.11	0.57			0.42		0.37	0.37	0.37			
v/c Ratio	1.16	0.48			1.17		1.20	0.96	0.94			
Control Delay	129.6	17.1			112.3		130.9	65.2	50.4			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	129.6	17.1			112.3		130.9	65.2	50.4			
LOS	F	B			F		F	E	D			
Approach Delay		43.9			112.3			99.3				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			F			F				
Queue Length 50th (ft)	495	283			839		718	409	391			
Queue Length 95th (ft) m#286		316			#932		#810	#664	#541			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	361	2799			2138		1794	550	1089			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	1.16	0.48			1.17		1.20	0.96	0.94			

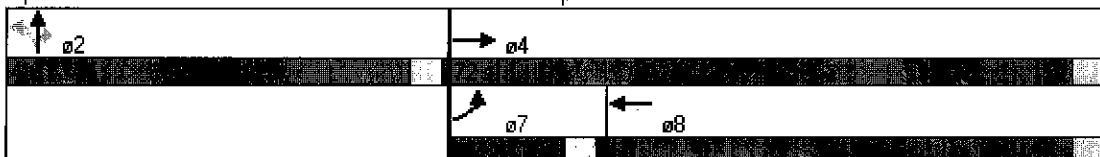
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 63 (53%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.20
 Intersection Signal Delay: 91.1
 Intersection Capacity Utilization 103.7%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service G

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps









8: Ave 17 & SR 99 SB on-ramp
 Mitigated 2030 Project PM Alternative B

10/22/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1575	2202	0	3114	902	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1712	2393	0	3385	980	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		213			717							
pX, platoon unblocked	0.24						0.24	0.24		0.24	0.24	0.24
vC, conflicting volume	4365			4105			2840	6077	571	4446	7980	1618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8736			4105			2329	15929	571	9074	23925	0
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	0			39			5	0	469	0	0	260
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3					
Volume Total	571	571	571	2393	1354	1354	1657					
Volume Left	0	0	0	0	0	0	0					
Volume Right	0	0	0	2393	0	0	980					
cSH	1700	1700	1700	1700	1700	1700	1700					
Volume to Capacity	0.34	0.34	0.34	1.41	0.80	0.80	0.97					
Queue Length 95th (ft)	0	0	0	0	0	0	0					
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Lane LOS												
Approach Delay (s)	0.0				0.0							
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		139.7%			ICU Level of Service				H			
Analysis Period (min)			15									

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑↑	↑↑↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.86	0.91	1.00	0.97	0.88
Flt Protected					0.950	
Satd. Flow (prot)	0	6285	4988	0	3273	2656
Flt Permitted					0.950	
Satd. Flow (perm)	0	6285	4988	0	3273	2656
Right Turn on Red				∅s		∅s
Satd. Flow (RTOR)						3
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	3361	3114	0	506	193
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	3653	3385	0	550	210
Lane Group Flow (vph)	0	3653	3385	0	550	210
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	92.0	92.0	0.0	28.0	28.0
Total Split (%)	0.0%	76.7%	76.7%	0.0%	23.3%	23.3%
Maximum Green (s)		86.7	86.7		23.4	23.4
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		88.8	88.8		23.2	23.2
Actuated g/C Ratio		0.74	0.74		0.19	0.19
v/c Ratio		0.79	0.92		0.87	0.41
Control Delay		6.3	3.8		61.9	44.2
Queue Delay		2.2	1.3		0.0	0.0
Total Delay		8.5	5.1		61.9	44.2
LOS		A	A		E	D
Approach Delay		8.5	5.1		57.0	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		E	
Queue Length 50th (ft)		272	265		212	79
Queue Length 95th (ft)		m228	m137		#297	122
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		4649	3690		655	534
Starvation Cap Reductn		825	146		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.96	0.96		0.84	0.39

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 88 (73%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 11.8
 Intersection Capacity Utilization 81.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Frt		0.987			0.959				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	4923	0	3335	4737	0	1752	1845	2760	3099	1681	1429
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	4923	0	3335	4737	0	1752	1845	2760	3099	1681	1429
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		14			118				512			10
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	14	1987	181	682	1902	725	171	100	741	633	84	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	15	2160	197	741	2067	788	186	109	805	688	91	10
Lane Group Flow (vph)	15	2357	0	741	2855	0	186	109	805	688	91	10
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5
Total Split (s)	8.5	49.5	0.0	25.0	66.0	0.0	20.7	20.5	20.5	25.0	24.8	24.8
Total Split (%)	7.1%	41.3%	0.0%	20.8%	55.0%	0.0%	17.3%	17.1%	17.1%	20.8%	20.7%	20.7%
Maximum Green (s)	4.0	45.0		20.5	61.5		16.2	16.0	16.0	20.5	20.3	20.3
Flow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	4.5	45.5		21.0	67.1		25.4	16.5	16.5	21.0	12.1	12.1
Actuated g/C Ratio	0.04	0.38		0.18	0.56		0.21	0.14	0.14	0.18	0.10	0.10
v/c Ratio	0.12	1.26		1.27	1.06		0.50	0.43	0.98	1.27	0.54	0.07
Control Delay	58.0	153.3		171.6	52.6		48.3	53.3	46.1	176.0	62.1	23.7
Queue Delay	0.0	0.0		0.0	39.7		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	153.3		171.6	92.3		48.3	53.3	46.1	176.0	62.1	23.7
LOS	E	F		F	F		D	D	D	F	E	C
Approach Delay		152.7			108.6			47.2			160.9	

10: Ave 17 & GS Blvd
 Mitigated 2030 Project PM Alternative B

10/22/2008

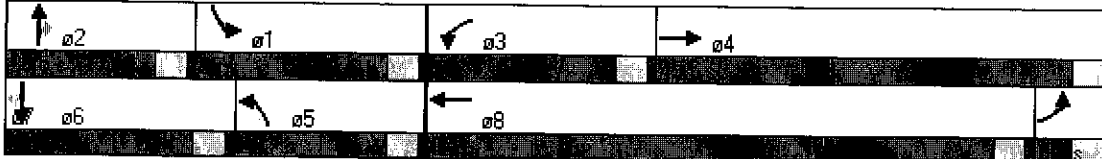
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	6	840		371	672		128	78	142	346	68	0
Queue Length 95th (ft)	18	#935		m#431	#634		214	138	#291	#465	119	16
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	126	1875		584	2701		371	254	821	542	291	256
Starvation Cap Reductn	0	0		0	216		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.12	1.26		1.27	1.15		0.50	0.43	0.98	1.27	0.31	0.04

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.27
 Intersection Signal Delay: 118.6
 Intersection Capacity Utilization 96.6%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989			0.965				0.850
Flt Protected		0.997		0.950			0.950				0.998	
Satd. Flow (prot)	0	3529	1583	1687	3337	0	1597	1623	0	0	1663	1417
Flt Permitted		0.873		0.224			0.549				0.977	
Satd. Flow (perm)	0	3090	1583	398	3337	0	923	1623	0	0	1628	1417
Right Turn on Red			RTOR			RTOR		RTOR			RTOR	
Satd. Flow (RTOR)			342		18			33				96
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	42	772	315	107	730	59	122	408	125	9	238	293
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	46	839	342	116	793	64	133	443	136	10	259	318
Lane Group Flow (vph)	0	885	342	116	857	0	133	579	0	0	269	318
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phases	4	4	4	8	8		2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3	21.3	21.3	21.3		21.3	21.3		21.3	21.3	21.3
Total Split (s)	30.0	30.0	30.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%
Maximum Green (s)	24.7	24.7	24.7	24.7	24.7		24.7	24.7		24.7	24.7	24.7
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	0
Act Effct Green (s)		21.4	21.4	21.4	21.4		21.8	21.8			21.8	21.8
Actuated g/C Ratio		0.41	0.41	0.41	0.41		0.42	0.42			0.42	0.42
v/c Ratio		0.69	0.40	0.70	0.62		0.34	0.82			0.39	0.49
Control Delay		16.2	3.1	41.4	14.2		14.2	25.5			13.2	11.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		16.2	3.1	41.4	14.2		14.2	25.5			13.2	11.0
LOS		B	A	D	B		B	C			B	B
Approach Delay		12.5			17.5			23.4			12.0	

11: Ave 17 & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		126	0	32	115		30	163		63	51	
Queue Length 95th (ft)		184	39	#110	166		67	#334		114	112	
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1450	924	186	1575		436	784		768	719	
Starvation Cap Reductn		0	0	0	0		0	0		0	0	
Spillback Cap Reductn		0	0	0	0		0	0		0	0	
Storage Cap Reductn		0	0	0	0		0	0		0	0	
Reduced v/c Ratio		0.61	0.37	0.62	0.54		0.31	0.74		0.35	0.44	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 51.7
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 16.0
 Intersection Capacity Utilization 100.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service G

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Ave 17 & Road 23



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frnt			0.850			0.850		0.969			0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.734			0.705		0.950			0.950		
Satd. Flow (perm)	0	1367	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red			\forall s			\forall s		\forall s			\forall s	
Satd. Flow (RTOR)			34			132		62			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	121	27	787	207	190	882	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	132	29	855	225	207	959	45
Lane Group Flow (vph)	0	41	34	0	242	132	29	1080	0	207	1004	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	26.1	0.0	13.0	30.2	0.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	34.8%	34.8%	14.8%	43.5%	0.0%	21.7%	50.3%	0.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.0	21.2		8.1	25.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							\forall s	\forall s		\forall s	\forall s	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		14.5	14.5		14.5	14.5	4.9	21.5		8.9	31.1	
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.08	0.38		0.16	0.54	
v/c Ratio		0.12	0.08		0.72	0.26	0.21	0.81		0.75	0.52	
Control Delay		17.1	7.1		33.5	5.4	30.4	21.9		43.8	11.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.1	7.1		33.5	5.4	30.4	21.9		43.8	11.0	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.6			23.6			22.1			16.6	
Approach LOS		B			C			C			B	

12: Ellis OC & Road 26
 Mitigated 2030 Project PM Alternative B

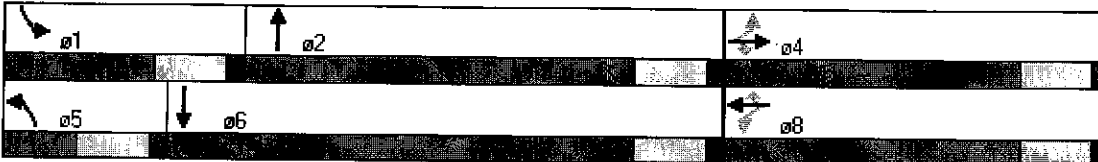
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		11	0		77	0	10	171		73	95	
Queue Length 95th (ft)		31	17		#164	33	32	#277		#170	199	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		390	475		375	546	140	1355		280	1919	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.11	0.07		0.65	0.24	0.21	0.80		0.74	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 57.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 19.7
 Intersection Capacity Utilization 67.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.868				
Fit Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Fit Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)						222		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	788	451	0	0	378	204	276	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	857	490	0	0	411	222	300	18	130	0	0	0
Lane Group Flow (vph)	857	490	0	0	411	222	300	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.64	0.21			0.58	0.45	0.37	0.31				
Control Delay	13.5	1.3			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.5	1.3			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.7			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	156	6			85	0	55	6				
Queue Length 95th (ft)	238	14			118	48	89	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	562	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.64	0.21			0.46	0.40	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB ramps
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Fr _t						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				∅s		∅s
Satd. Flow (RTOR)						352
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1010	572	0	229	712
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1098	622	0	249	774
Lane Group Flow (vph)	0	1098	622	0	249	774
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.6	37.6	0.0	32.4	32.4
Total Split (%)	0.0%	53.7%	53.7%	0.0%	46.3%	46.3%
Maximum Green (s)		32.7	32.7		27.9	27.9
Yellow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.6	33.6		28.4	28.4
Actuated g/C Ratio		0.48	0.48		0.41	0.41
v/c Ratio		0.65	0.37		0.18	0.58
Control Delay		16.0	1.1		13.8	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.0	1.1		13.8	10.3
LOS		B	A		B	B
Approach Delay		16.0	1.1		11.2	
Approach LOS		B	A		B	

15: Ellis OC & SR 99 SB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

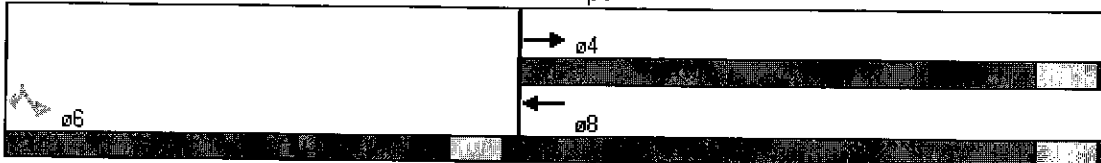
	↖	→	←	↖	↘	↘
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		177	0		34	70
Queue Length 95th (ft)		240	6		56	126
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1699	1699		1393	1340
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.37		0.18	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.8
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps















17: Ellis OC & Aviation Drive
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	0.95	0.97	0.97	0.95	1.00	1.00	0.88	
Frt			0.850		0.902			0.987			0.850	0.850	
Flt Protected	0.950			0.950			0.950	0.956		0.950			
Satd. Flow (prot)	1770	3539	1583	3433	3192	0	3433	3410	0	1770	1583	2787	
Flt Permitted	0.950			0.950			0.950	0.956		0.950			
Satd. Flow (perm)	1770	3539	1583	3433	3192	0	3433	3410	0	1770	1583	2787	
Right Turn on Red													
Satd. Flow (RTOR)			175		251			7				736	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Link Speed (mph)		40			40			40		40			
Link Distance (ft)		1066			1080			1293		1356			
Travel Time (s)		18.2			18.4			22.0		23.1			
Volume (vph)	54	170	161	807	121	231	383	623	58	175	611	1011	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	59	185	175	877	132	251	416	677	63	190	664	1099	
Lane Group Flow (vph)	59	185	175	877	383	0	416	740	0	190	664	1099	
Turn Type	Prot		Perm	Prot			Prot			Prot		custom	
Protected Phases	7	4		3	8		1	6		5			
Permitted Phases			4								2	2	
Detector Phases	7	4	4	3	8		1	6		5	2	2	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	8.5	20.9	20.9	8.5	20.9		8.5	20.9		20.9	20.9	20.9	
Total Split (s)	14.6	21.3	21.3	41.4	48.1	0.0	22.3	57.0	0.0	30.3	65.0	65.0	
Total Split (%)	9.7%	14.2%	14.2%	27.6%	32.1%	0.0%	14.9%	38.0%	0.0%	20.2%	43.3%	43.3%	
Maximum Green (s)	10.1	16.4	16.4	36.9	43.2		17.8	52.1		25.4	60.1	60.1	
Yellow Time (s)	3.5	3.9	3.9	3.5	3.9		3.5	3.9		3.9	3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead	
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	Max	
Walk Time (s)		5.0	5.0		5.0			5.0		5.0	5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0			0		0	0	0	
Act Effct Green (s)	9.5	13.8	13.8	37.4	43.9		18.3	53.0		26.3	61.0	61.0	
Actuated g/C Ratio	0.06	0.09	0.09	0.26	0.30		0.12	0.36		0.18	0.42	0.42	
v/c Ratio	0.52	0.56	0.57	1.00	0.34		0.97	0.60		0.60	1.01	0.69	
Control Delay	83.1	69.9	15.8	84.6	14.6		99.7	40.4		64.5	79.2	13.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	83.1	69.9	15.8	84.6	14.6		99.7	40.4		64.5	79.2	13.1	
LOS	F	E	B	F	B		F	D		E	E	B	
Approach Delay		49.2			63.3			61.7		40.6			
Approach LOS		D			E			E		D			

17: Ellis OC & Aviation Drive
 Mitigated 2030 Project PM Alternative B

10/22/2008

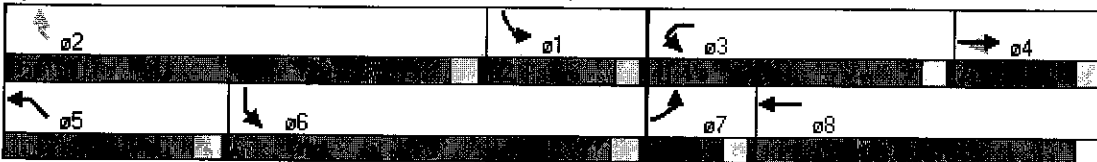
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	55	90	0	436	50		207	293		169	642	159
Queue Length 95th (ft)	108	133	74	#602	95		#326	373		261	#939	257
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	125	408	337	876	1157		429	1238		318	659	1590
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.45	0.52	1.00	0.33		0.97	0.60		0.60	1.01	0.69

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 146.5
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 52.4
 Intersection LOS: D
 Intersection Capacity Utilization Err%
 ICU Level of Service H
 Analysis Period (min) 15

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frnt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	3400	3505	0	0	3539	1583	1681	1686	2787	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	3400	3505	0	0	3539	1583	1681	1686	2787	0	0	0
Right Turn on Red			Yes			Yes		Yes		Yes		
Satd. Flow (RTOR)						792			34			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	302	1674	0	0	1457	813	523	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	328	1820	0	0	1584	884	568	7	807	0	0	0
Lane Group Flow (vph)	328	1820	0	0	1584	884	284	291	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	12.3	53.0	0.0	0.0	40.7	40.7	27.0	27.0	27.0	0.0	0.0	0.0
Total Split (%)	15.4%	66.3%	0.0%	0.0%	50.9%	50.9%	33.8%	33.8%	33.8%	0.0%	0.0%	0.0%
Maximum Green (s)	7.7	48.4			36.1	36.1	22.5	22.5	22.5			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	8.3	49.0			36.7	36.7	23.0	23.0	23.0			
Actuated g/C Ratio	0.10	0.61			0.46	0.46	0.29	0.29	0.29			
v/c Ratio	0.93	0.85			0.98	0.77	0.59	0.60	0.98			
Control Delay	49.3	12.4			39.8	7.5	30.3	30.7	55.4			
Queue Delay	0.0	1.4			0.0	0.0	0.0	0.0	0.0			
Total Delay	49.3	13.8			39.8	7.5	30.3	30.7	55.4			
LOS	D	B			D	A	C	C	E			
Approach Delay		19.2			28.2			45.0				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			D				
Queue Length 50th (ft)	78	220			391	25	127	131	218			
Queue Length 95th (ft)	m85	m250			#561	145	210	215	#352			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	353	2147			1624	1155	483	485	825			
Starvation Cap Reductn	0	162			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.93	0.92			0.98	0.77	0.59	0.60	0.98			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 67 (84%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 28.9
 Intersection Capacity Utilization 142.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↑	↓	↑↑					↑↑	↓		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)		50	50	50	50					50	50		
Trailing Detector (ft)		0	0	0	0					0	0		
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00	
Frt			0.850								0.854		
Flt Protected				0.950						0.950			
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	3273	1516	0	
Flt Permitted				0.950						0.950			
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	3273	1516	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			664								21		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Link Speed (mph)		35			35			30			30		
Link Distance (ft)		1214			391			1434			886		
Travel Time (s)		23.6			7.6			32.6			20.1		
Volume (vph)	0	1205	702	290	1690	0	0	0	0	771	9	320	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%	
Adj. Flow (vph)	0	1310	763	315	1837	0	0	0	0	838	10	348	
Lane Group Flow (vph)	0	1310	763	315	1837	0	0	0	0	838	358	0	
Turn Type			Perm		Prot					Perm			
Protected Phases		4		3		8					6		
Permitted Phases			4							6			
Detector Phases		4		3		8				6		6	
Minimum Initial (s)		4.0		4.0		4.0				4.0		4.0	
Minimum Split (s)		20.6		8.6		20.6				20.5		20.5	
Total Split (s)	0.0	35.3	35.3	19.2	54.5	0.0	0.0	0.0	0.0	25.5	25.5	0.0	
Total Split (%)	0.0%	44.1%	44.1%	24.0%	68.1%	0.0%	0.0%	0.0%	0.0%	31.9%	31.9%	0.0%	
Maximum Green (s)		30.7		14.6		49.9				21.0		21.0	
Yellow Time (s)		3.6		3.6		3.6				3.5		3.5	
All-Red Time (s)		1.0		1.0		1.0				1.0		1.0	
Lead/Lag		Lag		Lag		Lead							
Lead-Lag Optimize?		Yes		Yes		Yes							
Vehicle Extension (s)		3.0		3.0		3.0				3.0		3.0	
Recall Mode		C-Max		C-Max		None				None		None	
Walk Time (s)		5.0		5.0		5.0				5.0		5.0	
Flash Dont Walk (s)		11.0		11.0		11.0				11.0		11.0	
Pedestrian Calls (#/hr)		0		0		0				0		0	
Act Effct Green (s)		31.3		15.2		50.5				21.5		21.5	
Actuated g/C Ratio		0.39		0.19		0.63				0.27		0.27	
v/c Ratio		0.95		0.94		0.82				0.95		0.85	
Control Delay		39.1		64.6		4.6				51.1		46.5	
Queue Delay		0.0		0.0		1.0				0.0		0.0	
Total Delay		39.1		64.6		5.5				51.1		46.5	
LOS		D		A		E				D		D	
Approach Delay		27.8				14.2						49.7	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						D	
Queue Length 50th (ft)		324	31	169	132					211	160	
Queue Length 95th (ft)		#470	154	m#207	m119					#327	#309	
Internal Link Dist (ft)		1134			311			1354				806
Turn Bay Length (ft)												
Base Capacity (vph)		1385	1024	336	2234					880	423	
Starvation Cap Reductn		0	0	0	173					0	0	
Spillback Cap Reductn		0	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.95	0.75	0.94	0.89					0.95	0.85	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 27.2
 Intersection Capacity Utilization 142.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps















20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.937			0.978				
Flt Protected					0.975						0.995	
Satd. Flow (prot)	0	1736	0	0	1653	0	0	1689	0	0	1630	0
Flt Permitted					0.861						0.903	
Satd. Flow (perm)	0	1736	0	0	1460	0	0	1689	0	0	1479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			55			24				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2755			2781			7924			7936	
Travel Time (s)		47.0			47.4			120.1			120.2	
Volume (vph)	0	1	1	56	1	51	0	471	92	53	485	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	10%	10%	10%	16%	16%	16%
Adj. Flow (vph)	0	1	1	61	1	55	0	512	100	58	527	0
Lane Group Flow (vph)	0	2	0	0	117	0	0	612	0	0	585	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	25.9	25.9	0.0	25.9	25.9	0.0	54.1	54.1	0.0	54.1	54.1	0.0
Total Split (%)	32.4%	32.4%	0.0%	32.4%	32.4%	0.0%	67.6%	67.6%	0.0%	67.6%	67.6%	0.0%
Maximum Green (s)	21.0	21.0		21.0	21.0		48.8	48.8		48.8	48.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.6			10.6			49.4			49.4	
Actuated g/C Ratio		0.15			0.15			0.74			0.74	
v/c Ratio		0.01			0.43			0.49			0.54	
Control Delay		15.0			14.9			5.8			6.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.0			14.9			5.8			6.9	
LOS		B			B			A			A	
Approach Delay		15.0			14.9			5.8			6.9	

20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		0			15			65			69	
Queue Length 95th (ft)		5			58			167			185	
Internal Link Dist (ft)		2675			2701			7844			7856	
Turn Bay Length (ft)												
Base Capacity (vph)		515			472			1343			1172	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.00			0.25			0.46			0.50	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 67.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 7.1
 Intersection Capacity Utilization 81.8%
 Analysis Period (min) 15




















Intersection LOS: A
 ICU Level of Service D

Splits and Phases: 20: Ave 15.5/Cleveland & Road 23



21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15			15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt						0.850						0.853
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3539	1583	0	0	0	3433	1589	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3400	3505	0	0	3539	1583	0	0	0	3433	1589	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						341						168
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	1201	809	0	0	837	323	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1305	879	0	0	910	351	0	0	0	397	3	168
Lane Group Flow (vph)	1305	879	0	0	910	351	0	0	0	397	171	0
Turn Type	Prot					Perm				Perm		
Protected Phases	5	2			6							8
Permitted Phases						6					8	
Detector Phases	5	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	8.5	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	40.0	69.5	0.0	0.0	29.5	29.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	44.4%	77.2%	0.0%	0.0%	32.8%	32.8%	0.0%	0.0%	0.0%	22.8%	22.8%	0.0%
Maximum Green (s)	35.5	64.9			24.9	24.9				16.0	16.0	
Yellow Time (s)	3.5	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	None	C-Max			C-Max	C-Max				None	None	
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0				0	0	
Act Effct Green (s)	36.6	67.0			26.4	26.4				15.0	15.0	
Actuated g/C Ratio	0.41	0.74			0.29	0.29				0.17	0.17	
v/c Ratio	0.94	0.34			0.88	0.50				0.70	0.42	
Control Delay	25.7	0.6			41.8	6.1				42.1	9.1	
Queue Delay	0.6	0.0			0.0	0.0				0.1	0.0	
Total Delay	26.3	0.6			41.8	6.1				42.2	9.1	
LOS	C	A			D	A				D	A	
Approach Delay		16.0			31.9							32.2

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			C							C
Queue Length 50th (ft)	116	6			262	4				109	1	
Queue Length 95th (ft) m#492		m5			#377	68				156	54	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1384	2610			1038	705				629	429	
Starvation Cap Reductn	10	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				12	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.95	0.34			0.88	0.50				0.64	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 49 (54%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 23.3
 Intersection Capacity Utilization 77.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.95	1.00
Frt		0.908	0.850					0.998				0.850
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3367	3019	1413	0	0	0	3433	5075	0	1752	3505	1568
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3367	3019	1413	0	0	0	3433	5075	0	1752	3505	1568
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)		480	515					3				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	543	358	1139	0	0	0	343	1463	24	214	461	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	590	389	1238	0	0	0	373	1590	26	233	501	573
Lane Group Flow (vph)	590	1008	619	0	0	0	373	1616	0	233	501	573
Turn Type	Perm		Perm				Prot			Prot		Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		8.5	20.6	20.6
Total Split (s)	33.7	33.7	33.7	0.0	0.0	0.0	20.6	36.3	0.0	20.0	35.7	35.7
Total Split (%)	37.4%	37.4%	37.4%	0.0%	0.0%	0.0%	22.9%	40.3%	0.0%	22.2%	39.7%	39.7%
Maximum Green (s)	29.2	29.2	29.2				16.0	31.7		15.5	31.1	31.1
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.5	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max		None	Max	Max
Walk Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0			0	0
Act Effct Green (s)	29.7	29.7	29.7				16.6	33.1		15.2	31.7	31.7
Actuated g/C Ratio	0.33	0.33	0.33				0.18	0.37		0.17	0.35	0.35
v/c Ratio	0.53	0.76	0.76				0.59	0.86		0.79	0.41	0.62
Control Delay	23.7	15.1	11.0				37.9	32.6		39.3	6.6	9.6
Queue Delay	21.5	18.8	3.5				0.0	0.6		0.0	0.0	3.1
Total Delay	45.2	33.9	14.5				37.9	33.3		39.3	6.6	12.7
LOS	D	C	B				D	C		D	A	B
Approach Delay		31.5						34.1			15.1	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project PM Alternative B

10/22/2008

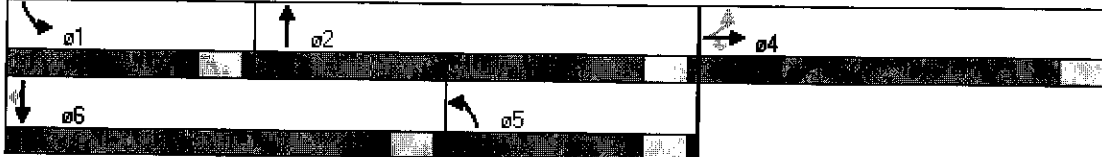
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C				B
Queue Length 50th (ft)	121	110	87				101	311		121	73	189
Queue Length 95th (ft)	m175	209	m156				146	#379		m155	m84	m298
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	1111	1318	811				633	1871		311	1235	923
Starvation Cap Reductn	525	327	115				0	0		0	0	243
Spillback Cap Reductn	0	0	0				0	63		0	0	4
Storage Cap Reductn	0	0	0				0	0		0	0	0
Reduced v/c Ratio	1.01	1.02	0.89				0.59	0.89		0.75	0.41	0.84

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 40 (44%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 28.6
 Intersection Capacity Utilization 72.8%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera









23: AVe 14/Olive & SR 99 SB off-ramp
Mitigated 2030 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1361
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1361
Right Turn on Red				⊘s		⊘s
Satd. Flow (RTOR)						70
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1110	870	0	930	389
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1207	946	0	1011	423
Lane Group Flow (vph)	0	1207	946	0	1011	423
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	45.3	45.3	0.0	44.7	44.7
Total Split (%)	0.0%	50.3%	50.3%	0.0%	49.7%	49.7%
Maximum Green (s)		40.8	40.8		40.2	40.2
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		46.9	46.9		35.1	35.1
Actuated g/C Ratio		0.52	0.52		0.39	0.39
v/c Ratio		0.65	0.51		0.80	0.74
Control Delay		19.0	3.6		29.2	27.0
Queue Delay		0.1	0.6		0.1	0.0
Total Delay		19.1	4.2		29.2	27.0
LOS		B	A		C	C
Approach Delay		19.1	4.2		28.6	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative B

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		254	38		252	183
Queue Length 95th (ft)		366	76		298	281
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1843	1843		1466	654
Starvation Cap Reductn		0	496		0	0
Spillback Cap Reductn		92	0		22	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.69	0.70		0.70	0.65

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 87 (97%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 19.0
 Intersection Capacity Utilization 67.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp















24: Ave 14/Olive & Road 23
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.895			0.990			0.958	
Flt Protected	0.950				0.997			0.999		0.950		
Satd. Flow (prot)	1752	1808	0	0	1541	0	0	1693	0	1556	1569	0
Flt Permitted	0.618				0.986			0.995		0.575		
Satd. Flow (perm)	1140	1808	0	0	1524	0	0	1686	0	942	1569	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		11			139			6			31	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2632			2680			5376			7924	
Travel Time (s)		44.9			45.7			81.5			120.1	
Volume (vph)	110	77	12	10	26	128	5	208	17	141	191	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	10%	10%	10%	11%	11%	11%	16%	16%	16%
Adj. Flow (vph)	120	84	13	11	28	139	5	226	18	153	208	80
Lane Group Flow (vph)	120	97	0	0	178	0	0	249	0	153	288	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	41.1	41.1	0.0	41.1	41.1	0.0	48.9	48.9	0.0	48.9	48.9	0.0
Total Split (%)	45.7%	45.7%	0.0%	45.7%	45.7%	0.0%	54.3%	54.3%	0.0%	54.3%	54.3%	0.0%
Maximum Green (s)	36.2	36.2		36.2	36.2		43.6	43.6		43.6	43.6	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.7	13.7			13.5			31.6		31.6	31.6	
Actuated g/C Ratio	0.26	0.26			0.26			0.65		0.65	0.65	
v/c Ratio	0.40	0.20			0.36			0.23		0.25	0.28	
Control Delay	13.0	8.4			5.3			5.9		7.2	5.9	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	13.0	8.4			5.3			5.9		7.2	5.9	
LOS	B	A			A			A		A	A	
Approach Delay		11.0			5.3			5.9			6.4	

24: Ave 14/Olive & Road 23
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)	12	8			4			22		14	24	
Queue Length 95th (ft)	51	37			36			69		54	77	
Internal Link Dist (ft)		2552			2600			5296			7844	
Turn Bay Length (ft)												
Base Capacity (vph)	621	989			893			1380		770	1289	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.19	0.10			0.20			0.18		0.20	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 48.3

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 7.0

Intersection LOS: A

Intersection Capacity Utilization 56.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 24: Ave 14/Olive & Road 23



25: SB Ramps & GS Blvd
 Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↖	↖	↑	↗	↘	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.664	
Satd. Flow (perm)	3335	1538	1759	1495	1213	1827
Right Turn on Red		ℳs		ℳs		
Satd. Flow (RTOR)		124		633		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	806		408			1104
Travel Time (s)	18.3		9.3			25.1
Volume (vph)	1363	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	1482	153	124	633	241	208
Lane Group Flow (vph)	1482	153	124	633	241	208
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	60.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	55.5	35.5	35.5	35.5	35.5	35.5
ℳlow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	67.1	24.9	24.9	24.9	24.9	24.9
Actuated g/C Ratio	0.67	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.66	0.32	0.28	0.75	0.80	0.46
Control Delay	13.2	8.9	21.0	7.0	53.4	33.5
Queue Delay	0.1	0.0	0.0	1.2	0.0	0.0
Total Delay	13.3	8.9	21.0	8.2	53.4	33.5
LOS	B	A	C	A	D	C
Approach Delay	12.9		10.3			44.2

25: SB Ramps & GS Blvd
 Mitigated 2030 Project PM Alternative B

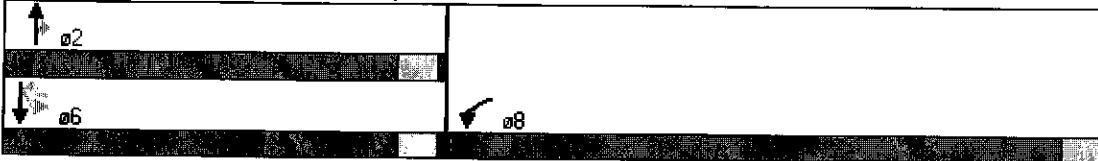
10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B		D	
Queue Length 50th (ft)	250	14	47	84	146	114
Queue Length 95th (ft)	458	54	m37	m43	202	153
Internal Link Dist (ft)	726		328		1024	
Turn Bay Length (ft)						
Base Capacity (vph)	2239	633	633	943	437	658
Starvation Cap Reductn	0	0	0	133	0	0
Spillback Cap Reductn	105	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.24	0.20	0.78	0.55	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 77 (77%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.1
 Intersection Capacity Utilization 64.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.94	1.00	1.00
Frt		0.990				0.850		0.872			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3309	0	1687	4848	1509	1752	1609	0	4848	1594	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	4848	1509	1752	1609	0	4848	1594	0
Right Turn on Red			vs			vs		vs			vs	
Satd. Flow (RTOR)		7				476		104			114	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1421	28	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1545	30	114
Lane Group Flow (vph)	261	446	0	21	703	476	47	122	0	1545	144	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						
Detector Phases	7	4		3	8	8	2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.6	20.6		8.6	20.6	20.6	20.5	20.5		20.5	20.5	
Total Split (s)	21.0	32.8	0.0	9.7	21.5	21.5	20.5	20.5	0.0	37.0	37.0	0.0
Total Split (%)	21.0%	32.8%	0.0%	9.7%	21.5%	21.5%	20.5%	20.5%	0.0%	37.0%	37.0%	0.0%
Maximum Green (s)	16.4	28.2		5.1	16.9	16.9	16.0	16.0		32.5	32.5	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead						
Lead-Lag Optimize?	vs	vs	vs	vs	vs	vs						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	
Act Effct Green (s)	17.0	34.6		5.7	17.5	17.5	16.5	16.5		33.0	33.0	
Actuated g/C Ratio	0.17	0.35		0.06	0.18	0.18	0.16	0.16		0.33	0.33	
v/c Ratio	0.92	0.39		0.22	0.83	0.72	0.16	0.35		0.97	0.24	
Control Delay	78.5	26.5		44.8	37.1	15.1	37.6	13.2		42.5	6.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		8.8	0.0	
Total Delay	78.5	26.5		44.8	37.1	15.1	37.6	13.2		51.3	6.4	
LOS	E	C		D	D	B	D	B		D	A	
Approach Delay		45.7			28.5			20.0			47.5	

26: Ave 12 & GS Blvd
 Mitigated 2030 Project PM Alternative B

10/22/2008

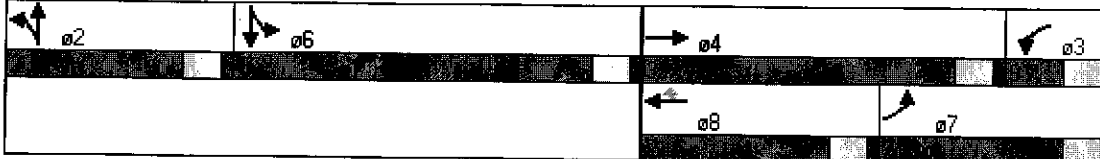
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			B			D	
Queue Length 50th (ft)	165	102		14	167	130	26	10		347	10	
Queue Length 95th (ft)	#315	168		m22	#198	239	59	60		#435	m35	
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	284	1150		96	848	657	289	352		1600	602	
Starvation Cap Reductn	0	0		0	0	0	0	0		72	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.92	0.39		0.22	0.83	0.72	0.16	0.35		1.01	0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 21 (21%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 39.9
 Intersection Capacity Utilization 71.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd















27: Ave 12 & SR 99 NB Ramps
Mitigated 2030 Project PM Alternative B

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.86	0.86	0.97	0.95	0.95	1.00	1.00	1.00
Fr					0.933	0.850		0.852	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3367	4988	0	0	4398	1335	3273	1437	1434	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3367	4988	0	0	4398	1335	3273	1437	1434	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					288	608		43	43			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	361	1572	0	0	714	1163	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	392	1709	0	0	776	1264	424	2	392	0	0	0
Lane Group Flow (vph)	392	1709	0	0	1408	632	424	198	196	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	22.0	75.0	0.0	0.0	53.0	53.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	22.0%	75.0%	0.0%	0.0%	53.0%	53.0%	25.0%	25.0%	25.0%	0.0%	0.0%	0.0%
Maximum Green (s)	17.5	70.5			48.5	48.5	20.5	20.5	20.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	18.0	73.6			51.6	51.6	18.4	18.4	18.4			
Actuated g/C Ratio	0.18	0.74			0.52	0.52	0.18	0.18	0.18			
v/c Ratio	0.65	0.47			0.58	0.64	0.71	0.66	0.66			
Control Delay	37.8	0.8			14.4	5.1	44.8	40.3	40.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	37.8	0.8			14.4	5.1	44.8	40.3	40.0			
LOS	D	A			B	A	D	D	D			
Approach Delay		7.7			11.5			42.6				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2030 Project PM Alternative B

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	136	16			184	8	130	95	94			
Queue Length 95th (ft)	m153	m15			242	91	178	173	171			
Internal Link Dist (ft)		738			2530			907				
Turn Bay Length (ft)											1026	
Base Capacity (vph)	606	3673			2410	983	687	336	335			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.65	0.47			0.58	0.64	0.62	0.59	0.59			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 96 (96%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 15.0
 Intersection Capacity Utilization 75.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



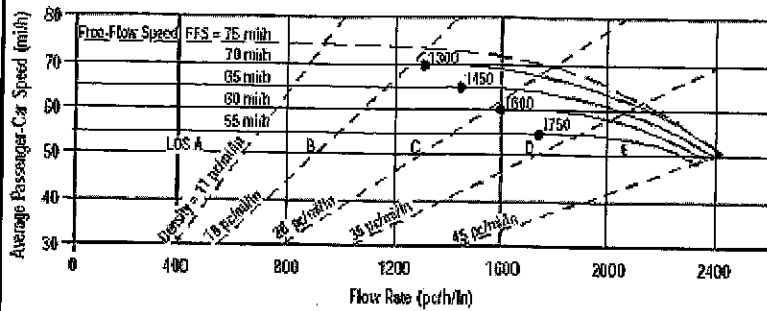
ATTACHMENT VI – C - 39

MITIGATED 2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

FREEWAY LEVEL OF SERVICE CALCULATIONS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4243	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T * (E _T - 1) + P _R * (E _R - 1)]	0.890

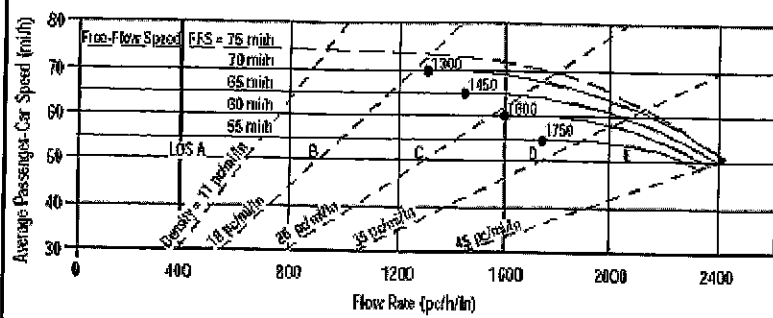
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * 1355 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h
D = v _p / S	19.4 pc/mi/ln	f _p	
LOS	C	S	mi/h
		D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibit 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibit 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibit 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v_p	LOS, S, D																						
Design (N)	FFS, LOS, v_p	N, S, D																						
Design (v_p)	FFS, LOS, N	v_p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v_p)	FFS, LOS, N	v_p , S, D																						
General Information		Site Information																						
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound																					
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2																					
Date Performed	9/22/08	Jurisdiction	Caltrans																					
Analysis Time Period	Mit 2030 Project Alt C PM	Analysis Year	2030																					
Project Description 04-837.2 Northfork Casino Alt C																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input checked="" type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	4999	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P_T																					
Peak-Hr Prop. of AADT, K			%RVs, P_R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT * K * D		veh/h	Grade % Length																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00	E_R	1.2																					
E_T	1.5	$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)}$	0.890																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																					
Interchange Density	0.50	l/mi	f_{ID}																					
Number of Lanes, N	4		f_N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h	70.0																					
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = (V \text{ or } DDHV) / (PHF * N * f_p)$	$HV * x$ 1596	pc/h/ln	Design LOS																					
S	69.5	mi/h	$v_p = (V \text{ or } DDHV) / (PHF * N * f_p)$																					
$D = v_p / S$	23.0	pc/mi/ln	f_p																					
LOS	C		S																					
			$D = v_p / S$																					
			Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibit 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibit 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibit 23-2, 23-3	f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	3903	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

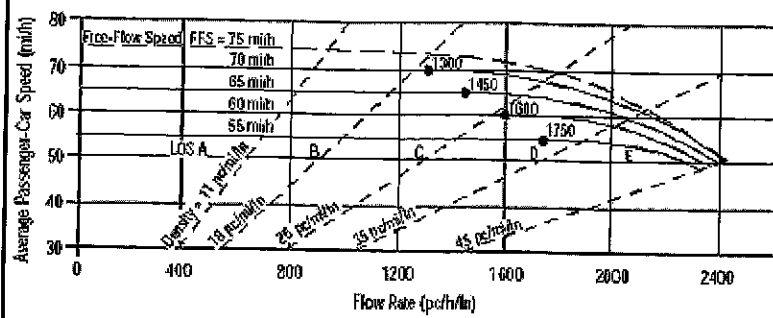
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X 1246 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * X pc/h
D = v _p / S	17.8 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	North of Avenue 18 1/2
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

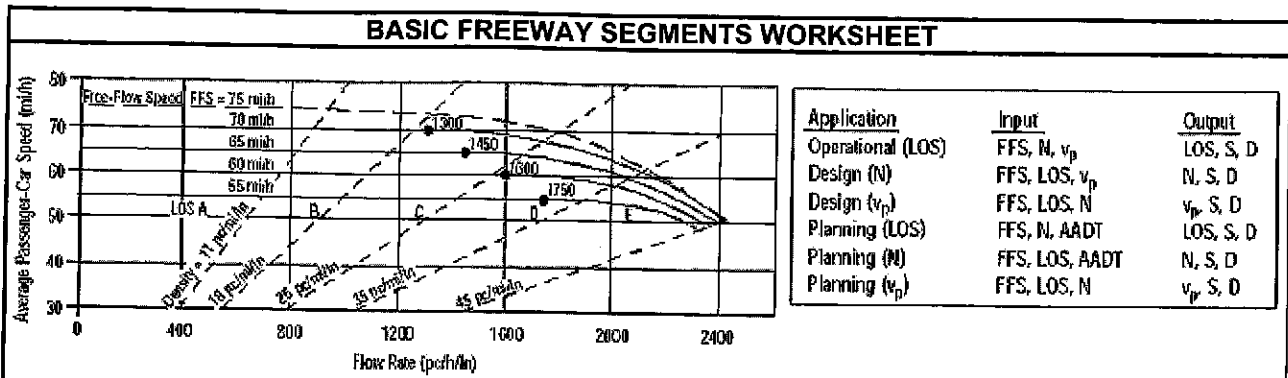
Flow Inputs			
Volume, V	5542	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level mi
DDHV =AADT *K *D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / (P _T (E _T - 1) + P _R (E _R - 1))	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X 1770 pc/h/ln	Design LOS	
S	68.2 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * X pc/h
D = v _p / S	26.0 pc/mi/ln	f _p	
LOS	C	S	mi/h
		D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibit 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibit 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibit 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4226	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

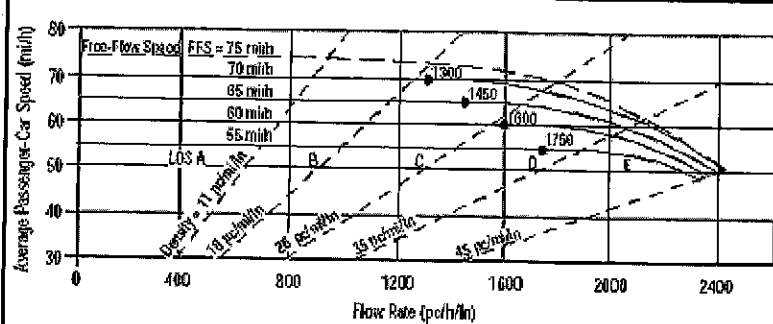
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T * (E _T - 1) + P _R * (E _R - 1)]	0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X 1349 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * X pc/h
D = v _p / S	19.3 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Ekibits 23-8, 23-10	f _{LW} - Ekibit 23-4
V - Hourly volume	D - Density	E _T - Ekibits 23-8, 23-10, 23-11	f _{LC} - Ekibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Ekibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Ekibits 23-2, 23-3	f _{ID} - Ekibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C PM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4850	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

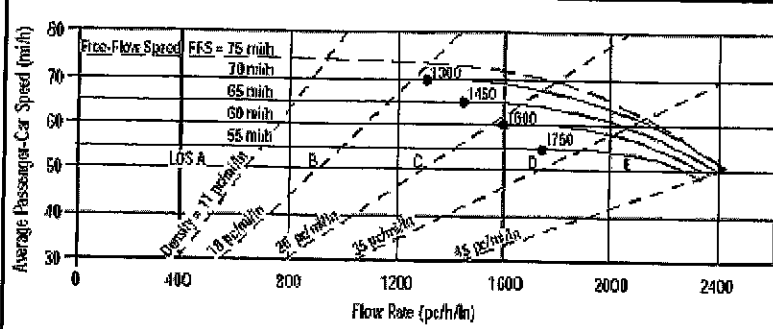
Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)] 0.890

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 1/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * 1549 pc/h/ln	Design LOS	
S	69.6 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h
D = v _p / S	22.2 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibit 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibit 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibit 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound
Agency or Company	TPG Consulting, Inc.	From/To	between Ave 18 1/2 & Ave 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	3855	veh/h	Peak-Hour Factor, PHF 0.88
AAADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AAADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AAADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)] 0.890

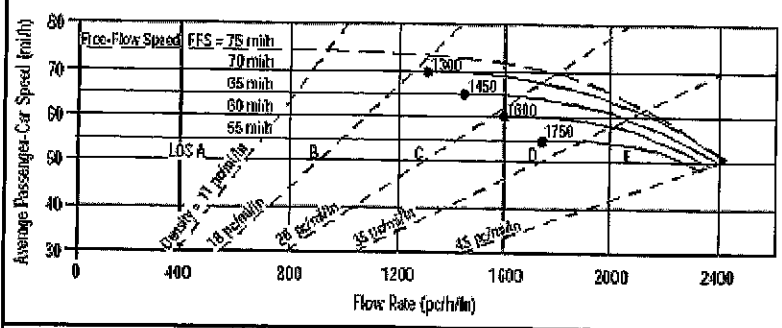
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures				Design (N)	
Operational (LOS)				Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * X	1231	pc/h/ln	Design LOS	
S		70.0	mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * X
D = v _p / S		17.6	pc/mi/ln	S	mi/h
LOS		B		D = v _p / S	pc/mi/ln
				Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibit 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibit 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibit 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																										
			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																								
Operational (LOS)	FFS, N, v_p	LOS, S, D																								
Design (N)	FFS, LOS, v_p	N, S, D																								
Design (v_p)	FFS, LOS, N	v_p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v_p)	FFS, LOS, N	v_p , S, D																								
General Information			Site Information																							
Analyst	R Davis		Highway/Direction of Travel	SR 99 Southbound																						
Agency or Company	TPG Consulting, Inc.		From/To	between Ave 18 1/2 & Ave 17																						
Date Performed	9/22/08		Jurisdiction	Caltrans																						
Analysis Time Period	Mit 2030 Project Alt C PM		Analysis Year	2030																						
Project Description 04-837.2 Northfork Casino Alt C																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	5418	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P_T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P_R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT * K * D		veh/h	Grade %	Length	mi																					
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f_p	1.00		E_R	1.2																						
E_T	1.5		$f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f_{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	mi/h																						
Interchange Density	0.50	l/mi	f_{ID}	mi/h																						
Number of Lanes, N	4		f_N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$	1730	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$																					
S		68.6	mi/h	S																						
$D = v_p / S$		25.2	pc/mi/ln	$D = v_p / S$																						
LOS		C		Required Number of Lanes, N																						
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																						
v_p - Flow rate	FFS - Free-flow speed		f_p - Page 23-12	f_N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																										

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	R Davis	Highway/Direction of Travel	SR 99 Northbound
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17
Date Performed	9/22/08	Jurisdiction	Caltrans
Analysis Time Period	Mit 2030 Project Alt C AM	Analysis Year	2030
Project Description 04-837.2 Northfork Casino Alt C			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5452	veh/h	Peak-Hour Factor, PHF 0.88
AADT		veh/day	%Trucks and Buses, P _T 24
Peak-Hr Prop. of AADT, K			%RVs, P _R 2
Peak-Hr Direction Prop, D			General Terrain: Level mi
DDHV = AADT * K * D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]	0.890

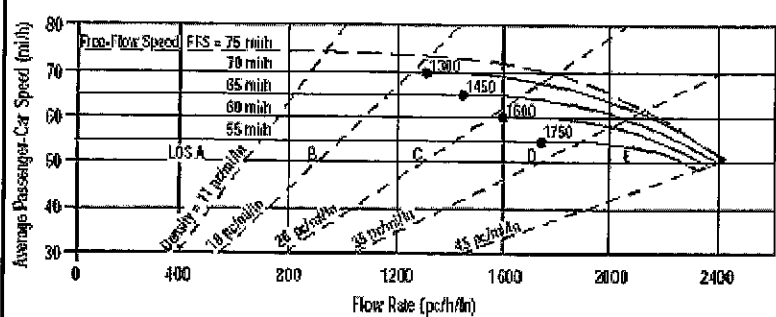
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	4	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF * N * f _p)	HV * 1741 pc/h/ln	Design LOS	
S	68.5 mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV * pc/h
D = v _p / S	25.4 pc/mi/ln	f _p	
LOS	C	S	mi/h
		D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibit 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibit 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibit 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																										
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Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst	R Davis		Highway/Direction of Travel	SR 99 Northbound																						
Agency or Company	TPG Consulting, Inc.		From/To	south of Avenue 17																						
Date Performed	9/22/08		Jurisdiction	Caltrans																						
Analysis Time Period	Mit 2030 Project Alt C PM		Analysis Year	2030																						
Project Description 04-837.2 Northfork Casino Alt C																										
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data																						
Flow Inputs																										
Volume, V	7312	veh/h	Peak-Hour Factor, PHF	0.88																						
AADT		veh/day	%Trucks and Buses, P _T	24																						
Peak-Hr Prop. of AADT, K			%RVs, P _R	2																						
Peak-Hr Direction Prop, D			General Terrain:	Level																						
DDHV = AADT * K * D		veh/h	Grade %	mi																						
Driver type adjustment	1.00		Up/Down %																							
Calculate Flow Adjustments																										
f _p	1.00		E _R	1.2																						
E _T	1.5		f _{HV} = [P _T (E _T - 1) + P _R (E _R - 1)]	0.890																						
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0	ft	f _{LW}	mi/h																						
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h																						
Interchange Density	0.50	l/mi	f _{ID}	mi/h																						
Number of Lanes, N	4		f _N	mi/h																						
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h																					
Base free-flow Speed, BFFS		mi/h																								
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF * N * f _p)	HV	2335 pc/h/ln	Design LOS																							
S	55.8	mi/h	v _p = (V or DDHV) / (PHF * N * f _p)	HV	pc/h																					
D = v _p / S	41.9	pc/mi/ln	f _p		mi/h																					
LOS	E		D = v _p / S		pc/mi/ln																					
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																						
V - Hourly volume	D - Density		E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																						
v _p - Flow rate	FFS - Free-flow speed		f _p - Page 23-12	f _N - Exhibit 23-6																						
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																						
DDHV - Directional design hour volume																										

BASIC FREEWAY SEGMENTS WORKSHEET																						
<p>The graph plots Average Passenger-Car Speed (mi/h) on the y-axis (30 to 80) against Flow Rate (pc/h/ln) on the x-axis (0 to 2400). It shows several curves representing different Levels of Service (LOS): LOS A (75 mi/h), LOS B (65 mi/h), LOS C (55 mi/h), and LOS D (45 mi/h). Density markers are shown at 71, 70, 65, 60, and 55 pc/mi/ln.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>	Application	Input	Output	Operational (LOS)	FFS, N, v_p	LOS, S, D	Design (N)	FFS, LOS, v_p	N, S, D	Design (v_p)	FFS, LOS, N	v_p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v_p)	FFS, LOS, N	v_p , S, D
Application	Input	Output																				
Operational (LOS)	FFS, N, v_p	LOS, S, D																				
Design (N)	FFS, LOS, v_p	N, S, D																				
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Planning (LOS)	FFS, N, AADT	LOS, S, D																				
Planning (N)	FFS, LOS, AADT	N, S, D																				
Planning (v_p)	FFS, LOS, N	v_p , S, D																				
General Information		Site Information																				
Analyst	R Davis	Highway/Direction of Travel	SR 99 Southbound																			
Agency or Company	TPG Consulting, Inc.	From/To	south of Avenue 17																			
Date Performed	9/22/08	Jurisdiction	Caltrans																			
Analysis Time Period	Mit 2030 Project Alt C AM	Analysis Year	2030																			
Project Description 04-837.2 Northfork Casino Alt C																						
<input checked="" type="checkbox"/> Oper.(LOS)		<input checked="" type="checkbox"/> Des.(N)																				
<input type="checkbox"/> Planning Data																						
Flow Inputs																						
Volume, V	4648	veh/h	Peak-Hour Factor, PHF																			
AADT		veh/day	%Trucks and Buses, P_T																			
Peak-Hr Prop. of AADT, K			%RVs, P_R																			
Peak-Hr Direction Prop, D			General Terrain:																			
DDHV = AADT * K * D		veh/h	Grade % Length																			
Driver type adjustment	1.00		Up/Down %																			
Calculate Flow Adjustments																						
f_D	1.00		E_R																			
E_T	1.5		$f_{HV} = 1 / (P_T(E_T - 1) + P_R(E_R - 1))$																			
Speed Inputs		Calc Speed Adj and FFS																				
Lane Width	12.0	ft	f_{LW}																			
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																			
Interchange Density	0.50	l/mi	f_{ID}																			
Number of Lanes, N	4		f_N																			
FFS (measured)	70.0	mi/h	FFS																			
Base free-flow Speed, BFFS		mi/h	70.0																			
LOS and Performance Measures		Design (N)																				
Operational (LOS)		Design (N)																				
$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$	$v_p = (V \text{ or DDHV}) / (PHF * N * f_p)$	$HV * X$																			
S	69.8	mi/h	S																			
$D = v_p / S$	21.2	pc/mi/ln	$D = v_p / S$																			
LOS	C		Required Number of Lanes, N																			
Glossary		Factor Location																				
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																			
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																			
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																			
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BASIC FREEWAY SEGMENTS WORKSHEET																										
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Application	Input	Output																								
Operational (LOS)	FFS, N, v _p	LOS, S, D																								
Design (N)	FFS, LOS, v _p	N, S, D																								
Design (v _p)	FFS, LOS, N	v _p , S, D																								
Planning (LOS)	FFS, N, AADT	LOS, S, D																								
Planning (N)	FFS, LOS, AADT	N, S, D																								
Planning (v _p)	FFS, LOS, N	v _p , S, D																								
General Information			Site Information																							
Analyst: <i>R Davis</i>		Highway/Direction of Travel: <i>SR 99 Southbound</i>		From/To: <i>south of Avenue 17</i>																						
Agency or Company: <i>TPG Consulting, Inc.</i>		Jurisdiction: <i>Caltrans</i>		Analysis Year: <i>2030</i>																						
Date Performed: <i>9/22/07</i>		Project Description: <i>04-837.2 Northfork Casino Alt C</i>																								
Analysis Time Period: <i>Mit 2030 Project Alt C PM</i>		<input checked="" type="checkbox"/> Oper.(LOS) <input checked="" type="checkbox"/> Des.(N) <input checked="" type="checkbox"/> Planning Data																								
Flow Inputs																										
Volume, V: <i>7653</i> veh/h		Peak-Hour Factor, PHF: <i>0.88</i>		AADT: <i></i> veh/day																						
Peak-Hr Prop. of AADT, K: <i></i>		%Trucks and Buses, P _T : <i>24</i>		%RVs, P _R : <i>2</i>																						
Peak-Hr Direction Prop, D: <i></i>		General Terrain: <i>Level</i>		Grade % Length: <i>mi</i>																						
DDHV = AADT * K * D: <i></i> veh/h		Driver type adjustment: <i>1.00</i>		Up/Down %: <i></i>																						
Calculate Flow Adjustments																										
f _p : <i>1.00</i>		E _R : <i>1.2</i>		E _T : <i>1.5</i>																						
E _T : <i>1.5</i>		f _{HV} = 1 / [P _T (E _T - 1) + P _R (E _R - 1)]: <i>0.890</i>																								
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width: <i>12.0</i> ft		f _{LW} : <i></i> mi/h		f _{LC} : <i></i> mi/h																						
Rt-Shoulder Lat. Clearance: <i>6.0</i> ft		f _{ID} : <i></i> mi/h		f _N : <i></i> mi/h																						
Interchange Density: <i>0.50</i> l/mi		FFS: <i>70.0</i> mi/h		FFS: <i>70.0</i> mi/h																						
Number of Lanes, N: <i>4</i>																										
FFS (measured): <i>70.0</i> mi/h																										
Base free-flow Speed, BFFS: <i></i> mi/h																										
LOS and Performance Measures			Design (N)																							
Operational (LOS)			Design (N)																							
v _p = (V or DDHV) / (PHF * K * f _p): <i>2444</i> pc/h/ln			Design LOS																							
S: <i></i> mi/h			v _p = (V or DDHV) / (PHF * K * f _p): <i></i> pc/h																							
D = v _p / S: <i></i> pc/mi/ln			S: <i></i> mi/h																							
LOS: <i>F</i>			D = v _p / S: <i></i> pc/mi/ln																							
			Required Number of Lanes, N: <i></i>																							
Glossary			Factor Location																							
N - Number of lanes		S - Speed		E _R - Exhibit 23-8, 23-10																						
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DDHV - Directional design hour volume				f _p - Page 23-12																						
				f _N - Exhibit 23-6																						
				LOS, S, FFS, v _p - Exhibit 23-2, 23-3																						
				f _{ID} - Exhibit 23-7																						

ATTACHMENT VI – C - 40

MITIGATED 2030 PROJECT CONDITIONS

MADERA SITE - ALTERNATIVE C

INTERSECTION LEVEL OF SERVICE CALCULATIONS













1: Ave 18.5 & SR 99 NB ramps
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt					0.981			0.857				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2466	1338	0	0	1566	0	1388	1253	0	0	0	0
Flt Permitted	0.596						0.950					
Satd. Flow (perm)	1547	1338	0	0	1566	0	1388	1253	0	0	0	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)					16			66				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	352	100	0	0	177	29	227	3	61	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	42%	42%	42%	19%	19%	19%	30%	30%	30%	0%	0%	0%
Adj. Flow (vph)	383	109	0	0	192	32	247	3	66	0	0	0
Lane Group Flow (vph)	383	109	0	0	224	0	247	69	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	37.4	37.4	0.0	0.0	37.4	0.0	32.6	32.6	0.0	0.0	0.0	0.0
Total Split (%)	53.4%	53.4%	0.0%	0.0%	53.4%	0.0%	46.6%	46.6%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.8	32.8			32.8		28.0	28.0				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	44.8	44.8			44.8		17.2	17.2				
Actuated g/C Ratio	0.64	0.64			0.64		0.25	0.25				
v/c Ratio	0.39	0.13			0.22		0.72	0.19				
Control Delay	5.4	4.0			6.7		35.7	6.7				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.4	4.0			6.7		35.7	6.7				
LOS	A	A			A		D	A				
Approach Delay		5.1			6.7			29.4				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative C

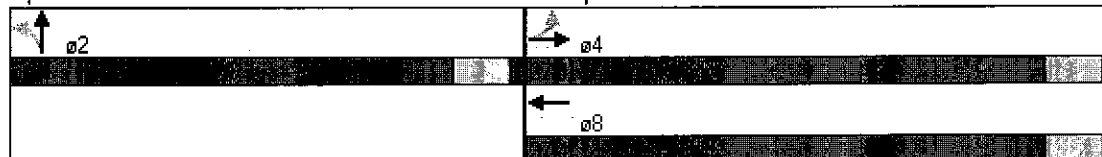
10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	19	10			32		98	1				
Queue Length 95th (ft)	39	m15			82		148	25				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	989	856			1007		567	551				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.39	0.13			0.22		0.44	0.13				

Intersection Summary







Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 11 (16%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 43.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps









3: Ave 18.5 & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1418	1545	0	1327	1187
Flt Permitted					0.950	
Satd. Flow (perm)	0	1418	1545	0	1327	1187
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						309
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	587	301	0	107	284
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	34%	34%	23%	23%	36%	36%
Adj. Flow (vph)	0	638	327	0	116	309
Lane Group Flow (vph)	0	638	327	0	116	309
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.6	20.6		21.3	21.3
Total Split (s)	0.0	48.0	48.0	0.0	22.0	22.0
Total Split (%)	0.0%	68.6%	68.6%	0.0%	31.4%	31.4%
Maximum Green (s)		43.4	43.4		16.7	16.7
Yellow Time (s)		3.6	3.6		4.3	4.3
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.5	49.5		12.5	12.5
Actuated g/C Ratio		0.71	0.71		0.18	0.18
v/c Ratio		0.64	0.30		0.49	0.66
Control Delay		8.6	3.5		32.0	10.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		8.6	3.5		32.0	10.8
LOS		A	A		C	B
Approach Delay		8.6	3.5		16.6	

3: Ave 18.5 & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		B	
Queue Length 50th (ft)		83	16		46	0
Queue Length 95th (ft)		225	68		84	60
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		1003	1093		341	535
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.64	0.30		0.34	0.58

Intersection Summary











Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 54 (77%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 9.8
 Intersection Capacity Utilization 43.5%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
 Mitigated 2030 Project AM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	572	424	181	0	132
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	622	461	197	0	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		683	295			
pX, platoon unblocked						
vC, conflicting volume	658				1124	461
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	658				1124	461
tC, single (s)	4.4				6.7	6.5
tC, 2 stage (s)						
tF (s)	2.5				3.8	3.6
p0 queue free %	97				100	74
cM capacity (veh/h)	799				194	543
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	642	461	197	143		
Volume Left	21	0	0	0		
Volume Right	0	0	197	143		
cSH	799	1700	1700	543		
Volume to Capacity	0.03	0.27	0.12	0.26		
Queue Length 95th (ft)	2	0	0	26		
Control Delay (s)	0.7	0.0	0.0	14.0		
Lane LOS	A			B		
Approach Delay (s)	0.7	0.0		14.0		
Approach LOS				B		
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			49.0%		ICU Level of Service	A
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.958			0.912			0.971			0.850	0.850
Flt Protected		0.994		0.950			0.950	0.961		0.950		
Satd. Flow (prot)	0	1762	0	3433	1220	0	1068	1544	0	1770	1583	1583
Flt Permitted		0.956		0.667			0.950	0.961		0.950		
Satd. Flow (perm)	0	1694	0	2410	1220	0	1068	1544	0	1770	1583	1583
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		32			101			17				265
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35		45		
Link Distance (ft)		412			683			1621		2125		
Travel Time (s)		8.0			13.3			31.6		32.2		
Volume (vph)	15	70	38	351	75	107	110	70	17	38	64	244
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	2%	2%	42%	42%	69%	2%	69%	2%	2%	2%
Adj. Flow (vph)	16	76	41	382	82	116	120	76	18	41	70	265
Lane Group Flow (vph)	0	133	0	382	198	0	120	94	0	41	70	265
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								2
Detector Phases	4	4		8	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6		20.6	20.6		21.3	21.3		21.3	21.3	21.3
Total Split (s)	23.4	23.4	0.0	23.4	23.4	0.0	23.3	23.3	0.0	23.3	23.3	23.3
Total Split (%)	33.4%	33.4%	0.0%	33.4%	33.4%	0.0%	33.3%	33.3%	0.0%	33.3%	33.3%	33.3%
Maximum Green (s)	18.8	18.8		18.8	18.8		18.0	18.0		18.0	18.0	18.0
ℳlow Time (s)	3.6	3.6		3.6	3.6		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		34.3		34.3	34.3		13.8	15.4		8.3	9.9	9.9
Actuated g/C Ratio		0.49		0.49	0.49		0.20	0.22		0.12	0.14	0.14
v/c Ratio		0.16		0.32	0.30		0.57	0.27		0.20	0.31	0.59
Control Delay		10.3		11.8	7.1		35.2	18.8		29.5	29.7	9.6
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		10.3		11.8	7.1		35.2	18.8		29.5	29.7	9.6
LOS		B		B	A		D	B		C	C	A
Approach Delay		10.3			10.2			28.0		15.5		

5: Ave 18.5 & Golden State
 Mitigated 2030 Project AM Alternative C

10/22/2008

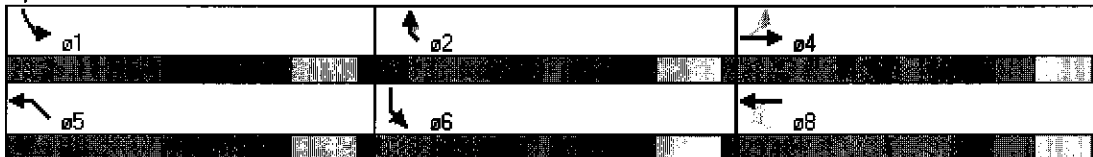
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Approach LOS		B			B			C		B		
Queue Length 50th (ft)		22		36	12		47	28		16	28	0
Queue Length 95th (ft)		66		97	m68		88	54		42	58	56
Internal Link Dist (ft)		332			603			1541		2045		
Turn Bay Length (ft)												
Base Capacity (vph)		847		1182	650		294	455		488	436	628
Starvation Cap Reductn		0		0	0		0	0		0	0	0
Spillback Cap Reductn		0		0	0		0	0		0	0	0
Storage Cap Reductn		0		0	0		0	0		0	0	0
Reduced v/c Ratio		0.16		0.32	0.30		0.41	0.21		0.08	0.16	0.42

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 21 (30%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 38.6%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 5: Ave 18.5 & Golden State















6: Ave 18 & Road 23
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.966			0.892			0.999				
Fl _t Protected					0.991						0.993	
Satd. Flow (prot)	0	1684	0	0	1486	0	0	1471	0	0	1440	0
Fl _t Permitted					0.963			0.999			0.908	
Satd. Flow (perm)	0	1684	0	0	1444	0	0	1470	0	0	1317	0
Right Turn on Red			ℳs			ℳs			ℳs			ℳs
Satd. Flow (RTOR)		3			59			1				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1863			2105			5263			1327	
Travel Time (s)		28.2			31.9			79.7			20.1	
Volume (vph)	0	8	3	12	2	54	1	389	3	54	359	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	13%	13%	13%	29%	29%	29%	31%	31%	31%
Adj. Flow (vph)	0	9	3	13	2	59	1	423	3	59	390	0
Lane Group Flow (vph)	0	12	0	0	74	0	0	427	0	0	449	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	21.3	21.3	0.0	21.3	21.3	0.0	38.7	38.7	0.0	38.7	38.7	0.0
Total Split (%)	35.5%	35.5%	0.0%	35.5%	35.5%	0.0%	64.5%	64.5%	0.0%	64.5%	64.5%	0.0%
Maximum Green (s)	16.0	16.0		16.0	16.0		33.4	33.4		33.4	33.4	
ℳlow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		9.8			9.8			55.2			55.2	
Actuated g/C Ratio		0.13			0.13			0.79			0.79	
v/c Ratio		0.05			0.31			0.37			0.43	
Control Delay		12.8			9.5			4.3			5.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.8			9.5			4.3			5.1	
LOS		B			A			A			A	
Approach Delay		12.8			9.5			4.3			5.1	

6: Ave 18 & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

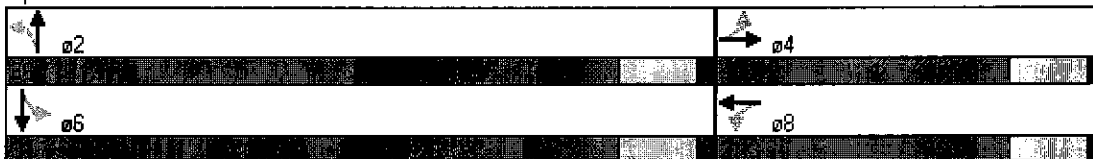
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		2			4			39			44	
Queue Length 95th (ft)		13			30			98			117	
Internal Link Dist (ft)		1783			2025			5183			1247	
Turn Bay Length (ft)												
Base Capacity (vph)		405			390			1185			1061	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.03			0.19			0.36			0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 69.5
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 5.2
 Intersection Capacity Utilization 63.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 6: Ave 18 & Road 23















7: Ave 17 & SR 99 NB ramps
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	0.94	0.91	0.91	1.00	1.00	1.00
Fr					0.986			0.856	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	2968	4396	0	0	4871	0	4802	1396	2773	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	2968	4396	0	0	4871	0	4802	1396	2773	0	0	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)					24			183	366			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	251	546	0	0	1239	124	1180	6	505	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	273	593	0	0	1347	135	1283	7	549	0	0	0
Lane Group Flow (vph)	273	593	0	0	1482	0	1283	190	366	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	9.3	21.3			21.3		20.6	20.6	20.6			
Total Split (s)	15.0	50.0	0.0	0.0	35.0	0.0	30.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	18.8%	62.5%	0.0%	0.0%	43.8%	0.0%	37.5%	37.5%	37.5%	0.0%	0.0%	0.0%
Maximum Green (s)	9.7	44.7			29.7		25.4	25.4	25.4			
Yellow Time (s)	4.3	4.3			4.3		3.6	3.6	3.6			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lag				Lead							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	11.0	46.2			31.2		25.8	25.8	25.8			
Actuated g/C Ratio	0.14	0.58			0.39		0.32	0.32	0.32			
v/c Ratio	0.67	0.23			0.77		0.83	0.33	0.32			
Control Delay	33.1	4.1			24.4		30.7	5.5	3.2			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	33.1	4.1			24.4		30.7	5.5	3.2			
LOS	C	A			C		C	A	A			
Approach Delay		13.3			24.4			22.6				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			C				
Queue Length 50th (ft)	71	21			228		206	2	0			
Queue Length 95th (ft)	#97	27			285		260	50	29			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	408	2541			1917		1561	577	1148			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.67	0.23			0.77		0.82	0.33	0.32			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 21.3
 Intersection Capacity Utilization 66.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C







95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps



9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↘↘	↗↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.86	0.91	1.00	0.97	0.88
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	5634	4940	0	2870	2330
Flt Permitted					0.950	
Satd. Flow (perm)	0	5634	4940	0	2870	2330
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						18
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	1733	1895	0	299	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	16%	5%	5%	22%	22%
Adj. Flow (vph)	0	1884	2060	0	325	116
Lane Group Flow (vph)	0	1884	2060	0	325	116
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	52.4	52.4	0.0	27.6	27.6
Total Split (%)	0.0%	65.5%	65.5%	0.0%	34.5%	34.5%
Maximum Green (s)		47.1	47.1		23.0	23.0
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.5	57.5		14.5	14.5
Actuated g/C Ratio		0.72	0.72		0.18	0.18
v/c Ratio		0.47	0.58		0.62	0.26
Control Delay		2.6	1.6		35.2	24.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		2.6	1.6		35.2	24.1
LOS		A	A		D	C
Approach Delay		2.6	1.6		32.3	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative C

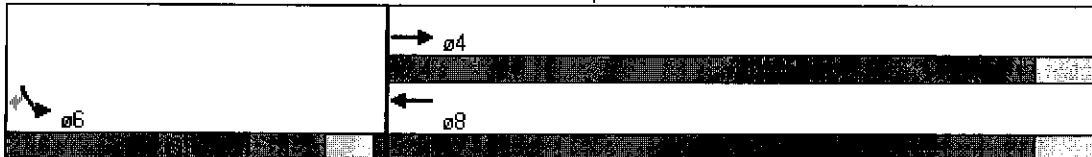
10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		41	13		78	23
Queue Length 95th (ft)		m97	26		110	45
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		4048	3549		847	700
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.47	0.58		0.38	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 73 (91%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 51.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Frt		0.990			0.954				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3183	4668	0	3155	4458	0	1433	1508	2256	3155	1712	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3183	4668	0	3155	4458	0	1433	1508	2256	3155	1712	1455
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		12			166				468			7
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	7	887	61	613	961	430	82	60	431	351	44	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	11%	11%	11%	26%	26%	26%	11%	11%	11%
Adj. Flow (vph)	8	964	66	666	1045	467	89	65	468	382	48	7
Lane Group Flow (vph)	8	1030	0	666	1512	0	89	65	468	382	48	7
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.3	21.3		9.3	21.3		8.6	20.6	20.6	8.6	20.6	20.6
Total Split (s)	9.3	22.7	0.0	22.0	35.4	0.0	12.1	20.6	20.6	14.7	23.2	23.2
Total Split (%)	11.6%	28.4%	0.0%	27.5%	44.3%	0.0%	15.1%	25.8%	25.8%	18.4%	29.0%	29.0%
Maximum Green (s)	4.0	17.4		16.7	30.1		7.5	16.0	16.0	10.1	18.6	18.6
Yellow Time (s)	4.3	4.3		4.3	4.3		3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	6.7	25.1		18.0	45.1		11.9	10.2	10.2	10.7	11.1	11.1
Actuated g/C Ratio	0.08	0.31		0.22	0.56		0.15	0.13	0.13	0.13	0.14	0.14
v/c Ratio	0.03	0.70		0.94	0.58		0.42	0.34	0.67	0.91	0.20	0.03
Control Delay	34.3	28.3		44.1	6.0		36.0	35.1	8.4	61.6	34.6	19.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.3	28.3		44.1	6.0		36.0	35.1	8.4	61.6	34.6	19.0
LOS	C	C		D	A		D	D	A	E	C	B
Approach Delay		28.3			17.6			15.1			58.0	

10: Ave 17 & GS Blvd
 Mitigated 2030 Project AM Alternative C

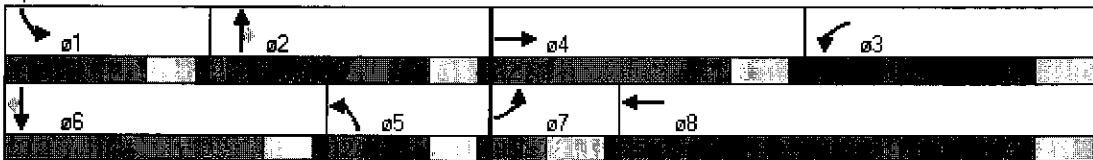
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			E	
Queue Length 50th (ft)	2	158		167	39		41	31	0	98	23	0
Queue Length 95th (ft)	8	#261		#272	241		80	62	41	#177	53	11
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	266	1474		710	2588		218	313	839	422	418	361
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.70		0.94	0.58		0.41	0.21	0.56	0.91	0.11	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 16 (20%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 24.0
 Intersection LOS: C
 Intersection Capacity Utilization 62.7%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Ave 17 & GS Blvd



11: Ave 17 & Road 23













Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.998			0.984				0.850
Fl _t Protected		0.998		0.950			0.950				0.997	
Satd. Flow (prot)	0	3498	1568	1656	3305	0	1504	1558	0	0	1515	1292
Fl _t Permitted		0.917		0.352			0.528				0.961	
Satd. Flow (perm)	0	3214	1568	614	3305	0	836	1558	0	0	1461	1292
Right Turn on Red			RTOR			RTOR			RTOR			RTOR
Satd. Flow (RTOR)			150		2			15				16
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	20	512	138	42	607	7	138	386	47	19	272	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	20%	20%	20%	25%	25%	25%
Adj. Flow (vph)	22	557	150	46	660	8	150	420	51	21	296	16
Lane Group Flow (vph)	0	579	150	46	668	0	150	471	0	0	317	16
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phases	4	4	4	8	8		2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3	21.3	21.3	21.3		21.3	21.3		21.3	21.3	21.3
Total Split (s)	24.9	24.9	24.9	24.9	24.9	0.0	35.1	35.1	0.0	35.1	35.1	35.1
Total Split (%)	41.5%	41.5%	41.5%	41.5%	41.5%	0.0%	58.5%	58.5%	0.0%	58.5%	58.5%	58.5%
Maximum Green (s)	19.6	19.6	19.6	19.6	19.6		29.8	29.8		29.8	29.8	29.8
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	0
Act Effct Green (s)		15.3	15.3	15.3	15.3		18.9	18.9			18.9	18.9
Actuated g/C Ratio		0.36	0.36	0.36	0.36		0.44	0.44			0.44	0.44
v/c Ratio		0.51	0.23	0.21	0.57		0.41	0.68			0.49	0.03
Control Delay		13.8	4.0	15.0	14.4		12.4	15.0			11.7	4.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		13.8	4.0	15.0	14.4		12.4	15.0			11.7	4.0
LOS		B	A	B	B		B	B			B	A
Approach Delay		11.8			14.4			14.4			11.3	

11: Ave 17 & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		52	0	7	62		22	78			49	0
Queue Length 95th (ft)		128	31	34	148		65	183			117	7
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1421	777	272	1462		481	902			840	750
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.41	0.19	0.17	0.46		0.31	0.52			0.38	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 42.9

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 13.2

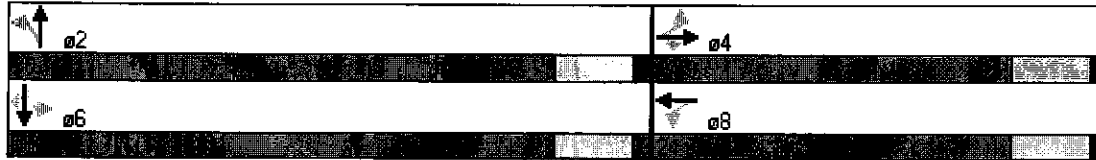
Intersection Capacity Utilization 83.4%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service E

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26

Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.967			0.997	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1719	3325	0	1752	3494	0
Flt Permitted		0.815			0.721		0.950			0.950		
Satd. Flow (perm)	0	1518	1583	0	1343	1583	1719	3325	0	1752	3494	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			15			54		73			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	9	1	14	160	2	50	10	380	109	32	609	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	10	1	15	174	2	54	11	413	118	35	662	12
Lane Group Flow (vph)	0	11	15	0	176	54	11	531	0	35	674	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	21.9	21.9	21.9	21.9	21.9	21.9	9.9	22.7	0.0	10.4	23.2	0.0
Total Split (%)	39.8%	39.8%	39.8%	39.8%	39.8%	39.8%	18.0%	41.3%	0.0%	18.9%	42.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	5.0	17.8		5.5	18.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		13.0	13.0		13.2	13.2	6.3	25.4		6.8	27.7	
Actuated g/C Ratio		0.25	0.25		0.26	0.26	0.11	0.52		0.12	0.57	
v/c Ratio		0.03	0.04		0.51	0.12	0.06	0.30		0.16	0.34	
Control Delay		11.9	7.2		17.6	5.4	22.3	8.8		21.2	8.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.9	7.2		17.6	5.4	22.3	8.8		21.2	8.4	
LOS		B	A		B	A	C	A		C	A	
Approach Delay		9.2			14.7			9.1			9.1	

12: Ellis OC & Road 26
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1	0		21	0	1	23		5	36	
Queue Length 95th (ft)		11	10		90	19	15	95		32	135	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		523	555		462	580	190	1857		217	2048	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.02	0.03		0.38	0.09	0.06	0.29		0.16	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 55

Actuated Cycle Length: 49

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 10.0

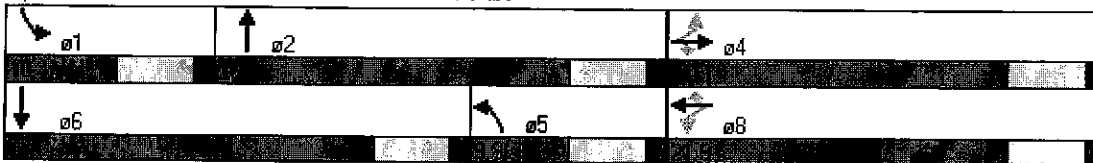
Intersection Capacity Utilization 46.2%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 12: Ellis OC & Road 26



13: Ellis OC & SR 99 NB ramps
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr						0.850		0.853				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1589	0	0	0	0
Right Turn on Red			∅s			∅s		∅s		∅s		∅s
Satd. Flow (RTOR)						164		95				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1134			844			1191	
Travel Time (s)		12.1			19.3			19.2			27.1	
Volume (vph)	481	315	0	0	240	151	204	2	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	523	342	0	0	261	164	222	2	95	0	0	0
Lane Group Flow (vph)	523	342	0	0	261	164	222	97	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.9	20.9				
Total Split (s)	18.2	39.1	0.0	0.0	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0
Total Split (%)	30.3%	65.2%	0.0%	0.0%	34.8%	34.8%	34.8%	34.8%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	13.7	34.2			16.0	16.0	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.9	3.9				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	∅s				∅s	∅s						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	C-Max	None			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	20.6	35.1			10.5	10.5	16.9	16.9				
Actuated g/C Ratio	0.34	0.58			0.18	0.18	0.28	0.28				
v/c Ratio	0.44	0.17			0.42	0.40	0.23	0.19				
Control Delay	11.3	3.3			23.7	7.2	17.3	5.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	11.3	3.3			23.7	7.2	17.3	5.7				
LOS	B	A			C	A	B	A				
Approach Delay		8.2			17.3			13.8				
Approach LOS		A			B			B				

13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	48	12			44	0	31	1				
Queue Length 95th (ft)	130	19			70	40	55	29				
Internal Link Dist (ft)		630			1054			764			1111	
Turn Bay Length (ft)												
Base Capacity (vph)	1178	2070			997	564	967	516				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.44	0.17			0.26	0.29	0.23	0.19				

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 7:EBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



15: Ellis OC & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative C

10/22/2008

	↗	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↗↘	↖↙
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				ℳs		ℳs
Satd. Flow (RTOR)						479
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1404	
Travel Time (s)		18.4	12.1		31.9	
Volume (vph)	0	633	368	0	163	441
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	688	400	0	177	479
Lane Group Flow (vph)	0	688	400	0	177	479
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.9	20.9
Total Split (s)	0.0	30.1	30.1	0.0	29.9	29.9
Total Split (%)	0.0%	50.2%	50.2%	0.0%	49.8%	49.8%
Maximum Green (s)		25.2	25.2		25.0	25.0
Yellow Time (s)		3.9	3.9		3.9	3.9
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		26.1	26.1		25.9	25.9
Actuated g/C Ratio		0.44	0.44		0.43	0.43
v/c Ratio		0.45	0.26		0.12	0.32
Control Delay		13.1	2.7		10.5	1.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.1	2.7		10.5	1.9
LOS		B	A		B	A
Approach Delay		13.1	2.7		4.2	
Approach LOS		B	A		A	

15: Ellis OC & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative C

10/22/2008

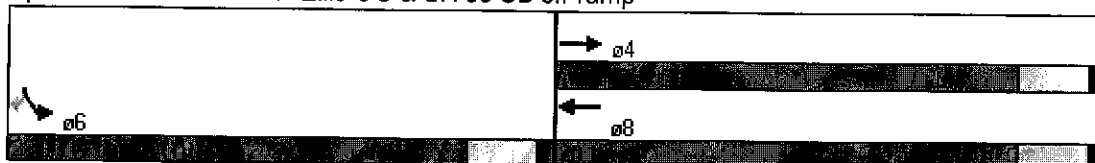
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		87	0		18	0
Queue Length 95th (ft)		126	3		34	24
Internal Link Dist (ft)		1000	630		1324	
Turn Bay Length (ft)						
Base Capacity (vph)		1539	1539		1482	1475
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.26		0.12	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB off-ramp



17: Ellis OC & Aviation Drive
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	0.95	0.97	0.97	0.95	1.00	1.00	0.88
Frt			0.850		0.899			0.978			0.850	0.850
Flt Protected	0.950			0.950			0.950	0.959		0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3182	0	3433	3389	0	1770	1583	2787
Flt Permitted	0.950			0.950			0.950	0.959		0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3182	0	3433	3389	0	1770	1583	2787
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)			129		197			22				621
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1110			1080			1297		1356		
Travel Time (s)		18.9			18.4			22.1		23.1		
Volume (vph)	47	122	119	445	89	181	194	261	44	121	387	571
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	133	129	484	97	197	211	284	48	132	421	621
Lane Group Flow (vph)	51	133	129	484	294	0	211	332	0	132	421	621
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases		4	4		8						2	2
Detector Phases	7	4	4	3	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	20.9	20.9	8.5	20.9		8.5	20.9		20.9	20.9	20.9
Total Split (s)	10.6	21.2	21.2	17.0	27.6	0.0	11.3	20.9	0.0	20.9	30.5	30.5
Total Split (%)	13.3%	26.5%	26.5%	21.3%	34.5%	0.0%	14.1%	26.1%	0.0%	26.1%	38.1%	38.1%
Maximum Green (s)	6.1	16.3	16.3	12.5	22.7		6.8	16.0		16.0	25.6	25.6
Yellow Time (s)	3.5	3.9	3.9	3.5	3.9		3.5	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		Max	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0		0	0	0
Act Effct Green (s)	6.5	9.0	9.0	12.9	19.6		7.3	16.9		16.9	26.5	26.5
Actuated g/C Ratio	0.09	0.13	0.13	0.18	0.27		0.10	0.24		0.24	0.37	0.37
v/c Ratio	0.34	0.30	0.41	0.79	0.29		0.60	0.41		0.32	0.72	0.44
Control Delay	38.0	30.2	10.4	39.2	9.1		39.1	23.6		25.6	28.5	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	38.0	30.2	10.4	39.2	9.1		39.1	23.6		25.6	28.5	2.7
LOS	D	C	B	D	A		D	C		C	C	A
Approach Delay		23.3			27.8			29.7		14.5		
Approach LOS		C			C			C		B		

17: Ellis OC & Aviation Drive
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	22	28	0	106	18		46	59		48	156	0
Queue Length 95th (ft)	55	53	44	#181	48		#82	98		98	#299	34
Internal Link Dist (ft)		1030			1000			1217		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	154	762	442	622	1140		350	817		418	586	1423
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.33	0.17	0.29	0.78	0.26		0.60	0.41		0.32	0.72	0.44

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 71.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 22.1

Intersection LOS: C

Intersection Capacity Utilization Err%

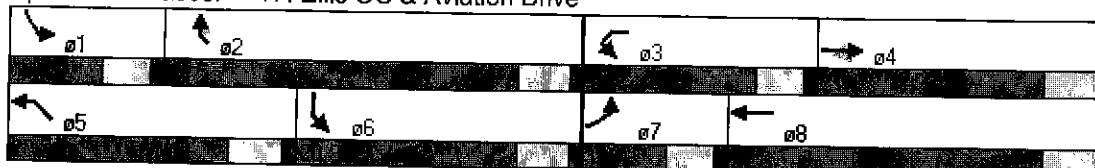
ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive



18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗			↖↖	↗	↖	↗	↗↗			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3367	3471	0	0	3471	1553	1618	1618	2682	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3367	3471	0	0	3471	1553	1618	1618	2682	0	0	0
Right Turn on Red			∞s			∞s			∞s		∞s	
Satd. Flow (RTOR)						514			201			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	196	995	0	0	931	473	359	0	353	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	0%	0%	0%
Adj. Flow (vph)	213	1082	0	0	1012	514	390	0	384	0	0	0
Lane Group Flow (vph)	213	1082	0	0	1012	514	195	195	384	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	13.9	48.4	0.0	0.0	34.5	34.5	21.6	21.6	21.6	0.0	0.0	0.0
Total Split (%)	19.9%	69.1%	0.0%	0.0%	49.3%	49.3%	30.9%	30.9%	30.9%	0.0%	0.0%	0.0%
Maximum Green (s)	9.3	43.8			29.9	29.9	17.1	17.1	17.1			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	∞s				∞s	∞s						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.3	44.4			31.1	31.1	17.6	17.6	17.6			
Actuated g/C Ratio	0.13	0.63			0.44	0.44	0.25	0.25	0.25			
v/c Ratio	0.48	0.49			0.66	0.53	0.48	0.48	0.47			
Control Delay	39.5	1.1			17.9	3.6	27.0	27.0	12.4			
Queue Delay	0.0	0.1			0.0	0.0	0.0	0.0	0.0			
Total Delay	39.5	1.2			17.9	3.6	27.0	27.0	12.4			
LOS	D	A			B	A	C	C	B			
Approach Delay		7.5			13.1			19.7				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project AM Alternative C

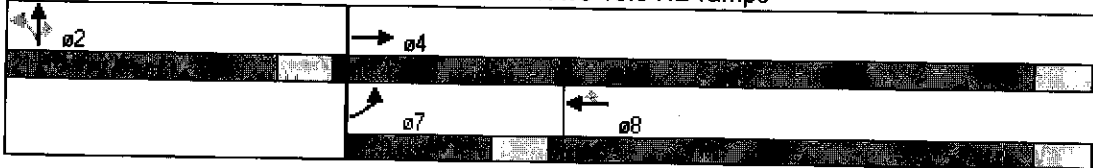
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B				
Queue Length 50th (ft)	44	4			175	0	74	74	35			
Queue Length 95th (ft)	m62	16			238	50	137	137	75			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	476	2202			1544	976	407	407	825			
Starvation Cap Reductn	0	213			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.45	0.54			0.66	0.53	0.48	0.48	0.47			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 66 (94%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 73.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑↑	↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	
Trailing Detector (ft)		0	0	0	0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850								0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3374	1509	1719	3438	0	0	0	0	3099	1429	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3374	1509	1719	3438	0	0	0	0	3099	1429	0
Right Turn on Red			Ⓢ			Ⓢ			Ⓢ		Ⓢ	
Satd. Flow (RTOR)			459								144	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	760	422	414	921	0	0	0	0	430	0	229
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	0%	0%	0%	13%	13%	13%
Adj. Flow (vph)	0	826	459	450	1001	0	0	0	0	467	0	249
Lane Group Flow (vph)	0	826	459	450	1001	0	0	0	0	467	249	0
Turn Type			Perm	Prot						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Detector Phases		4	4	3	8					6	6	
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	
Total Split (s)	0.0	24.5	24.5	25.0	49.5	0.0	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	0.0%	35.0%	35.0%	35.7%	70.7%	0.0%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)		19.9	19.9	20.4	44.9					16.0	16.0	
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Ⓢ	Ⓢ	Ⓢ								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Recall Mode		C-Max	C-Max	None	C-Max					None	None	
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0					0	0	
Act Effct Green (s)		22.0	22.0	21.0	47.0					15.0	15.0	
Actuated g/C Ratio		0.31	0.31	0.30	0.67					0.21	0.21	
v/c Ratio		0.78	0.58	0.87	0.43					0.70	0.59	
Control Delay		28.9	5.6	34.5	2.2					31.5	17.0	
Queue Delay		0.0	0.0	0.0	0.2					0.0	0.0	
Total Delay		28.9	5.6	34.5	2.3					31.5	17.0	
LOS		C	A	C	A					C	B	
Approach Delay		20.6			12.3						26.4	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project AM Alternative C

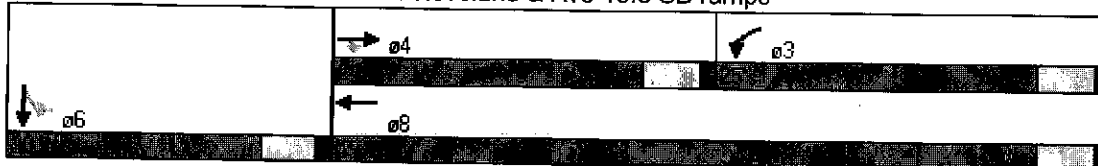
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						C	
Queue Length 50th (ft)		174	0	163	12					93	37	
Queue Length 95th (ft)		#267	63	#337	43					139	105	
Internal Link Dist (ft)		1134			311			1354			806	
Turn Bay Length (ft)												
Base Capacity (vph)		1060	789	516	2308					730	447	
Starvation Cap Reductn		0	0	0	473					0	0	
Spillback Cap Reductn		0	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.78	0.58	0.87	0.55					0.64	0.56	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 18.3
 Intersection LOS: B
 Intersection Capacity Utilization 73.2%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps



20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.941			0.987				
Flt Protected					0.973						0.996	
Satd. Flow (prot)	0	1863	0	0	1706	0	0	1576	0	0	1590	0
Flt Permitted					0.872						0.943	
Satd. Flow (perm)	0	1863	0	0	1528	0	0	1576	0	0	1506	0
Right Turn on Red			rs			rs			rs			rs
Satd. Flow (RTOR)					38			12				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2755			2781			7924			7936	
Travel Time (s)		47.0			47.4			120.1			120.2	
Volume (vph)	0	0	0	44	1	35	0	368	38	30	306	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	19%	19%	19%	19%	19%	19%
Adj. Flow (vph)	0	0	0	48	1	38	0	400	41	33	333	0
Lane Group Flow (vph)	0	0	0	0	87	0	0	441	0	0	366	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	27.9	27.9	0.0	27.9	27.9	0.0	42.1	42.1	0.0	42.1	42.1	0.0
Total Split (%)	39.9%	39.9%	0.0%	39.9%	39.9%	0.0%	60.1%	60.1%	0.0%	60.1%	60.1%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		36.8	36.8		36.8	36.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)					10.1			48.3			48.3	
Actuated g/C Ratio					0.15			0.73			0.73	
v/c Ratio					0.33			0.38			0.33	
Control Delay					10.9			4.9			4.7	
Queue Delay					0.0			0.0			0.0	
Total Delay					10.9			4.9			4.7	
LOS					B			A			A	
Approach Delay					10.9			4.9			4.7	

20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B			A			A	
Queue Length 50th (ft)					12			41			33	
Queue Length 95th (ft)					38			102			84	
Internal Link Dist (ft)		2675			2701			7844			7856	
Turn Bay Length (ft)												
Base Capacity (vph)					519			1217			1161	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.17			0.36			0.32	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 65.8
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.38
 Intersection Signal Delay: 5.4
 Intersection Capacity Utilization 52.3%
 Analysis Period (min) 15



















Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 20: Ave 15.5/Cleveland & Road 23



21: SR 145/Madera & SR 99 NB ramps
Mitigated 2030 Project AM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15			9	15	9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt						0.850					0.850	
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3213	3312	0	0	3374	1509	0	0	0	3400	1568	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3213	3312	0	0	3374	1509	0	0	0	3400	1568	0
Right Turn on Red			ns			ns			ns		ns	
Satd. Flow (RTOR)						226					310	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	822	580	0	0	568	208	0	0	0	327	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	893	630	0	0	617	226	0	0	0	355	0	168
Lane Group Flow (vph)	893	630	0	0	617	226	0	0	0	355	168	0
Turn Type	Prot					Perm				Perm		
Protected Phases	5	2			6						8	
Permitted Phases						6						8
Detector Phases	5	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	8.5	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	0.0%	0.0%	0.0%	29.3%	29.3%	0.0%
Maximum Green (s)	23.5	44.9			16.9	16.9				16.0	16.0	
Yellow Time (s)	3.5	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ns				ns	ns						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	None	C-Max			C-Max	C-Max				None	None	
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0				0	0	
Act Effct Green (s)	24.0	49.1			21.1	21.1				12.9	12.9	
Actuated g/C Ratio	0.34	0.70			0.30	0.30				0.18	0.18	
v/c Ratio	0.81	0.27			0.61	0.37				0.56	0.31	
Control Delay	18.1	0.7			24.7	5.4				29.2	1.5	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	18.1	0.7			24.7	5.4				29.2	1.5	
LOS	B	A			C	A				C	A	
Approach Delay		10.9			19.6						20.3	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project AM Alternative C

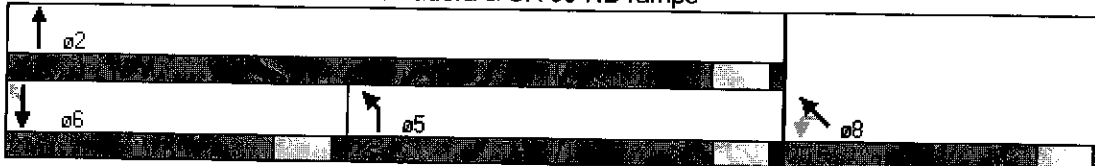
10/22/2008

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			B							C
Queue Length 50th (ft)	147	0			117	0				73	0	0
Queue Length 95th (ft)	#276	0			184	49				104	0	0
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1102	2321			1015	612				801	607	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.81	0.27			0.61	0.37				0.44	0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 15.1
 Intersection LOS: B
 Intersection Capacity Utilization 58.7%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: Ave 14/Olive & SR 145/Madera
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.95	1.00
Frt		0.917	0.850					0.991				0.850
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3335	3020	1400	0	0	0	3213	4716	0	1736	3471	1553
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3335	3020	1400	0	0	0	3213	4716	0	1736	3471	1553
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)		379	379					16				468
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	433	278	697	0	0	0	254	974	65	120	344	431
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	9%	9%	9%	4%	4%	4%
Adj. Flow (vph)	471	302	758	0	0	0	276	1059	71	130	374	468
Lane Group Flow (vph)	471	681	379	0	0	0	276	1130	0	130	374	468
Turn Type	Perm		Perm				Prot			Prot		Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		8.5	20.6	20.6
Total Split (s)	25.4	25.4	25.4	0.0	0.0	0.0	20.6	28.7	0.0	15.9	24.0	24.0
Total Split (%)	36.3%	36.3%	36.3%	0.0%	0.0%	0.0%	29.4%	41.0%	0.0%	22.7%	34.3%	34.3%
Maximum Green (s)	20.9	20.9	20.9				16.0	24.1		11.4	19.4	19.4
ℳlow Time (s)	3.5	3.5	3.5				3.6	3.6		3.5	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max	None	Max	Max	
Walk Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0			0	0
Act Effct Green (s)	21.4	21.4	21.4				16.6	27.9		10.9	20.0	20.0
Actuated g/C Ratio	0.31	0.31	0.31				0.24	0.40		0.16	0.29	0.29
v/c Ratio	0.46	0.57	0.55				0.36	0.60		0.48	0.38	0.60
Control Delay	19.4	10.3	7.1				23.9	19.2		40.0	9.4	9.6
Queue Delay	1.5	0.9	0.6				0.0	0.0		0.0	0.0	0.0
Total Delay	20.9	11.2	7.8				23.9	19.2		40.0	9.4	9.6
LOS	C	B	A				C	B		D	A	A
Approach Delay		13.3						20.1			13.6	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project AM Alternative C

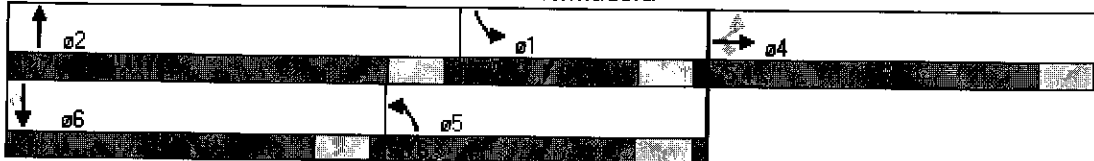
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						C			B	
Queue Length 50th (ft)	70	46	21				51	146		63	47	138
Queue Length 95th (ft)	114	94	m83				82	191		m107	50	247
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	1020	1186	691				762	1888		295	992	778
Starvation Cap Reductn	359	246	96				0	0		0	0	0
Spillback Cap Reductn	0	0	0				0	0		0	0	0
Storage Cap Reductn	0	0	0				0	0		0	0	0
Reduced v/c Ratio	0.71	0.72	0.64				0.36	0.60		0.44	0.38	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 26 (37%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 15.8
 Intersection LOS: B
 Intersection Capacity Utilization 52.1%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



23: AVE 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓	↓↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Frt					0.992	0.850
Flt Protected					0.955	
Satd. Flow (prot)	0	3505	3505	0	3233	1361
Flt Permitted					0.955	
Satd. Flow (perm)	0	3505	3505	0	3233	1361
Right Turn on Red				∞s		∞s
Satd. Flow (RTOR)					10	120
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	823	685	0	585	319
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	8%	8%
Adj. Flow (vph)	0	895	745	0	636	347
Lane Group Flow (vph)	0	895	745	0	671	312
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	35.2	35.2	0.0	34.8	34.8
Total Split (%)	0.0%	50.3%	50.3%	0.0%	49.7%	49.7%
Maximum Green (s)		30.7	30.7		30.3	30.3
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		41.5	41.5		20.5	20.5
Actuated g/C Ratio		0.59	0.59		0.29	0.29
v/c Ratio		0.43	0.36		0.70	0.64
Control Delay		9.6	2.8		25.3	18.5
Queue Delay		0.0	0.3		0.0	0.0
Total Delay		9.6	3.1		25.3	18.5
LOS		A	A		C	B
Approach Delay		9.6	3.1		23.1	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project AM Alternative C

10/22/2008

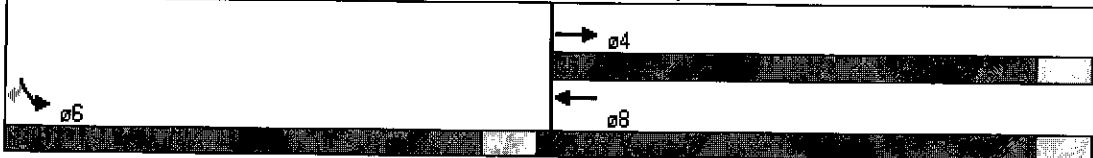
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		C	
Queue Length 50th (ft)		98	26		129	75
Queue Length 95th (ft)		180	41		154	138
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		2076	2076		1428	666
Starvation Cap Reductn		0	649		0	0
Spillback Cap Reductn		0	0		2	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.43	0.52		0.47	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 63 (90%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 49.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.927			0.994			0.957	
Flt Protected	0.950				0.998			0.997		0.950		
Satd. Flow (prot)	1671	1735	0	0	1542	0	0	1569	0	1543	1554	0
Flt Permitted	0.597				0.992			0.985		0.661		
Satd. Flow (perm)	1050	1735	0	0	1533	0	0	1550	0	1073	1554	0
Right Turn on Red			ns			ns			ns			ns
Satd. Flow (RTOR)		7			113			4			36	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2632			2680			5376			7924	
Travel Time (s)		44.9			45.7			81.5			120.1	
Volume (vph)	42	61	6	9	90	117	8	137	6	103	131	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	14%	14%	14%	20%	20%	20%	17%	17%	17%
Adj. Flow (vph)	46	66	7	10	98	127	9	149	7	112	142	58
Lane Group Flow (vph)	46	73	0	0	235	0	0	165	0	112	200	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	36.4	36.4	0.0	36.4	36.4	0.0	33.6	33.6	0.0	33.6	33.6	0.0
Total Split (%)	52.0%	52.0%	0.0%	52.0%	52.0%	0.0%	48.0%	48.0%	0.0%	48.0%	48.0%	0.0%
Maximum Green (s)	31.5	31.5		31.5	31.5		28.3	28.3		28.3	28.3	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.4	10.4			10.4			17.6		17.6	17.6	
Actuated g/C Ratio	0.28	0.28			0.28			0.51		0.51	0.51	
v/c Ratio	0.15	0.15			0.45			0.21		0.21	0.25	
Control Delay	8.2	7.0			7.1			7.0		7.8	6.3	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	8.2	7.0			7.1			7.0		7.8	6.3	
LOS	A	A			A			A		A	A	
Approach Delay		7.5			7.1			7.0			6.9	

24: Ave 14/Olive & Road 23
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	4	5			10			13		9	13	
Queue Length 95th (ft)	18	22			45			45		35	48	
Internal Link Dist (ft)		2552			2600			5296			7844	
Turn Bay Length (ft)												
Base Capacity (vph)	601	997			926			1088		753	1101	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.08	0.07			0.25			0.15		0.15	0.18	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 34.5

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 7.0

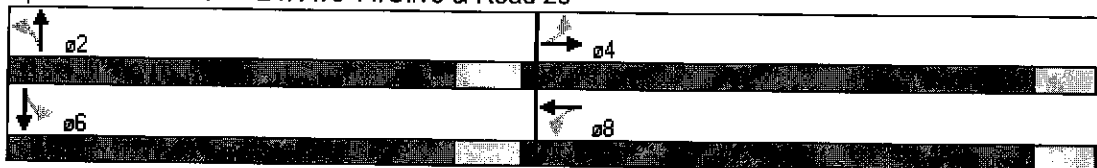
Intersection LOS: A

Intersection Capacity Utilization 47.4%

ICU Level of Service A
















Analysis Period (min) 15

Splits and Phases: 24: Ave 14/Olive & Road 23



25: SB Ramps & GS Blvd
 Mitigated 2030 Project AM Alternative C

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 			 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Frt Protected	0.950				0.950	
Satd. Flow (prot)	3303	1524	1696	1442	1752	1845
Frt Permitted	0.950				0.682	
Satd. Flow (perm)	3303	1524	1696	1442	1258	1845
Right Turn on Red		ℳs		ℳs		
Satd. Flow (RTOR)		82		497		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	791		408			1104
Travel Time (s)	18.0		9.3			25.1
Volume (vph)	1045	75	108	457	279	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	12%	12%	3%	3%
Adj. Flow (vph)	1136	82	117	497	303	74
Lane Group Flow (vph)	1136	82	117	497	303	74
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	42.8	37.2	37.2	37.2	37.2	37.2
Total Split (%)	53.5%	46.5%	46.5%	46.5%	46.5%	46.5%
Maximum Green (s)	38.3	32.7	32.7	32.7	32.7	32.7
ℳlow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	48.3	23.7	23.7	23.7	23.7	23.7
Actuated g/C Ratio	0.60	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.57	0.16	0.23	0.64	0.81	0.14
Control Delay	12.5	4.8	23.6	8.8	42.5	18.5
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	12.5	4.8	23.6	9.1	42.5	18.5
LOS	B	A	C	A	D	B
Approach Delay	11.9		11.8			37.8

25: SB Ramps & GS Blvd
 Mitigated 2030 Project AM Alternative C

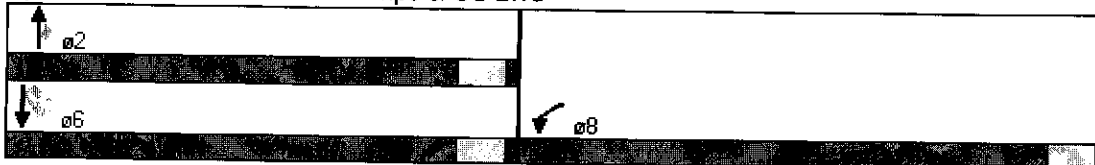
10/22/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			D
Queue Length 50th (ft)	158	0	40	73	140	27
Queue Length 95th (ft)	290	25	m44	m94	196	47
Internal Link Dist (ft)	711		328			1024
Turn Bay Length (ft)						
Base Capacity (vph)	1995	680	704	889	522	766
Starvation Cap Reductn	0	0	0	75	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.12	0.17	0.61	0.58	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 44 (55%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 58.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.94	1.00	1.00
Frt		0.994				0.850		0.867			0.866	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3204	0	1612	4631	1442	1656	1511	0	4757	1538	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	3204	0	1612	4631	1442	1656	1511	0	4757	1538	0
Right Turn on Red			vs			vs		vs			vs	
Satd. Flow (RTOR)		5				405		24			91	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	189	360	16	19	603	373	16	3	22	1019	10	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	9%	9%	9%	7%	7%	7%
Adj. Flow (vph)	205	391	17	21	655	405	17	3	24	1108	11	91
Lane Group Flow (vph)	205	408	0	21	655	405	17	27	0	1108	102	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						
Detector Phases	7	4		3	8	8	2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.6	20.6		8.6	20.6	20.6	20.5	20.5		20.5	20.5	
Total Split (s)	15.2	27.3	0.0	8.6	20.7	20.7	20.5	20.5	0.0	23.6	23.6	0.0
Total Split (%)	19.0%	34.1%	0.0%	10.8%	25.9%	25.9%	25.6%	25.6%	0.0%	29.5%	29.5%	0.0%
Maximum Green (s)	10.6	22.7		4.0	16.1	16.1	16.3	16.3		19.4	19.4	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead						
Lead-Lag Optimize?	vs	vs	vs	vs	vs							
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	
Act Effct Green (s)	11.2	28.5		4.6	16.7	16.7	16.5	16.5		19.6	19.6	
Actuated g/C Ratio	0.14	0.36		0.06	0.21	0.21	0.21	0.21		0.24	0.24	
v/c Ratio	0.91	0.36		0.23	0.68	0.65	0.05	0.08		0.95	0.23	
Control Delay	76.9	20.9		37.3	24.0	10.3	26.1	12.6		38.5	5.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	76.9	20.9		37.3	24.0	10.3	26.1	12.6		38.5	5.4	
LOS	E	C		D	C	B	C	B		D	A	
Approach Delay		39.6			19.1			17.8			35.7	

26: Ave 12 & GS Blvd
 Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			B			B			D	
Queue Length 50th (ft)	102	71		11	98	55	7	1		195	22	
Queue Length 95th (ft)	#226	126		m20	124	91	23	22		#265	m13	
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	226	1143		93	967	621	342	331		1165	446	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.91	0.36		0.23	0.68	0.65	0.05	0.08		0.95	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 8 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 30.2
 Intersection LOS: C
 Intersection Capacity Utilization 58.2%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2030 Project AM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.86	0.86	0.97	0.95	0.95	1.00	1.00	1.00
Frt					0.935	0.850		0.850	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3213	4759	0	0	4324	1310	3099	1358	1358	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3213	4759	0	0	4324	1310	3099	1358	1358	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)					320	494		80	80			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	209	1192	0	0	598	909	397	0	260	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	13%	13%	13%	2%	2%	2%
Adj. Flow (vph)	227	1296	0	0	650	988	432	0	283	0	0	0
Lane Group Flow (vph)	227	1296	0	0	1144	494	432	141	142	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	15.6	56.9	0.0	0.0	41.3	41.3	23.1	23.1	23.1	0.0	0.0	0.0
Total Split (%)	19.5%	71.1%	0.0%	0.0%	51.6%	51.6%	28.9%	28.9%	28.9%	0.0%	0.0%	0.0%
Maximum Green (s)	11.1	52.4			36.8	36.8	18.6	18.6	18.6			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	11.6	55.6			40.0	40.0	16.4	16.4	16.4			
Actuated g/C Ratio	0.14	0.70			0.50	0.50	0.20	0.20	0.20			
v/c Ratio	0.49	0.39			0.49	0.55	0.68	0.41	0.42			
Control Delay	26.1	0.7			10.4	3.9	34.8	16.4	16.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	26.1	0.7			10.4	3.9	34.8	16.4	16.5			
LOS	C	A			B	A	C	B	B			
Approach Delay		4.5			8.4			27.5				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2030 Project AM Alternative C

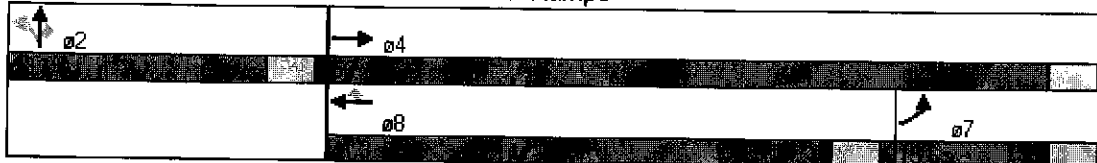
10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	62	9			98	0	102	26	27			
Queue Length 95th (ft)	m72	m4			143	58	144	76	76			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	466	3306			2321		902	740	385	385		
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.49	0.39			0.49	0.55	0.58	0.37	0.37			

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 73 (91%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.4
 Intersection Capacity Utilization 58.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps















1: Ave 18.5 & SR 99 NB ramps
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50				
Trailing Detector (ft)	0	0			0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.986			0.850				
Fit Protected	0.950						0.950					
Satd. Flow (prot)	2847	1545	0	0	1643	0	1504	1346	0	0	0	0
Fit Permitted	0.555						0.950					
Satd. Flow (perm)	1663	1545	0	0	1643	0	1504	1346	0	0	0	0
Right Turn on Red			ns			ns		ns			ns	
Satd. Flow (RTOR)					11			753				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		717			1726			897			1263	
Travel Time (s)		14.0			33.6			17.5			24.6	
Volume (vph)	482	141	0	0	223	26	255	0	84	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	14%	14%	14%	20%	20%	20%	0%	0%	0%
Adj. Flow (vph)	524	153	0	0	242	28	277	0	91	0	0	0
Lane Group Flow (vph)	524	153	0	0	270	0	277	91	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Detector Phases	4	4			8		2	2				
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0				
Minimum Split (s)	20.6	20.6			20.6		20.6	20.6				
Total Split (s)	46.1	46.1	0.0	0.0	46.1	0.0	33.9	33.9	0.0	0.0	0.0	0.0
Total Split (%)	57.6%	57.6%	0.0%	0.0%	57.6%	0.0%	42.4%	42.4%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	41.5	41.5			41.5		29.3	29.3				
Yellow Time (s)	3.6	3.6			3.6		3.6	3.6				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	C-Max	C-Max			C-Max		Min	Min				
Walk Time (s)	5.0	5.0			5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0			0		0	0				
Act Effct Green (s)	52.6	52.6			52.6		19.4	19.4				
Actuated g/C Ratio	0.66	0.66			0.66		0.24	0.24				
v/c Ratio	0.48	0.15			0.25		0.76	0.10				
Control Delay	5.6	4.0			7.1		40.9	0.2				
Queue Delay	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.6	4.0			7.1		40.9	0.2				
LOS	A	A			A		D	A				
Approach Delay		5.2			7.1			30.9				

1: Ave 18.5 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative C

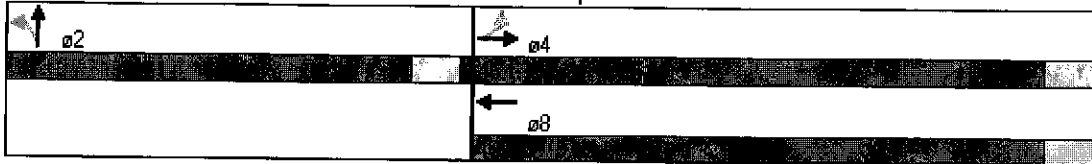
10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			C				
Queue Length 50th (ft)	25	14			46		129	0				
Queue Length 95th (ft)	m68	m24			104		188	0				
Internal Link Dist (ft)		637			1646			817			1183	
Turn Bay Length (ft)												
Base Capacity (vph)	1093	1015			1083		562	975				
Starvation Cap Reductn	0	0			0		0	0				
Spillback Cap Reductn	0	0			0		0	0				
Storage Cap Reductn	0	0			0		0	0				
Reduced v/c Ratio	0.48	0.15			0.25		0.49	0.09				

Intersection Summary













Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 16 (20%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 51.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ave 18.5 & SR 99 NB ramps









2: Ave 18.5 & SB Ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗						
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	622	368	0	370	108	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	676	400	0	402	117	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		223			717							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	520			1076			1078	1196	676	1078	1478	402
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	498			1076			1082	1205	676	1082	1500	375
tC, single (s)	4.3			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	928			585			188	177	457	188	118	646
Direction, Lane #	EB 1	EB 2	WB 1	WB 2								
Volume Total	676	400	402	117								
Volume Left	0	0	0	0								
Volume Right	0	400	0	117								
cSH	1700	1700	1700	1700								
Volume to Capacity	0.40	0.24	0.24	0.07								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS												
Approach Delay (s)	0.0		0.0									
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			36.1%		ICU Level of Service				A			
Analysis Period (min)			15									

3: Ave 18.5 & Road 23
Mitigated 2030 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1583	1597	0	1289	1154
Flt Permitted					0.950	
Satd. Flow (perm)	0	1583	1597	0	1289	1154
Right Turn on Red				∞s		∞s
Satd. Flow (RTOR)						466
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35	35		45	
Link Distance (ft)		295	223		2043	
Travel Time (s)		5.7	4.3		31.0	
Volume (vph)	0	853	351	0	137	429
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	19%	19%	40%	40%
Adj. Flow (vph)	0	927	382	0	149	466
Lane Group Flow (vph)	0	927	382	0	149	466
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.6	20.6		20.6	20.6
Total Split (s)	0.0	58.0	58.0	0.0	22.0	22.0
Total Split (%)	0.0%	72.5%	72.5%	0.0%	27.5%	27.5%
Maximum Green (s)		53.4	53.4		17.4	17.4
Yellow Time (s)		3.6	3.6		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.7	57.7		14.3	14.3
Actuated g/C Ratio		0.72	0.72		0.18	0.18
v/c Ratio		0.81	0.33		0.65	0.79
Control Delay		14.2	2.5		43.2	14.2
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		14.2	2.5		43.2	14.2
LOS		B	A		D	B
Approach Delay		14.2	2.5		21.2	

3: Ave 18.5 & Road 23
 Mitigated 2030 Project PM Alternative C

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		177	23		70	0
Queue Length 95th (ft)		#632	m40		124	#119
Internal Link Dist (ft)		215	143		1963	
Turn Bay Length (ft)						
Base Capacity (vph)		1143	1153		290	621
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.81	0.33		0.51	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 69 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B











95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Ave 18.5 & Road 23



4: Ave 18.5 & Pistacchio
Mitigated 2030 Project PM Alternative C

10/22/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	842	538	224	0	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	915	585	243	0	209
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		683	295			
pX, platoon unblocked	0.98				0.98	0.98
vC, conflicting volume	828				1628	585
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	826				1638	578
tC, single (s)	4.3				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	91				100	57
cM capacity (veh/h)	721				92	484
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	979	585	243	209		
Volume Left	64	0	0	0		
Volume Right	0	0	243	209		
cSH	721	1700	1700	484		
Volume to Capacity	0.09	0.34	0.14	0.43		
Queue Length 95th (ft)	7	0	0	53		
Control Delay (s)	2.6	0.0	0.0	17.9		
Lane LOS	A			C		
Approach Delay (s)	2.6	0.0		17.9		
Approach LOS				C		
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			82.6%		ICU Level of Service	E
Analysis Period (min)			15			













5: Ave 18.5 & Golden State
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.950			0.911			0.982			0.850	0.850
Flt Protected		0.995		0.950			0.950	0.958		0.950		
Satd. Flow (prot)	0	1761	0	3433	1194	0	1195	1659	0	1770	1583	1583
Flt Permitted		0.965		0.603			0.950	0.958		0.950		
Satd. Flow (perm)	0	1708	0	2179	1194	0	1195	1659	0	1770	1583	1583
Right Turn on Red			∅s			∅s			∅s			∅s
Satd. Flow (RTOR)		44			110			8				429
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			35		45		
Link Distance (ft)		412			683			1621		2125		
Travel Time (s)		8.0			13.3			31.6		32.2		
Volume (vph)	18	97	67	545	74	109	125	111	15	50	110	395
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	45%	45%	51%	2%	51%	2%	2%	2%
Adj. Flow (vph)	20	105	73	592	80	118	136	121	16	54	120	429
Lane Group Flow (vph)	0	198	0	592	198	0	136	137	0	54	120	429
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								2
Detector Phases	4	4		8	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.6	20.6		20.6	20.6		21.3	21.3		21.3	21.3	21.3
Total Split (s)	35.7	35.7	0.0	35.7	35.7	0.0	21.3	23.0	0.0	21.3	23.0	23.0
Total Split (%)	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%	26.6%	28.8%	0.0%	26.6%	28.8%	28.8%
Maximum Green (s)	31.1	31.1		31.1	31.1		16.0	17.7		16.0	17.7	17.7
Yellow Time (s)	3.6	3.6		3.6	3.6		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							∅s	∅s		∅s	∅s	∅s
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		40.5		40.5	40.5		14.5	18.4		9.1	13.0	13.0
Actuated g/C Ratio		0.51		0.51	0.51		0.18	0.23		0.11	0.16	0.16
v/c Ratio		0.22		0.54	0.30		0.63	0.35		0.27	0.47	0.70
Control Delay		11.2		15.7	7.0		42.8	25.2		35.1	35.3	9.7
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		11.2		15.7	7.0		42.8	25.2		35.1	35.3	9.7
LOS		B		B	A		D	C		D	D	A
Approach Delay		11.2			13.6			34.0		17.0		

5: Ave 18.5 & Golden State
 Mitigated 2030 Project PM Alternative C

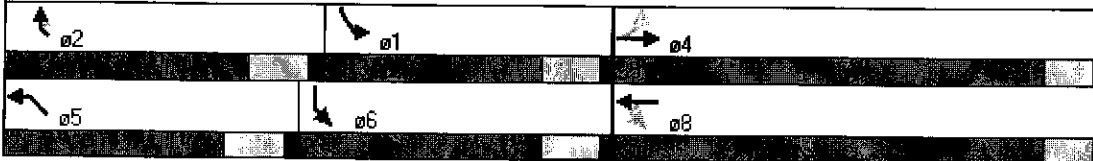
10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Approach LOS		B			B			C		B		
Queue Length 50th (ft)		40		76	9		63	54		25	56	0
Queue Length 95th (ft)		97		m181	m61		118	92		57	96	71
Internal Link Dist (ft)		332			603			1541		2045		
Turn Bay Length (ft)												
Base Capacity (vph)		887		1104	659		261	441		383	376	703
Starvation Cap Reductn		0		0	0		0	0		0	0	0
Spillback Cap Reductn		0		0	0		0	0		0	0	0
Storage Cap Reductn		0		0	0		0	0		0	0	0
Reduced v/c Ratio		0.22		0.54	0.30		0.52	0.31		0.14	0.32	0.61

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 16 (20%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 17.4
 Intersection LOS: B
 Intersection Capacity Utilization 49.5%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ave 18.5 & Golden State



6: Ave 18 & Road 23













Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected		0.955			0.885			0.998				
Flt Permitted		0.998			0.997						0.993	
Satd. Flow (prot)	0	1631	0	0	1597	0	0	1607	0	0	1626	0
Satd. Flow (perm)	0	1618	0	0	1585	0	0	1599	0	0	1404	0
Right Turn on Red			rs			rs			rs			rs
Satd. Flow (RTOR)		7			116			2				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1863			2105			5263			1327	
Travel Time (s)		28.2			31.9			79.7			20.1	
Volume (vph)	1	12	6	6	12	107	5	526	6	93	524	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	11%	11%	5%	5%	5%	18%	18%	18%	16%	16%	16%
Adj. Flow (vph)	1	13	7	7	13	116	5	572	7	101	570	2
Lane Group Flow (vph)	0	21	0	0	136	0	0	584	0	0	673	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.3	21.3		21.3	21.3		21.3	21.3		21.3	21.3	
Total Split (s)	21.3	21.3	0.0	21.3	21.3	0.0	38.7	38.7	0.0	38.7	38.7	0.0
Total Split (%)	35.5%	35.5%	0.0%	35.5%	35.5%	0.0%	64.5%	64.5%	0.0%	64.5%	64.5%	0.0%
Maximum Green (s)	16.0	16.0		16.0	16.0		33.4	33.4		33.4	33.4	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		9.8			9.8			50.5			50.5	
Actuated g/C Ratio		0.14			0.14			0.75			0.75	
v/c Ratio		0.09			0.42			0.49			0.64	
Control Delay		15.1			9.8			5.8			9.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.1			9.8			5.8			9.2	
LOS		B			A			A			A	
Approach Delay		15.1			9.8			5.8			9.2	

6: Ave 18 & Road 23
 Mitigated 2030 Project PM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		4			5			60			85	
Queue Length 95th (ft)		18			41			159			#273	
Internal Link Dist (ft)		1783			2025			5183			1247	
Turn Bay Length (ft)												
Base Capacity (vph)		404			478			1203			1056	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.05			0.28			0.49			0.64	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 67.3
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 7.9
 Intersection Capacity Utilization 80.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: Ave 18 & Road 23



7: Ave 17 & SR 99 NB ramps
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	0.94	0.91	0.91	1.00	1.00	1.00
Frt					0.983			0.855	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3335	4940	0	0	4999	0	4894	1421	2826	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3335	4940	0	0	4999	0	4894	1421	2826	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs		ℳs		ℳs
Satd. Flow (RTOR)					22			34	62			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		717			1330			1679			1421	
Travel Time (s)		10.9			20.2			32.7			27.7	
Volume (vph)	387	1319	0	0	2048	257	2046	17	1411	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	4%	4%	4%	0%	0%	0%
Adj. Flow (vph)	421	1434	0	0	2226	279	2224	18	1534	0	0	0
Lane Group Flow (vph)	421	1434	0	0	2505	0	2224	529	1023	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Detector Phases	7	4			8		2	2	2			
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5		20.5	20.5	20.5			
Total Split (s)	17.0	71.0	0.0	0.0	54.0	0.0	49.0	49.0	49.0	0.0	0.0	0.0
Total Split (%)	14.2%	59.2%	0.0%	0.0%	45.0%	0.0%	40.8%	40.8%	40.8%	0.0%	0.0%	0.0%
Maximum Green (s)	12.5	66.5			49.5		44.5	44.5	44.5			
Yellow Time (s)	3.5	3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	ℳs				ℳs							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max		Min	Min	Min			
Walk Time (s)		5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)	13.0	67.0			50.0		45.0	45.0	45.0			
Actuated g/C Ratio	0.11	0.56			0.42		0.38	0.38	0.38			
v/c Ratio	1.17	0.52			1.20		1.21	0.95	0.93			
Control Delay	132.9	18.1			125.2		134.9	63.5	49.2			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	132.9	18.1			125.2		134.9	63.5	49.2			
LOS	F	B			F		F	E	D			
Approach Delay		44.1			125.2			101.7				

7: Ave 17 & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

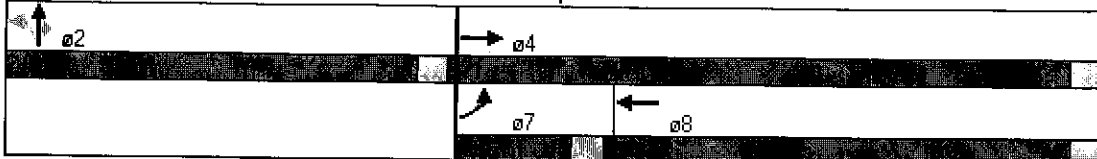
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			F			F				
Queue Length 50th (ft)	498	286			860		746	413	394			
Queue Length 95th (ft) m#278		347			#953		#838	#665	#542			
Internal Link Dist (ft)		637			1250			1599			1341	
Turn Bay Length (ft)												
Base Capacity (vph)	361	2758			2096		1835	554	1099			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	1.17	0.52			1.20		1.21	0.95	0.93			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 68 (57%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.21
 Intersection Signal Delay: 95.8
 Intersection Capacity Utilization 105.2%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service G













~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Ave 17 & SR 99 NB ramps









8: Ave 17 & SR 99 SB on-ramp
 Mitigated 2030 Project PM Alternative C

10/22/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1617	2283	0	3199	895	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1758	2482	0	3477	973	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		213			717							
pX, platoon unblocked	0.24						0.24	0.24		0.24	0.24	0.24
vC, conflicting volume	4450			4239			2917	6208	586	4549	8203	1645
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9092			4239			2650	16477	586	9510	24859	0
tC, single (s)	4.2			4.2			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	0			34			3	0	459	0	0	260
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3					
Volume Total	586	586	586	2482	1391	1391	1668					
Volume Left	0	0	0	0	0	0	0					
Volume Right	0	0	0	2482	0	0	973					
cSH	1700	1700	1700	1700	1700	1700	1700					
Volume to Capacity	0.34	0.34	0.34	1.46	0.82	0.82	0.98					
Queue Length 95th (ft)	0	0	0	0	0	0	0					
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Lane LOS												
Approach Delay (s)	0.0				0.0							
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		144.7%			ICU Level of Service				H			
Analysis Period (min)			15									

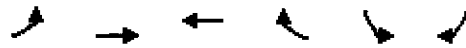
9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.86	0.91	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	6285	4988	0	3273	2656
Flt Permitted					0.950	
Satd. Flow (perm)	0	6285	4988	0	3273	2656
Right Turn on Red				xs		xs
Satd. Flow (RTOR)						3
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45	45		35	
Link Distance (ft)		460	213		1241	
Travel Time (s)		7.0	3.2		24.2	
Volume (vph)	0	3483	3199	0	506	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	7%	7%
Adj. Flow (vph)	0	3786	3477	0	550	212
Lane Group Flow (vph)	0	3786	3477	0	550	212
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		21.3	21.3		20.6	20.6
Total Split (s)	0.0	93.0	93.0	0.0	27.0	27.0
Total Split (%)	0.0%	77.5%	77.5%	0.0%	22.5%	22.5%
Maximum Green (s)		87.7	87.7		22.4	22.4
Yellow Time (s)		4.3	4.3		3.6	3.6
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		89.5	89.5		22.5	22.5
Actuated g/C Ratio		0.75	0.75		0.19	0.19
v/c Ratio		0.81	0.93		0.90	0.42
Control Delay		7.8	4.3		66.1	45.2
Queue Delay		4.5	2.3		0.0	0.0
Total Delay		12.3	6.6		66.1	45.2
LOS		B	A		E	D
Approach Delay		12.3	6.6		60.3	

9: Ave 17 & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative C

10/22/2008



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		E	
Queue Length 50th (ft)		265	263		215	81
Queue Length 95th (ft)		m212	m119		#308	124
Internal Link Dist (ft)		380	133		1161	
Turn Bay Length (ft)						
Base Capacity (vph)		4687	3720		627	511
Starvation Cap Reductn		837	151		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.98	0.97		0.88	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 91 (76%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 14.4
 Intersection Capacity Utilization 82.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 9: Ave 17 & SR 99 SB off-ramp



10: Ave 17 & GS Blvd
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Frt		0.988			0.955				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	4928	0	3335	4718	0	1752	1845	2760	3099	1681	1429
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	4928	0	3335	4718	0	1752	1845	2760	3099	1681	1429
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		14			129				488			11
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		6530			460			1699			1221	
Travel Time (s)		98.9			7.0			33.1			23.8	
Volume (vph)	14	1988	180	681	1897	815	175	125	740	755	109	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	13%	13%	13%
Adj. Flow (vph)	15	2161	196	740	2062	886	190	136	804	821	118	11
Lane Group Flow (vph)	15	2357	0	740	2948	0	190	136	804	821	118	11
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	20.5		8.5	20.5		8.5	20.5	20.5	8.5	20.5	20.5
Total Split (s)	8.5	48.5	0.0	24.0	64.0	0.0	25.9	20.5	20.5	27.0	21.6	21.6
Total Split (%)	7.1%	40.4%	0.0%	20.0%	53.3%	0.0%	21.6%	17.1%	17.1%	22.5%	18.0%	18.0%
Maximum Green (s)	4.0	44.0		19.5	59.5		21.4	16.0	16.0	22.5	17.1	17.1
Flow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	ℳs	ℳs		ℳs	ℳs		ℳs	ℳs	ℳs	ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		5.0			5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	4.5	44.5		20.0	65.1		25.8	16.5	16.5	23.0	13.7	13.7
Actuated g/C Ratio	0.04	0.37		0.17	0.54		0.22	0.14	0.14	0.19	0.11	0.11
v/c Ratio	0.12	1.28		1.33	1.13		0.50	0.54	1.00	1.38	0.61	0.06
Control Delay	58.0	165.0		197.2	82.8		48.0	56.7	53.6	219.7	64.0	22.7
Queue Delay	0.0	0.0		0.0	39.5		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	165.0		197.2	122.3		48.0	56.7	53.6	219.7	64.0	22.7
LOS	E	F		F	F		D	E	D	F	E	C
Approach Delay		164.4			137.3			53.0			198.1	

10: Ave 17 & GS Blvd
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	6	852		382	333		131	99	457	435	88	0
Queue Length 95th (ft)	18	#946		m#431	#1098		216	166	#309	#559	147	18
Internal Link Dist (ft)		6450			380			1619			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	126	1836		556	2619		377	254	800	594	247	219
Starvation Cap Reductn	0	0		0	192		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.12	1.28		1.33	1.21		0.50	0.54	1.00	1.38	0.48	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 118 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.38
 Intersection Signal Delay: 140.6
 Intersection Capacity Utilization 103.3%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service G

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Ave 17 & GS Blvd















11: Ave 17 & Road 23
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989			0.965				0.850
Flt Protected		0.997		0.950			0.950				0.998	
Satd. Flow (prot)	0	3529	1583	1687	3337	0	1597	1623	0	0	1663	1417
Flt Permitted		0.845		0.220			0.540				0.978	
Satd. Flow (perm)	0	2991	1583	391	3337	0	908	1623	0	0	1630	1417
Right Turn on Red												
Satd. Flow (RTOR)			342		18			32				96
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1503			6530			7936			5263	
Travel Time (s)		22.8			98.9			120.2			79.7	
Volume (vph)	51	772	315	107	730	59	122	416	125	9	246	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	13%	13%	13%	14%	14%	14%
Adj. Flow (vph)	55	839	342	116	793	64	133	452	136	10	267	330
Lane Group Flow (vph)	0	894	342	116	857	0	133	588	0	0	277	330
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phases	4	4	4	8	8		2	2		6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	21.3	21.3	21.3	21.3	21.3		21.3	21.3		21.3	21.3	21.3
Total Split (s)	30.0	30.0	30.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%
Maximum Green (s)	24.7	24.7	24.7	24.7	24.7		24.7	24.7		24.7	24.7	24.7
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	0
Act Effct Green (s)		21.7	21.7	21.7	21.7		22.1	22.1			22.1	22.1
Actuated g/C Ratio		0.41	0.41	0.41	0.41		0.42	0.42			0.42	0.42
v/c Ratio		0.72	0.40	0.72	0.61		0.35	0.84			0.40	0.50
Control Delay		17.0	3.1	42.9	14.3		14.4	26.6			13.4	11.4
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		17.0	3.1	42.9	14.3		14.4	26.6			13.4	11.4
LOS		B	A	D	B		B	C			B	B
Approach Delay		13.2			17.7			24.3			12.3	

11: Ave 17 & Road 23
 Mitigated 2030 Project PM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		130	0	32	115		30	167			65	55
Queue Length 95th (ft)		190	39	#112	166		68	#342			117	117
Internal Link Dist (ft)		1423			6450			7856			5183	
Turn Bay Length (ft)												
Base Capacity (vph)		1395	921	182	1566		426	778			765	716
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.64	0.37	0.64	0.55		0.31	0.76			0.36	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 52.3
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 16.5
 Intersection Capacity Utilization 101.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service G

Splits and Phases: 11: Ave 17 & Road 23



12: Ellis OC & Road 26
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.969			0.993	
Flt Protected		0.962			0.954		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1777	1583	1770	3429	0	1770	3514	0
Flt Permitted		0.734			0.705		0.950			0.950		
Satd. Flow (perm)	0	1367	1583	0	1313	1583	1770	3429	0	1770	3514	0
Right Turn on Red												
Satd. Flow (RTOR)			34			135		62			10	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1408			1120			1056			2208	
Travel Time (s)		24.0			19.1			18.0			37.6	
Volume (vph)	29	8	31	213	9	124	27	790	207	184	902	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	34	232	10	135	29	859	225	200	980	45
Lane Group Flow (vph)	0	41	34	0	242	135	29	1084	0	200	1025	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Detector Phases	4	4	4	8	8	8	5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	20.9		8.9	20.9	
Total Split (s)	20.9	20.9	20.9	20.9	20.9	20.9	8.9	26.1	0.0	13.0	30.2	0.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	34.8%	34.8%	14.8%	43.5%	0.0%	21.7%	50.3%	0.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.0	21.2		8.1	25.3	
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)		14.6	14.6		14.6	14.6	4.9	21.6		8.9	31.1	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.08	0.38		0.16	0.54	
v/c Ratio		0.12	0.08		0.72	0.27	0.21	0.81		0.73	0.53	
Control Delay		17.1	7.1		33.5	5.4	30.4	21.9		42.3	11.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.1	7.1		33.5	5.4	30.4	21.9		42.3	11.2	
LOS		B	A		C	A	C	C		D	B	
Approach Delay		12.6			23.4			22.2			16.3	
Approach LOS		B			C			C			B	

12: Ellis OC & Road 26
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		11	0		77	0	10	172		70	98	
Queue Length 95th (ft)		31	17		#164	33	32	#280		#163	205	
Internal Link Dist (ft)		1328			1040			976			2128	
Turn Bay Length (ft)												
Base Capacity (vph)		390	476		375	548	140	1357		280	1919	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.11	0.07		0.65	0.25	0.21	0.80		0.71	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 57.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 19.5
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Ellis OC & Road 26















13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50				
Trailing Detector (ft)	0	0			0	0	0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.868				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	3539	1583	3433	1617	0	0	0	0
Right Turn on Red			ℳs			ℳs		ℳs			ℳs	
Satd. Flow (RTOR)						222		130				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		710			1791			1039			1165	
Travel Time (s)		12.1			30.5			23.6			26.5	
Volume (vph)	791	453	0	0	378	204	275	17	120	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	860	492	0	0	411	222	299	18	130	0	0	0
Lane Group Flow (vph)	860	492	0	0	411	222	299	148	0	0	0	0
Turn Type	Prot					Perm	Perm					
Protected Phases	7	4			8			2				
Permitted Phases						8	2					
Detector Phases	7	4			8	8	2	2				
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Minimum Split (s)	8.5	20.9			20.9	20.9	20.5	20.5				
Total Split (s)	28.0	49.5	0.0	0.0	21.5	21.5	20.5	20.5	0.0	0.0	0.0	0.0
Total Split (%)	40.0%	70.7%	0.0%	0.0%	30.7%	30.7%	29.3%	29.3%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	23.5	44.6			16.6	16.6	16.0	16.0				
Yellow Time (s)	3.5	3.9			3.9	3.9	3.5	3.5				
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	ℳs				ℳs	ℳs						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Recall Mode	None	C-Max			None	None	Max	Max				
Walk Time (s)		5.0			5.0	5.0	5.0	5.0				
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	27.4	45.5			14.1	14.1	16.5	16.5				
Actuated g/C Ratio	0.39	0.65			0.20	0.20	0.24	0.24				
v/c Ratio	0.64	0.21			0.58	0.45	0.37	0.31				
Control Delay	13.5	1.3			28.3	6.7	24.0	7.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	13.5	1.3			28.3	6.7	24.0	7.9				
LOS	B	A			C	A	C	A				
Approach Delay		9.0			20.7			18.7				
Approach LOS		A			C			B				

13: Ellis OC & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

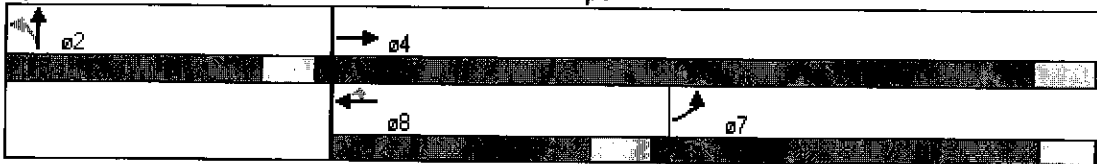
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	156	6			85	0	55	6				
Queue Length 95th (ft)	239	14			118	48	88	48				
Internal Link Dist (ft)		630			1711			959			1085	
Turn Bay Length (ft)												
Base Capacity (vph)	1345	2300			885	562	809	481				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.64	0.21			0.46	0.40	0.37	0.31				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 4:EBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15







Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 13: Ellis OC & SR 99 NB ramps



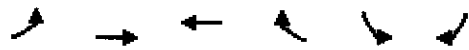
15: Ellis OC & SR 99 SB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3433	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3433	2787
Right Turn on Red				∅s		∅s
Satd. Flow (RTOR)						352
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40	40		30	
Link Distance (ft)		1080	710		1257	
Travel Time (s)		18.4	12.1		28.6	
Volume (vph)	0	1013	571	0	234	716
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1101	621	0	254	778
Lane Group Flow (vph)	0	1101	621	0	254	778
Turn Type						custom
Protected Phases		4	8			
Permitted Phases					6	6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.9	20.9		20.5	20.5
Total Split (s)	0.0	37.5	37.5	0.0	32.5	32.5
Total Split (%)	0.0%	53.6%	53.6%	0.0%	46.4%	46.4%
Maximum Green (s)		32.6	32.6		28.0	28.0
Yellow Time (s)		3.9	3.9		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		33.5	33.5		28.5	28.5
Actuated g/C Ratio		0.48	0.48		0.41	0.41
v/c Ratio		0.65	0.37		0.18	0.58
Control Delay		16.1	1.2		13.7	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.1	1.2		13.7	10.3
LOS		B	A		B	B
Approach Delay		16.1	1.2		11.2	
Approach LOS		B	A		B	

15: Ellis OC & SR 99 SB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008



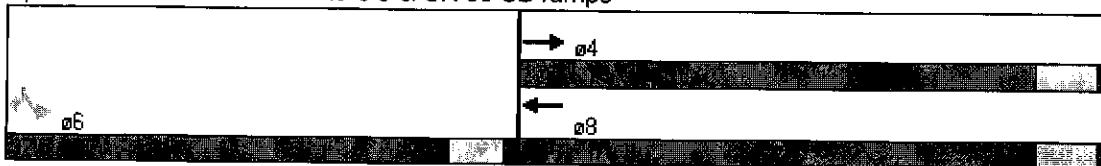
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 50th (ft)		177	0		35	71
Queue Length 95th (ft)		241	7		57	127
Internal Link Dist (ft)		1000	630		1177	
Turn Bay Length (ft)						
Base Capacity (vph)		1694	1694		1398	1343
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.37		0.18	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 15: Ellis OC & SR 99 SB ramps



17: Ellis OC & Aviation Drive
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	0.95	0.97	0.97	0.95	1.00	1.00	0.88
Frt			0.850		0.902			0.987			0.850	0.850
Flt Protected	0.950			0.950			0.950	0.956		0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3192	0	3433	3410	0	1770	1583	2787
Flt Permitted	0.950			0.950			0.950	0.956		0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3192	0	3433	3410	0	1770	1583	2787
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)			175		250			8				757
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			40		40		
Link Distance (ft)		1066			1080			1293		1356		
Travel Time (s)		18.2			18.4			22.0		23.1		
Volume (vph)	54	170	161	810	122	230	393	622	58	175	631	1013
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	185	175	880	133	250	427	676	63	190	686	1101
Lane Group Flow (vph)	59	185	175	880	383	0	427	739	0	190	686	1101
Turn Type	Prot		Perm	Prot			Prot			Prot		custom
Protected Phases	7	4		3	8		1	6		5		
Permitted Phases			4								2	2
Detector Phases	7	4	4	3	8		1	6		5	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	20.9	20.9	8.5	20.9		8.5	20.9		20.9	20.9	20.9
Total Split (s)	14.3	22.0	22.0	37.3	45.0	0.0	20.7	52.2	0.0	28.5	60.0	60.0
Total Split (%)	10.2%	15.7%	15.7%	26.6%	32.1%	0.0%	14.8%	37.3%	0.0%	20.4%	42.9%	42.9%
Mainum Green (s)	9.8	17.1	17.1	32.8	40.1		16.2	47.3		23.6	55.1	55.1
ℳlow Time (s)	3.5	3.9	3.9	3.5	3.9		3.5	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		Max	Max	Max
Walk Time (s)		5.0	5.0		5.0			5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0		0	0	0
Act Effect Green (s)	9.3	13.3	13.3	33.3	39.5		16.7	48.2		24.5	56.0	56.0
Actuated g/C Ratio	0.07	0.10	0.10	0.25	0.29		0.12	0.36		0.18	0.41	0.41
v/c Ratio	0.50	0.53	0.56	1.04	0.35		1.01	0.61		0.59	1.05	0.69
Control Delay	75.6	63.8	15.0	91.4	14.0		104.1	38.2		59.8	86.8	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.6	63.8	15.0	91.4	14.0		104.1	38.2		59.8	86.8	11.8
LOS	E	E	B	F	B		F	D		E	F	B
Approach Delay		45.1			67.9			62.3		42.4		
Approach LOS		D			E			E		D		

17: Ellis OC & Aviation Drive
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Queue Length 50th (ft)	50	82	0	430	47		498	271		155	654	134
Queue Length 95th (ft)	101	123	70	#582	90		#322	350		245	#930	232
Internal Link Dist (ft)		986			1000			1213		1276		
Turn Bay Length (ft)												
Base Capacity (vph)	132	455	356	845	1152		424	1221		321	655	1598
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.45	0.41	0.49	1.04	0.33		1.01	0.61		0.59	1.05	0.69

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 135.3
 Natural Cycle: 140
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 54.1
 Intersection Capacity Utilization Err%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 17: Ellis OC & Aviation Drive















18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	3400	3505	0	0	3539	1583	1681	1686	2787	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	3400	3505	0	0	3539	1583	1681	1686	2787	0	0	0
Right Turn on Red			∞s			∞s		∞s		∞s		
Satd. Flow (RTOR)						785			34			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		391			1686			1254			906	
Travel Time (s)		7.6			32.8			28.5			20.6	
Volume (vph)	306	1692	0	0	1463	827	521	6	742	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Adj. Flow (vph)	333	1839	0	0	1590	899	566	7	807	0	0	0
Lane Group Flow (vph)	333	1839	0	0	1590	899	283	290	807	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2	2	2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.6	20.6			20.6	20.6	20.5	20.5	20.5			
Total Split (s)	13.8	59.7	0.0	0.0	45.9	45.9	30.3	30.3	30.3	0.0	0.0	0.0
Total Split (%)	15.3%	66.3%	0.0%	0.0%	51.0%	51.0%	33.7%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	9.2	55.1			41.3	41.3	25.8	25.8	25.8			
Yellow Time (s)	3.6	3.6			3.6	3.6	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	∞s				∞s	∞s						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Max	Max	Max			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	9.8	55.7			41.9	41.9	26.3	26.3	26.3			
Actuated g/C Ratio	0.11	0.62			0.47	0.47	0.29	0.29	0.29			
v/c Ratio	0.90	0.85			0.96	0.78	0.58	0.59	0.96			
Control Delay	49.7	13.2			39.6	8.3	32.7	33.0	54.7			
Queue Delay	0.0	1.8			0.0	0.0	0.0	0.0	0.0			
Total Delay	49.7	15.0			39.6	8.3	32.7	33.0	54.7			
LOS	D	B			D	A	C	C	D			
Approach Delay		20.3			28.3			45.6				

18: Ave 15.5/Cleveland & Ave 15.5 NB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D				
Queue Length 50th (ft)	95	242			444	36	143	147	246			
Queue Length 95th (ft)	m100	m265			#617	183	230	235	#383			
Internal Link Dist (ft)		311			1606			1174			826	
Turn Bay Length (ft)												
Base Capacity (vph)	370	2169			1648	1157	491	493	838			
Starvation Cap Reductn	0	184			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.90	0.93			0.96	0.78	0.58	0.59	0.96			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 29.4
 Intersection Capacity Utilization 144.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service H

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Ave 15.5/Cleveland & Ave 15.5 NB ramps



19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑↑	↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	
Trailing Detector (ft)		0	0	0	0					0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850								0.854	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	3273	1516	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	1770	3539	0	0	0	0	3273	1516	0
Right Turn on Red			∞s			∞s			∞s		∞s	
Satd. Flow (RTOR)			673								21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35				30		30	
Link Distance (ft)		1214			391			1434			886	
Travel Time (s)		23.6			7.6			32.6			20.1	
Volume (vph)	0	1209	705	290	1694	0	0	0	0	789	9	324
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	7%	7%	7%
Adj. Flow (vph)	0	1314	766	315	1841	0	0	0	0	858	10	352
Lane Group Flow (vph)	0	1314	766	315	1841	0	0	0	0	858	362	0
Turn Type			Perm	Prot						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4							6		
Detector Phases		4	4	3	8					6	6	
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Minimum Split (s)		20.6	20.6	8.6	20.6					20.5	20.5	
Total Split (s)	0.0	40.0	40.0	21.0	61.0	0.0	0.0	0.0	0.0	29.0	29.0	0.0
Total Split (%)	0.0%	44.4%	44.4%	23.3%	67.8%	0.0%	0.0%	0.0%	0.0%	32.2%	32.2%	0.0%
Maximum Green (s)		35.4	35.4	16.4	56.4					24.5	24.5	
Yellow Time (s)		3.6	3.6	3.6	3.6					3.5	3.5	
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		∞s	∞s	∞s								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Recall Mode		C-Max	C-Max	None	C-Max					None	None	
Walk Time (s)		5.0	5.0		5.0					5.0	5.0	
Flash Dont Walk (s)		11.0	11.0		11.0					11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0					0	0	
Act Effct Green (s)		36.0	36.0	17.0	57.0					25.0	25.0	
Actuated g/C Ratio		0.40	0.40	0.19	0.63					0.28	0.28	
v/c Ratio		0.93	0.74	0.94	0.82					0.94	0.83	
Control Delay		38.6	8.2	70.8	5.2					52.0	46.8	
Queue Delay		0.4	0.0	0.0	1.1					0.0	0.0	
Total Delay		39.0	8.2	70.8	6.3					52.0	46.8	
LOS		D	A	E	A					D	D	
Approach Delay		27.6			15.7						50.4	

19: Ave 15.5/Cleveland & Ave 15.5 SB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						D	
Queue Length 50th (ft)		366	33	191	151					245	182	
Queue Length 95th (ft)		#512	161 m#235	m164						#364	#334	
Internal Link Dist (ft)		1134			311			1354				806
Turn Bay Length (ft)												
Base Capacity (vph)		1416	1037	334	2241					909	436	
Starvation Cap Reductn		0	0	0	191					0	0	
Spillback Cap Reductn		9	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.93	0.74	0.94	0.90					0.94	0.83	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 28.0
 Intersection Capacity Utilization 144.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Ave 15.5/Cleveland & Ave 15.5 SB ramps















20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.932			0.937			0.978				
Flt Protected					0.975						0.995	
Satd. Flow (prot)	0	1736	0	0	1653	0	0	1689	0	0	1630	0
Flt Permitted					0.859						0.901	
Satd. Flow (perm)	0	1736	0	0	1456	0	0	1689	0	0	1476	0
Right Turn on Red			rs			rs			rs		rs	
Satd. Flow (RTOR)		1			48			22				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2755			2781			7924			7936	
Travel Time (s)		47.0			47.4			120.1			120.2	
Volume (vph)	0	1	1	56	1	51	0	478	92	53	496	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	10%	10%	10%	16%	16%	16%
Adj. Flow (vph)	0	1	1	61	1	55	0	520	100	58	539	0
Lane Group Flow (vph)	0	2	0	0	117	0	0	620	0	0	597	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	27.9	27.9	0.0	27.9	27.9	0.0	62.1	62.1	0.0	62.1	62.1	0.0
Total Split (%)	31.0%	31.0%	0.0%	31.0%	31.0%	0.0%	69.0%	69.0%	0.0%	69.0%	69.0%	0.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		56.8	56.8		56.8	56.8	
Yellow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.5			10.5			47.9			47.9	
Actuated g/C Ratio		0.16			0.16			0.74			0.74	
v/c Ratio		0.01			0.44			0.50			0.55	
Control Delay		15.5			16.0			6.0			7.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.5			16.0			6.0			7.2	
LOS		B			B			A			A	
Approach Delay		15.5			16.0			6.0			7.2	

20: Ave 15.5/Cleveland & Road 23
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		0			17			68			74	
Queue Length 95th (ft)		5			62			174			196	
Internal Link Dist (ft)		2675			2701			7844			7856	
Turn Bay Length (ft)												
Base Capacity (vph)		547			491			1375			1198	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.00			0.24			0.45			0.50	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 65
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 82.7%
 Analysis Period (min) 15



















Intersection LOS: A
 ICU Level of Service E

Splits and Phases: 20: Ave 15.5/Cleveland & Road 23



21: SR 145/Madera & SR 99 NB ramps
Mitigated 2030 Project PM Alternative C

10/22/2008

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50				50	50	
Trailing Detector (ft)	0	0			0	0				0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frnt						0.850						0.853
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3400	3505	0	0	3539	1583	0	0	0	3433	1589	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3400	3505	0	0	3539	1583	0	0	0	3433	1589	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)						354					168	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		491			1298			1379			1837	
Travel Time (s)		9.6			25.3			31.3			41.8	
Volume (vph)	1209	810	0	0	838	326	0	0	0	365	3	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1314	880	0	0	911	354	0	0	0	397	3	168
Lane Group Flow (vph)	1314	880	0	0	911	354	0	0	0	397	171	0
Turn Type	Prot					Perm				Perm		
Protected Phases	5	2			6						8	
Permitted Phases						6						8
Detector Phases	5	2			6	6				8	8	
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Minimum Split (s)	8.5	20.6			20.6	20.6				20.5	20.5	
Total Split (s)	34.4	59.5	0.0	0.0	25.1	25.1	0.0	0.0	0.0	20.5	20.5	0.0
Total Split (%)	43.0%	74.4%	0.0%	0.0%	31.4%	31.4%	0.0%	0.0%	0.0%	25.6%	25.6%	0.0%
Maximum Green (s)	29.9	54.9			20.5	20.5				16.0	16.0	
Yellow Time (s)	3.5	3.6			3.6	3.6				3.5	3.5	
All-Red Time (s)	1.0	1.0			1.0	1.0				1.0	1.0	
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Recall Mode	None	C-Max			C-Max	C-Max				None	None	
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0				0	0	
Act Effct Green (s)	32.6	57.7			21.1	21.1				14.3	14.3	
Actuated g/C Ratio	0.41	0.72			0.26	0.26				0.18	0.18	
v/c Ratio	0.95	0.35			0.98	0.52				0.65	0.41	
Control Delay	26.5	0.5			55.2	6.0				35.5	8.2	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	26.5	0.5			55.2	6.0				35.5	8.2	
LOS	C	A			E	A				D	A	
Approach Delay		16.1			41.4						27.3	

21: SR 145/Madera & SR 99 NB ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

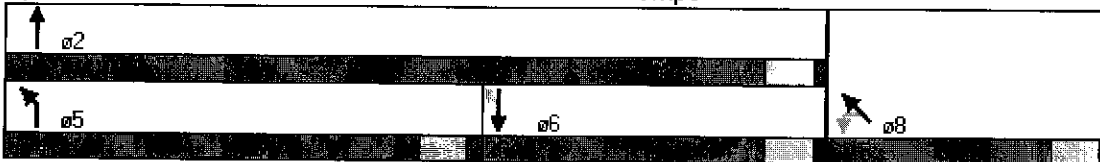
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Approach LOS		B			D						C	
Queue Length 50th (ft)	103	4			237	0				95	1	
Queue Length 95th (ft) m#469		m3			#363	62				136	50	
Internal Link Dist (ft)		411			1218			1299			1757	
Turn Bay Length (ft)												
Base Capacity (vph)	1386	2529			933	678				708	461	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.95	0.35			0.98	0.52				0.56	0.37	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 50 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 25.6
 Intersection Capacity Utilization 78.1%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: SR 145/Madera & SR 99 NB ramps



22: AVe 14/Olive & SR 145/Madera
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50				50	50		50	50	50
Trailing Detector (ft)	0	0	0				0	0		0	0	0
Turning Speed (mph)	15		9	15			15		9	15		9
Lane Util. Factor	0.97	0.91	0.91	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.95	1.00
Frt		0.908	0.850					0.998				0.850
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3367	3019	1413	0	0	0	3433	5075	0	1752	3505	1568
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3367	3019	1413	0	0	0	3433	5075	0	1752	3505	1568
Right Turn on Red			ℳs			ℳs			ℳs		ℳs	
Satd. Flow (RTOR)		526	550					3				573
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		226			1947			2148			491	
Travel Time (s)		5.1			44.3			41.8			9.6	
Volume (vph)	554	358	1147	0	0	0	343	1469	24	214	462	527
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	602	389	1247	0	0	0	373	1597	26	233	502	573
Lane Group Flow (vph)	602	1012	624	0	0	0	373	1623	0	233	502	573
Turn Type	Perm		Perm				Prot			Prot		Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4									6
Detector Phases	4	4	4				5	2		1	6	6
Minimum Initial (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5				20.6	20.6		8.5	20.6	20.6
Total Split (s)	28.6	28.6	28.6	0.0	0.0	0.0	20.6	33.1	0.0	18.3	30.8	30.8
Total Split (%)	35.8%	35.8%	35.8%	0.0%	0.0%	0.0%	25.8%	41.4%	0.0%	22.9%	38.5%	38.5%
Maximum Green (s)	24.1	24.1	24.1				16.0	28.5		13.8	26.2	26.2
Yellow Time (s)	3.5	3.5	3.5				3.6	3.6		3.5	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0				1.0	1.0		1.0	1.0	1.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							ℳs	ℳs		ℳs	ℳs	ℳs
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max				Max	Max	None	Max	Max	
Walk Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0				11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0	0				0	0			0	0
Act Effct Green (s)	24.6	24.6	24.6				16.6	29.8		13.6	26.8	26.8
Actuated g/C Ratio	0.31	0.31	0.31				0.21	0.37		0.17	0.34	0.34
v/c Ratio	0.58	0.78	0.77				0.52	0.86		0.78	0.43	0.63
Control Delay	23.5	14.1	10.3				31.3	29.2		33.5	4.6	7.4
Queue Delay	17.8	12.0	2.7				0.0	0.0		0.0	0.0	4.0
Total Delay	41.3	26.1	13.0				31.3	29.2		33.5	4.6	11.3
LOS	D	C	B				C	C		C	A	B
Approach Delay		26.5						29.6			12.7	

22: AVe 14/Olive & SR 145/Madera
 Mitigated 2030 Project PM Alternative C

10/22/2008

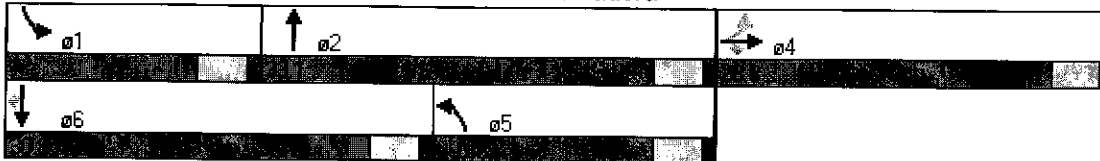
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			B	
Queue Length 50th (ft)	114	95	75				86	271		83	28	55
Queue Length 95th (ft)	m169	185	m138				127	#339		m105	m45	m211
Internal Link Dist (ft)		146			1867			2068			411	
Turn Bay Length (ft)												
Base Capacity (vph)	1035	1293	815				712	1891		313	1174	906
Starvation Cap Reductn	429	272	100				0	0		0	0	246
Spillback Cap Reductn	0	0	0				0	0		0	0	2
Storage Cap Reductn	0	0	0				0	0		0	0	0
Reduced v/c Ratio	0.99	0.99	0.87				0.52	0.86		0.74	0.43	0.87

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 40 (50%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 24.4
 Intersection Capacity Utilization 73.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.







Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 22: AVe 14/Olive & SR 145/Madera



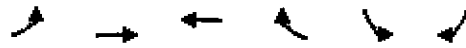
23: Ave 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative C

10/22/2008

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓↓	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	3242	1361
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	3242	1361
Right Turn on Red				es		es
Satd. Flow (RTOR)						71
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1742	226		1476	
Travel Time (s)		39.6	5.1		33.5	
Volume (vph)	0	1112	870	0	937	393
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	8%	8%
Adj. Flow (vph)	0	1209	946	0	1018	427
Lane Group Flow (vph)	0	1209	946	0	1018	427
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Detector Phases		4	8		6	6
Minimum Initial (s)		4.0	4.0		4.0	4.0
Minimum Split (s)		20.5	20.5		20.5	20.5
Total Split (s)	0.0	41.0	41.0	0.0	39.0	39.0
Total Split (%)	0.0%	51.3%	51.3%	0.0%	48.8%	48.8%
Maximum Green (s)		36.5	36.5		34.5	34.5
Yellow Time (s)		3.5	3.5		3.5	3.5
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Min	Min
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		40.4	40.4		31.6	31.6
Actuated g/C Ratio		0.50	0.50		0.40	0.40
v/c Ratio		0.68	0.53		0.80	0.74
Control Delay		18.1	3.7		26.3	24.9
Queue Delay		0.1	0.6		0.1	0.0
Total Delay		18.3	4.2		26.4	24.9
LOS		B	A		C	C
Approach Delay		18.3	4.2		25.9	

23: AVe 14/Olive & SR 99 SB off-ramp
 Mitigated 2030 Project PM Alternative C

10/22/2008



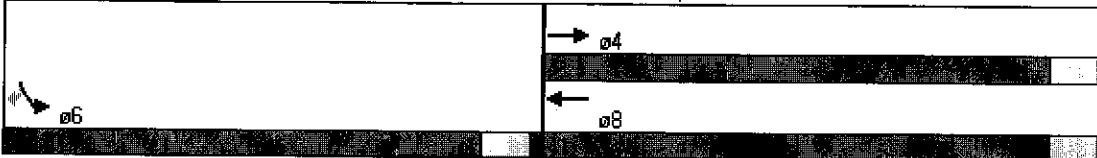
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		B	A		C	
Queue Length 50th (ft)		241	36		213	153
Queue Length 95th (ft)		325	73		278	267
Internal Link Dist (ft)		1662	146		1396	
Turn Bay Length (ft)						
Base Capacity (vph)		1788	1788		1418	635
Starvation Cap Reductn		0	424		0	0
Spillback Cap Reductn		84	0		31	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.71	0.69		0.73	0.67

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.7
 Intersection Capacity Utilization 68.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 23: AVe 14/Olive & SR 99 SB off-ramp



24: Ave 14/Olive & Road 23
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.980			0.894			0.990			0.958	
Flt Protected	0.950				0.997			0.999		0.950		
Satd. Flow (prot)	1752	1808	0	0	1540	0	0	1693	0	1556	1569	0
Flt Permitted	0.627				0.986			0.995		0.578		
Satd. Flow (perm)	1157	1808	0	0	1523	0	0	1686	0	947	1569	0
Right Turn on Red			rs			rs			rs			rs
Satd. Flow (RTOR)		12			140			7			35	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		2632			2680			5376			7924	
Travel Time (s)		44.9			45.7			81.5			120.1	
Volume (vph)	112	77	12	10	26	129	5	211	17	142	194	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	10%	10%	10%	11%	11%	11%	16%	16%	16%
Adj. Flow (vph)	122	84	13	11	28	140	5	229	18	154	211	83
Lane Group Flow (vph)	122	97	0	0	179	0	0	252	0	154	294	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.9	20.9		20.9	20.9		21.3	21.3		21.3	21.3	
Total Split (s)	36.9	36.9	0.0	36.9	36.9	0.0	43.1	43.1	0.0	43.1	43.1	0.0
Total Split (%)	46.1%	46.1%	0.0%	46.1%	46.1%	0.0%	53.9%	53.9%	0.0%	53.9%	53.9%	0.0%
Maxnum Green (s)	32.0	32.0		32.0	32.0		37.8	37.8		37.8	37.8	
Flow Time (s)	3.9	3.9		3.9	3.9		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	13.8	13.8			13.5			31.7		31.7	31.7	
Actuated g/C Ratio	0.26	0.26			0.26			0.65		0.65	0.65	
v/c Ratio	0.40	0.20			0.36			0.23		0.25	0.28	
Control Delay	12.9	8.4			5.3			5.9		7.2	5.9	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	12.9	8.4			5.3			5.9		7.2	5.9	
LOS	B	A			A			A		A	A	
Approach Delay		10.9			5.3			5.9			6.4	

24: Ave 14/Olive & Road 23
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
Queue Length 50th (ft)	12	8			4			22		14	24	
Queue Length 95th (ft)	51	37			36			70		54	79	
Internal Link Dist (ft)		2552			2600			5296			7844	
Turn Bay Length (ft)												
Base Capacity (vph)	599	941			855			1349		757	1261	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.20	0.10			0.21			0.19		0.20	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 48.4
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 7.0
 Intersection Capacity Utilization 56.7%
 Analysis Period (min) 15
















Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 24: Ave 14/Olive & Road 23



25: SB Ramps & GS Blvd
 Mitigated 2030 Project PM Alternative C

10/22/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 			 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3335	1538	1759	1495	1736	1827
Flt Permitted	0.950				0.664	
Satd. Flow (perm)	3335	1538	1759	1495	1213	1827
Right Turn on Red		ns		ns		
Satd. Flow (RTOR)		124		633		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	806		408			1104
Travel Time (s)	18.3		9.3			25.1
Volume (vph)	1365	141	114	582	222	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	8%	8%	4%	4%
Adj. Flow (vph)	1484	153	124	633	241	208
Lane Group Flow (vph)	1484	153	124	633	241	208
Turn Type		custom		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		6		2	6	
Detector Phases	8	6	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	60.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	55.5	35.5	35.5	35.5	35.5	35.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	Min	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	67.1	24.9	24.9	24.9	24.9	24.9
Actuated g/C Ratio	0.67	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.66	0.32	0.28	0.75	0.80	0.46
Control Delay	13.2	8.9	20.5	6.9	53.4	33.5
Queue Delay	0.1	0.0	0.0	1.2	0.0	0.0
Total Delay	13.3	8.9	20.5	8.1	53.4	33.5
LOS	B	A	C	A	D	C
Approach Delay	12.9		10.1			44.2

25: SB Ramps & GS Blvd
 Mitigated 2030 Project PM Alternative C

10/22/2008

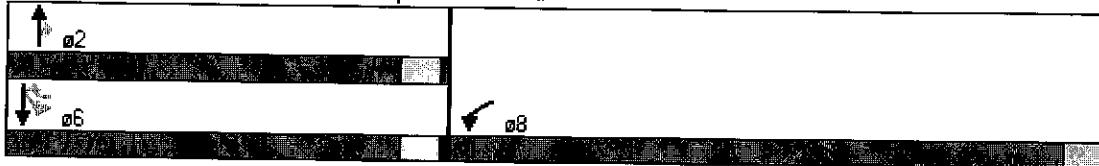
	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B		D	
Queue Length 50th (ft)	251	14	46	76	146	114
Queue Length 95th (ft)	459	54	m38	m43	202	153
Internal Link Dist (ft)	726		328		1024	
Turn Bay Length (ft)						
Base Capacity (vph)	2239	633	633	943	437	658
Starvation Cap Reductn	0	0	0	134	0	0
Spillback Cap Reductn	108	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.24	0.20	0.78	0.55	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 74 (74%), Referenced to phase 8:WBL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.1
 Intersection Capacity Utilization 64.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 25: SB Ramps & GS Blvd



26: Ave 12 & GS Blvd
 Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.94	1.00	1.00
Frt		0.990				0.850		0.872			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3309	0	1687	4848	1509	1752	1609	0	4848	1594	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1671	3309	0	1687	4848	1509	1752	1609	0	4848	1594	0
Right Turn on Red												
Satd. Flow (RTOR)		7				476		104			113	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1843			818			837			408	
Travel Time (s)		35.9			15.9			19.0			9.3	
Volume (vph)	240	384	27	19	647	438	43	17	96	1424	28	104
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	261	417	29	21	703	476	47	18	104	1548	30	113
Lane Group Flow (vph)	261	446	0	21	703	476	47	122	0	1548	143	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						
Detector Phases	7	4		3	8	8	2	2		6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.6	20.6		8.6	20.6	20.6	20.5	20.5		20.5	20.5	
Total Split (s)	21.0	32.8	0.0	9.7	21.5	21.5	20.5	20.5	0.0	37.0	37.0	0.0
Total Split (%)	21.0%	32.8%	0.0%	9.7%	21.5%	21.5%	20.5%	20.5%	0.0%	37.0%	37.0%	0.0%
Maximum Green (s)	16.4	28.2		5.1	16.9	16.9	16.0	16.0		32.5	32.5	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lag	Lead		Lag	Lead	Lead				1.0	1.0	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	Max	Max		Max	Max	
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	
Act Effct Green (s)	17.0	34.6		5.7	17.5	17.5	16.5	16.5		33.0	33.0	
Actuated g/C Ratio	0.17	0.35		0.06	0.18	0.18	0.16	0.16		0.33	0.33	
v/c Ratio	0.92	0.39		0.22	0.83	0.72	0.16	0.35		0.97	0.24	
Control Delay	78.5	26.5		44.8	37.1	15.1	37.6	13.2		42.9	6.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		9.1	0.0	
Total Delay	78.5	26.5		44.8	37.1	15.1	37.6	13.2		52.0	6.6	
LOS	E	C		D	D	B	D	B		D	A	
Approach Delay		45.7			28.5			20.0			48.2	

26: Ave 12 & GS Blvd
 Mitigated 2030 Project PM Alternative C

10/22/2008

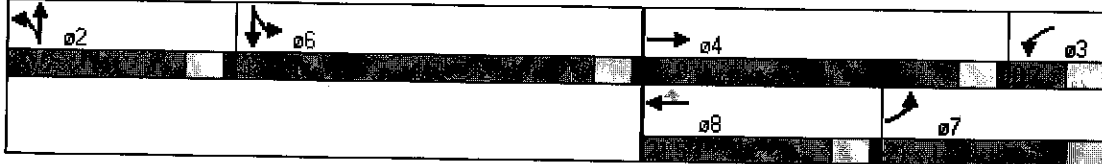
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			B			D	
Queue Length 50th (ft)	165	102		14	167	128	26	10		348	8	
Queue Length 95th (ft)	#315	168		m22	#199	240	59	60		#436	m37	
Internal Link Dist (ft)		1763			738			757			328	
Turn Bay Length (ft)												
Base Capacity (vph)	284	1150		96	848	657	289	352		1600	602	
Starvation Cap Reductn	0	0		0	0	0	0	0		72	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.92	0.39		0.22	0.83	0.72	0.16	0.35		1.01	0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 17 (17%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 40.2
 Intersection Capacity Utilization 71.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: Ave 12 & GS Blvd



27: Ave 12 & SR 99 NB Ramps
Mitigated 2030 Project PM Alternative C

10/22/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.91	1.00	1.00	0.86	0.86	0.97	0.95	0.95	1.00	1.00	1.00
Frnt					0.932	0.850		0.852	0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3367	4988	0	0	4393	1335	3273	1437	1434	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3367	4988	0	0	4393	1335	3273	1437	1434	0	0	0
Right Turn on Red			$\frac{1}{2}$ s			$\frac{1}{2}$ s		$\frac{1}{2}$ s		$\frac{1}{2}$ s		
Satd. Flow (RTOR)					289	604		45	45			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		818			2610			987			1106	
Travel Time (s)		15.9			50.8			22.4			25.1	
Volume (vph)	382	1553	0	0	714	1169	390	2	361	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	2%	2%	2%
Adj. Flow (vph)	415	1688	0	0	776	1271	424	2	392	0	0	0
Lane Group Flow (vph)	415	1688	0	0	1411	636	424	198	196	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Detector Phases	7	4			8	8	2		2			
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.5	20.5			20.5	20.5	20.5	20.5	20.5			
Total Split (s)	22.0	75.0	0.0	0.0	53.0	53.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	22.0%	75.0%	0.0%	0.0%	53.0%	53.0%	25.0%	25.0%	25.0%	0.0%	0.0%	0.0%
Maximum Green (s)	17.5	70.5			48.5	48.5	20.5	20.5	20.5			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	$\frac{1}{2}$ s				$\frac{1}{2}$ s	$\frac{1}{2}$ s						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	Min	Min	Min			
Walk Time (s)		5.0			5.0	5.0	5.0	5.0	5.0			
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0			
Pedestrian Calls (#/hr)		0			0	0	0	0	0			
Act Effct Green (s)	18.0	73.6			51.6	51.6	18.4	18.4	18.4			
Actuated g/C Ratio	0.18	0.74			0.52	0.52	0.18	0.18	0.18			
v/c Ratio	0.68	0.46			0.59	0.65	0.71	0.66	0.65			
Control Delay	38.7	0.8			14.4	5.3	44.8	39.7	39.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	38.7	0.8			14.4	5.3	44.8	39.7	39.3			
LOS	D	A			B	A	D	D	D			
Approach Delay		8.3			11.6			42.3				

27: Ave 12 & SR 99 NB Ramps
 Mitigated 2030 Project PM Alternative C

10/22/2008

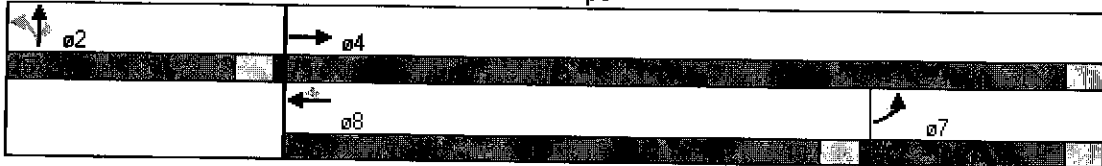
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D				
Queue Length 50th (ft)	144	15			185	11	130	94	93			
Queue Length 95th (ft)	m161	m15			243	102	178	171	170			
Internal Link Dist (ft)		738			2530			907			1026	
Turn Bay Length (ft)												
Base Capacity (vph)	606	3673			2408	981	687	337	337			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.68	0.46			0.59	0.65	0.62	0.59	0.58			

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 92 (92%), Referenced to phase 4:EBT and 8:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 15.2
 Intersection Capacity Utilization 76.7%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 27: Ave 12 & SR 99 NB Ramps



ATTACHMENT VI – C - 41










EXISTING (2008) CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

INTERSECTION LEVEL OF SERVICE CALCULATIONS







1: Mission Drive & Cascadel Road
Existing AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	0	4	3	0	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	7	0	5	3	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	22	6			8	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	22	6			8	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	994	1076			1612	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	7	8	16			
Volume Left	7	0	0			
Volume Right	0	3	0			
cSH	994	1700	1612			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.6	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			



















2: Cascadel Road & Road 225
Existing AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	W
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Volume (veh/h)	1	22	39	0	7	22
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	25	44	0	8	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	85	44			44	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85	44			44	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	100	98			99	
cM capacity (veh/h)	906	1020			1514	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	26	44	8	25		
Volume Left	1	0	8	0		
Volume Right	25	0	0	0		
cSH	1014	1700	1514	1700		
Volume to Capacity	0.03	0.03	0.01	0.01		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	8.6	0.0	7.4	0.0		
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	1.8			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization		15.8%			ICU Level of Service	A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
Existing AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	47	31	12	2	57	22	8	0	2	5	2	26
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	53	35	14	2	65	25	9	0	2	6	2	30
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	89	14	67	25	11	8	30					
Volume Left (vph)	53	0	2	0	9	6	0					
Volume Right (vph)	0	14	0	25	2	0	30					
Hadj (s)	0.42	-0.58	0.05	-0.67	0.07	0.41	-0.65					
Departure Headway (s)	5.1	4.1	4.7	4.0	5.1	5.4	4.3					
Degree Utilization, x	0.13	0.02	0.09	0.03	0.02	0.01	0.04					
Capacity (veh/h)	695	855	747	870	677	637	792					
Control Delay (s)	7.6	6.0	7.0	5.9	8.2	7.2	6.3					
Approach Delay (s)	7.4		6.7		8.2	6.5						
Approach LOS	A		A		A	A						

Intersection Summary

Delay		7.0		
HCM Level of Service		A		
Intersection Capacity Utilization	24.8%		ICU Level of Service	A
Analysis Period (min)		15		










4: Northfork Road & Auberry Road/Driveway
Existing AM

9/18/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕			↕	↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	72	6	20	51	0	6	2	26	2	0	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	82	7	23	58	0	7	2	30	2	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	58			89			185	185	82	216	192	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	58			89			185	185	82	216	192	58
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	100			98			99	100	97	100	100	100
cM capacity (veh/h)	1540			1501			758	691	967	708	692	1008
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	82	7	23	58	9	30	2					
Volume Left	0	0	23	0	7	0	2					
Volume Right	0	7	0	0	0	30	0					
cSH	1540	1700	1501	1700	740	967	708					
Volume to Capacity	0.00	0.00	0.02	0.03	0.01	0.03	0.00					
Queue Length 95th (ft)	0	0	1	0	1	2	0					
Control Delay (s)	0.0	0.0	7.4	0.0	9.9	8.8	10.1					
Lane LOS			A		A	A	B					
Approach Delay (s)	0.0		2.1		9.1		10.1					
Approach LOS					A		B					
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			20.5%		ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
Existing AM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	16	85	59	33	9	12
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	18	97	67	38	10	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	105				219	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	105				219	86
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	99
cM capacity (veh/h)	1487				760	973
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	115	105	24			
Volume Left	18	0	10			
Volume Right	0	38	14			
cSH	1487	1700	869			
Volume to Capacity	0.01	0.06	0.03			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	1.3	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s)	1.3	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization		22.0%		ICU Level of Service		A
Analysis Period (min)			15			







6: SR 49 & SR 41
Existing AM

9/18/2008

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Fr		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3367	1553	3303	3406	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3367	1553	3303	3406	3505	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		149				455
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	359	131	155	355	334	400
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	6%	6%	3%	3%
Adj. Flow (vph)	408	149	176	403	380	455
Lane Group Flow (vph)	408	149	176	403	380	455
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	12.2	12.2	6.1	18.6	11.3	12.2
Actuated g/C Ratio	0.31	0.31	0.15	0.47	0.29	0.31
v/c Ratio	0.39	0.26	0.36	0.25	0.38	0.57
Control Delay	12.7	4.1	20.2	6.7	13.9	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	4.1	20.2	6.7	13.9	4.9
LOS	B	A	C	A	B	A
Approach Delay	10.4			10.8	9.0	
Approach LOS	B			B	A	

6: SR 49 & SR 41
Existing AM

9/18/2008

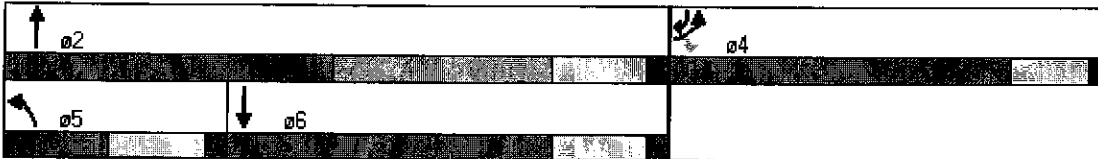
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	38	0	19	24	38	0
Queue Length 95th (ft)	71	27	46	48	70	45
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1280	683	489	1924	1307	878
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.22	0.36	0.21	0.29	0.52

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 39.4
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 9.9
 Intersection Capacity Utilization 35.9%
 Analysis Period (min) 15











Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41















7: Thornberry Road/Road 420 & SR 41
Existing AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	17	32	455	11	22	357
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	19	36	517	12	25	406
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	776	265			530	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	776	265			530	
tC, single (s)	6.8	6.9			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	94	95			97	
cM capacity (veh/h)	326	734			987	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	56	345	185	25	203	203
Volume Left	19	0	0	25	0	0
Volume Right	36	0	12	0	0	0
cSH	511	1700	1700	987	1700	1700
Volume to Capacity	0.11	0.20	0.11	0.03	0.12	0.12
Queue Length 95th (ft)	9	0	0	2	0	0
Control Delay (s)	12.9	0.0	0.0	8.7	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	12.9	0.0		0.5		
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			28.3%		ICU Level of Service	A
Analysis Period (min)			15			

8: Road 200 & SR 41
Existing AM

9/18/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1612	1442	3343	1495	1752	3505
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1612	1442	3343	1495	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		30		62		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	106	26	248	55	52	677
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	12%	12%	8%	8%	3%	3%
Adj. Flow (vph)	120	30	282	62	59	769
Lane Group Flow (vph)	120	30	282	62	59	769
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	13.3	13.3	36.5	36.5	9.0	45.4
Actuated g/C Ratio	0.20	0.20	0.56	0.56	0.13	0.69
v/c Ratio	0.38	0.10	0.15	0.07	0.26	0.32
Control Delay	20.4	7.7	9.4	4.1	23.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	7.7	9.4	4.1	23.6	4.9
LOS	C	A	A	A	C	A
Approach Delay	17.9		8.4			6.2
Approach LOS	B		A			A

8: Road 200 & SR 41
Existing AM

9/18/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	31	0	28	0	16	46
Queue Length 95th (ft)	65	15	54	18	44	86
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	474	446	1860	859	226	2428
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.07	0.15	0.07	0.26	0.32

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 65.6

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 8.1

Intersection LOS: A

Intersection Capacity Utilization 31.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41

Existing AM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr			0.850		0.952			0.994			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1776	1509	1570	1573	0	1703	3385	0	1752	3442	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1776	1509	1570	1573	0	1703	3385	0	1752	3442	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			69		19			3			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	65	26	61	15	38	18	11	228	10	30	645	88
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	7%	7%	15%	15%	15%	6%	6%	6%	3%	3%	3%
Adj. Flow (vph)	74	30	69	17	43	20	12	259	11	34	733	100
Lane Group Flow (vph)	74	30	69	17	63	0	12	270	0	34	833	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.6	18.5	18.5	9.3	10.7		9.0	50.7		9.8	53.7	
Actuated g/C Ratio	0.14	0.23	0.23	0.11	0.13		0.10	0.65		0.12	0.69	
v/c Ratio	0.31	0.08	0.18	0.10	0.29		0.07	0.12		0.17	0.35	
Control Delay	31.9	22.6	8.2	36.9	25.6		36.6	11.7		34.2	10.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.9	22.6	8.2	36.9	25.6		36.6	11.7		34.2	10.8	
LOS	C	C	A	D	C		D	B		C	B	
Approach Delay		20.8			28.0			12.8			11.7	
Approach LOS		C			C			B			B	

9: SR 145 & SR 41
Existing AM

9/18/2008

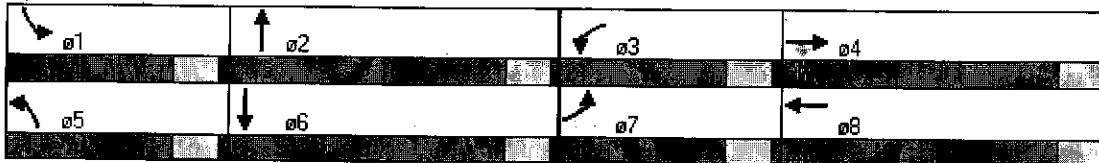
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	25	7	0	6	15		4	26		12	100	
Queue Length 95th (ft)	74	36	32	28	56		22	78		43	242	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	400	633	582	344	528		373	2211		395	2385	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.05	0.12	0.05	0.12		0.03	0.12		0.09	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 77.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 14.0
 Intersection Capacity Utilization 41.9%
 Analysis Period (min) 15










Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 9: SR 145 & SR 41



1: Mission Drive & Cascadel Road
Existing PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	3	1	21	5	1	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	1	24	6	1	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	36	27			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	36	27			30	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	100	100			100	
cM capacity (veh/h)	976	1049			1509	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	5	30	8			
Volume Left	3	0	1			
Volume Right	1	6	0			
cSH	993	1700	1509			
Volume to Capacity	0.00	0.02	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	8.6	0.0	1.1			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	1.1			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			





















2: Cascadel Road & Road 225
Existing PM

9/18/2008

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↖		↘	↗
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	11	30	0	21	51
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	12	34	0	24	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	140	34			34	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	140	34			34	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	99			98	
cM capacity (veh/h)	827	1022			1577	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	14	34	24	58		
Volume Left	1	0	24	0		
Volume Right	12	0	0	0		
cSH	1002	1700	1577	1700		
Volume to Capacity	0.01	0.02	0.02	0.03		
Queue Length 95th (ft)	1	0	1	0		
Control Delay (s)	8.6	0.0	7.3	0.0		
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	2.1			
Approach LOS	A					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization		17.8%		ICU Level of Service	A	
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
Existing PM

9/18/2008













													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	27	73	5	0	54	13	9	1	2	28	3	48	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	31	83	6	0	61	15	10	1	2	32	3	55	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total (vph)	114	6	61	15	14	35	55						
Volume Left (vph)	31	0	0	0	10	32	0						
Volume Right (vph)	0	6	0	15	2	0	55						
Hadj (s)	0.19	-0.65	0.05	-0.65	0.19	0.49	-0.67						
Departure Headway (s)	5.0	4.2	4.9	4.2	5.3	5.5	4.3						
Degree Utilization, x	0.16	0.01	0.08	0.02	0.02	0.05	0.07						
Capacity (veh/h)	703	833	707	825	652	628	793						
Control Delay (s)	7.7	6.0	7.2	6.1	8.4	7.6	6.4						
Approach Delay (s)	7.7		6.9		8.4	6.9							
Approach LOS	A		A		A	A							

Intersection Summary

Delay		7.3										
HCM Level of Service		A										
Intersection Capacity Utilization		26.0%		ICU Level of Service		A						
Analysis Period (min)		15										







4: Northfork Road & Auberry Road/Driveway
Existing PM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Free			Free			Stop	Stop		Stop	
Grade		0%			0%			0%	0%		0%	
Volume (veh/h)	0	79	11	18	94	0	4	0	21	0	0	3
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	90	12	20	107	0	5	0	24	0	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	107			102			247	244	96	268	250	107
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	107			102			247	244	96	268	250	107
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	98	100	100	100
cM capacity (veh/h)	1484			1490			697	649	960	661	644	947
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total	102	20	107	5	24	3						
Volume Left	0	20	0	5	0	0						
Volume Right	12	0	0	0	24	3						
cSH	1484	1490	1700	697	960	947						
Volume to Capacity	0.00	0.01	0.06	0.01	0.02	0.00						
Queue Length 95th (ft)	0	1	0	0	2	0						
Control Delay (s)	0.0	7.5	0.0	10.2	8.8	8.8						
Lane LOS		A		B	A	A						
Approach Delay (s)	0.0	1.2		9.1		8.8						
Approach LOS				A		A						
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization		21.5%			ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
Existing PM













9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	41	85	75	15	23	17
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	47	97	85	17	26	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	102				284	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	102				284	94
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	98
cM capacity (veh/h)	1490				682	960
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	143	102	45			
Volume Left	47	0	26			
Volume Right	0	17	19			
cSH	1490	1700	778			
Volume to Capacity	0.03	0.06	0.06			
Queue Length 95th (ft)	2	0	5			
Control Delay (s)	2.6	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	2.6	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			23.4%	ICU Level of Service		A
Analysis Period (min)			15			

6: SR 49 & SR 41







Existing PM

9/18/2008

Lane Group						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	1583	3400	3505	3539	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3433	1583	3400	3505	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		152				510
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	551	134	168	425	565	449
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	626	152	191	483	642	510
Lane Group Flow (vph)	626	152	191	483	642	510
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	14.1	14.1	6.1	21.2	14.0	14.1
Actuated g/C Ratio	0.32	0.32	0.13	0.48	0.32	0.32
v/c Ratio	0.57	0.25	0.42	0.29	0.57	0.60
Control Delay	15.6	4.2	23.2	7.1	15.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	4.2	23.2	7.1	15.8	5.0
LOS	B	A	C	A	B	A
Approach Delay	13.4			11.7	11.1	
Approach LOS	B			B	B	

6: SR 49 & SR 41
Existing PM

9/18/2008

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	74	0	26	36	80	0
Queue Length 95th (ft)	114	28	51	56	119	49
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1232	665	453	1905	1266	895
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.23	0.42	0.25	0.51	0.57

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 43.9
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 11.9
 Intersection Capacity Utilization 46.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41



7: Thornberry Road/Road 420 & SR 41
Existing PM

9/18/2008

Movement	↙	↖	↑	↗	↘	↓
	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↕		↘	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	8	14	514	18	29	525
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	9	16	584	20	33	597
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	959	302			605	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	959	302			605	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	96	98			97	
cM capacity (veh/h)	241	685			962	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	25	389	215	33	298	298
Volume Left	9	0	0	33	0	0
Volume Right	16	0	20	0	0	0
cSH	410	1700	1700	962	1700	1700
Volume to Capacity	0.06	0.23	0.13	0.03	0.18	0.18
Queue Length 95th (ft)	5	0	0	3	0	0
Control Delay (s)	14.3	0.0	0.0	8.9	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	14.3	0.0		0.5		
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		31.4%		ICU Level of Service		A
Analysis Period (min)			15			

8: Road 200 & SR 41
Existing PM

9/18/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Flt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1553	3505	1568	1719	3438
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1736	1553	3505	1568	1719	3438
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		56		92		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	59	49	620	81	22	385
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Adj. Flow (vph)	67	56	705	92	25	438
Lane Group Flow (vph)	67	56	705	92	25	438
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.2	11.2	47.4	47.4	8.7	50.4
Actuated g/C Ratio	0.16	0.16	0.73	0.73	0.12	0.78
v/c Ratio	0.24	0.19	0.27	0.08	0.12	0.16
Control Delay	18.9	7.3	5.7	2.6	22.6	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	7.3	5.7	2.6	22.6	3.1
LOS	B	A	A	A	C	A
Approach Delay	13.6		5.3			4.1
Approach LOS	B		A			A

8: Road 200 & SR 41
Existing PM

9/18/2008

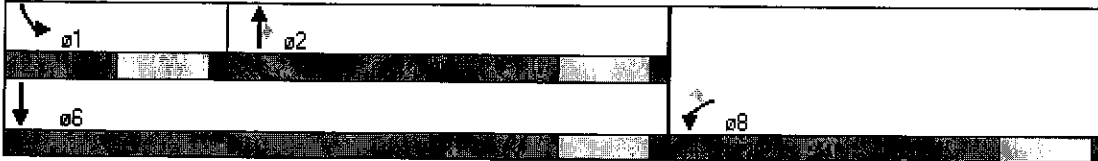
Lane Group	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	17	0	36	0	6	20
Queue Length 95th (ft)	41	21	121	20	23	40
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	488	476	2575	1176	206	2685
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.12	0.27	0.08	0.12	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 64.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.27
 Intersection Signal Delay: 5.7
 Intersection Capacity Utilization 28.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41

Existing PM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr			0.850		0.951			0.997			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1689	0	1752	3494	0	1719	3356	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1810	1538	1687	1689	0	1752	3494	0	1719	3356	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			19		20			2			18	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	95	87	17	18	81	40	44	695	15	18	352	67
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	108	99	19	20	92	45	50	790	17	20	400	76
Lane Group Flow (vph)	108	99	19	20	137	0	50	807	0	20	476	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	12.5	22.4	22.4	8.6	13.1		9.9	46.0		8.6	42.5	
Actuated g/C Ratio	0.15	0.26	0.26	0.10	0.15		0.11	0.56		0.10	0.51	
v/c Ratio	0.43	0.21	0.05	0.12	0.49		0.25	0.41		0.12	0.27	
Control Delay	37.8	25.1	12.3	40.5	33.7		39.3	17.3		40.5	17.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.8	25.1	12.3	40.5	33.7		39.3	17.3		40.5	17.7	
LOS	D	C	B	D	C		D	B		D	B	
Approach Delay		30.1			34.6			18.6			18.6	
Approach LOS		C			C			B			B	

9: SR 145 & SR 41
Existing PM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	52	35	0	10	56		24	121		10	87	
Queue Length 95th (ft)	108	88	17	33	118		62	278		33	159	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	377	624	543	335	539		361	1945		342	1733	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.29	0.16	0.03	0.06	0.25		0.14	0.41		0.06	0.27	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 82.7
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 21.6
 Intersection Capacity Utilization 48.3%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 9: SR 145 & SR 41



ATTACHMENT VI – C - 42
EXISTING (2008) CONDITIONS
NORTH FORK SITE - ALTERNATIVE D
SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: CASCADEL

Critical Approach Speed NPS mph

MINOR STREET: MISSION

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

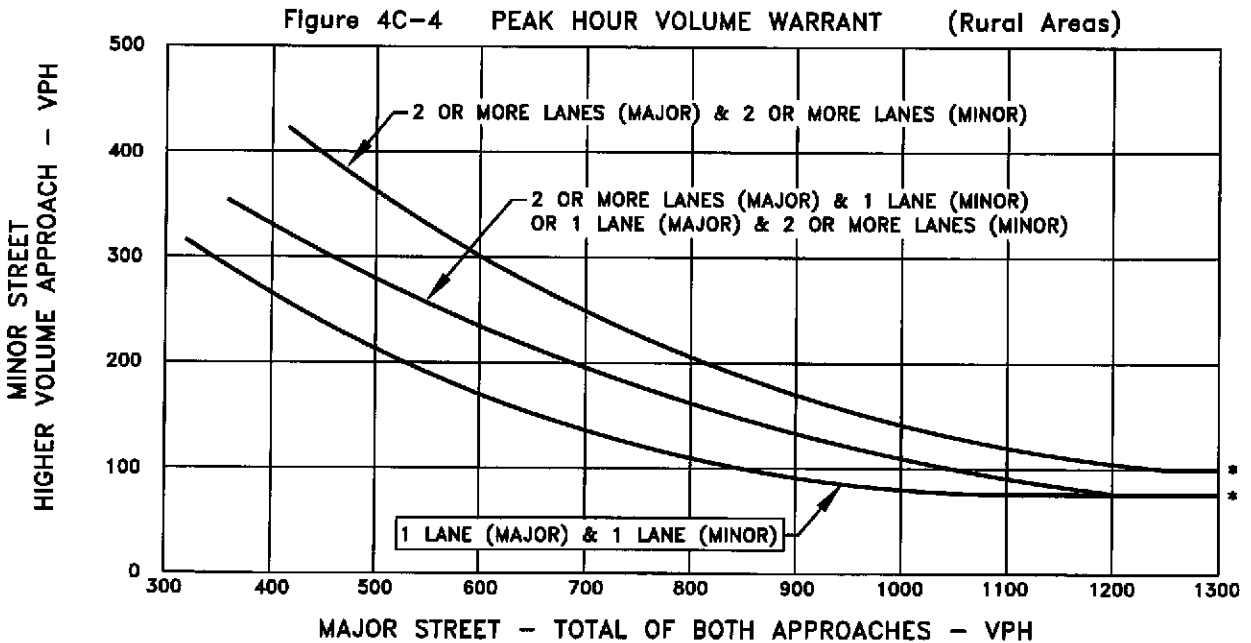
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21	33			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6	4			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

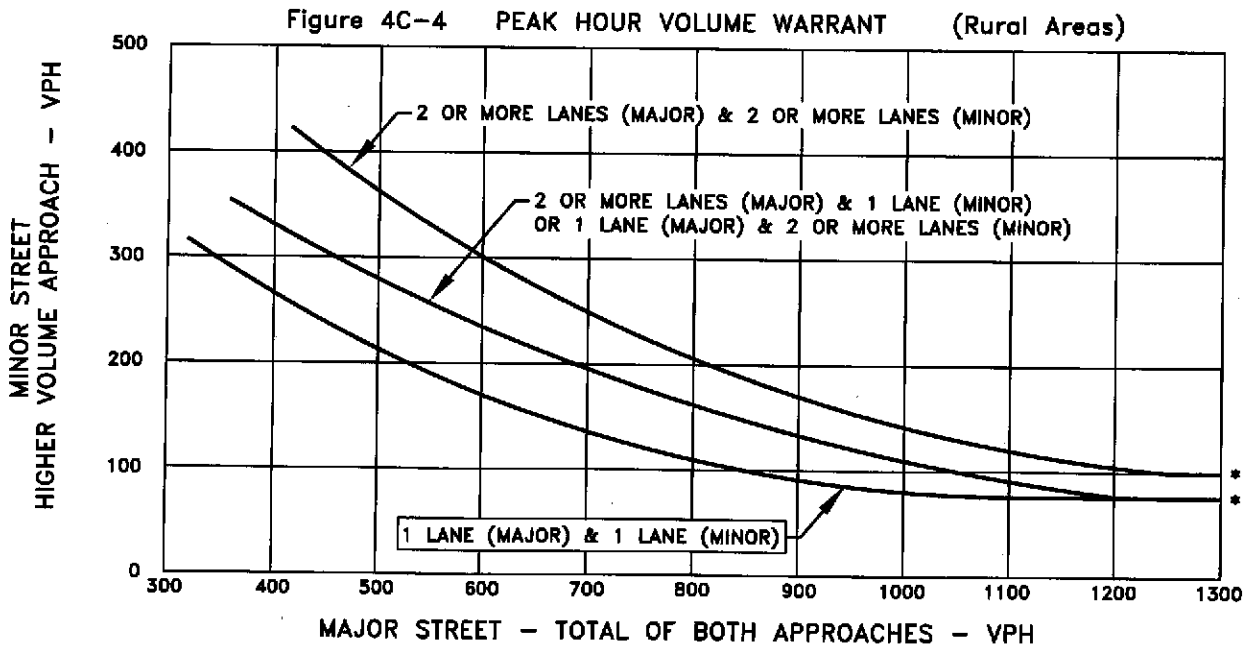
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		68	102			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		23	12			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: ROAD 274

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

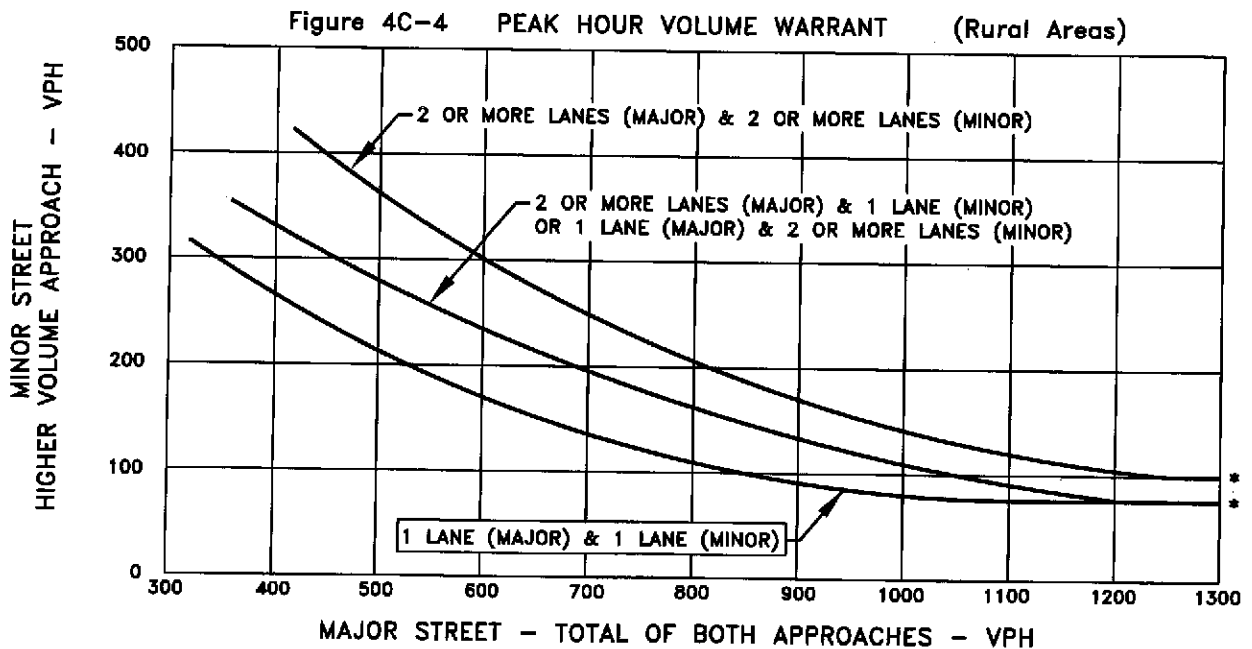
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	✓		171	172			
Highest Approaches - Minor Street	✓		33	12			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: AUBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

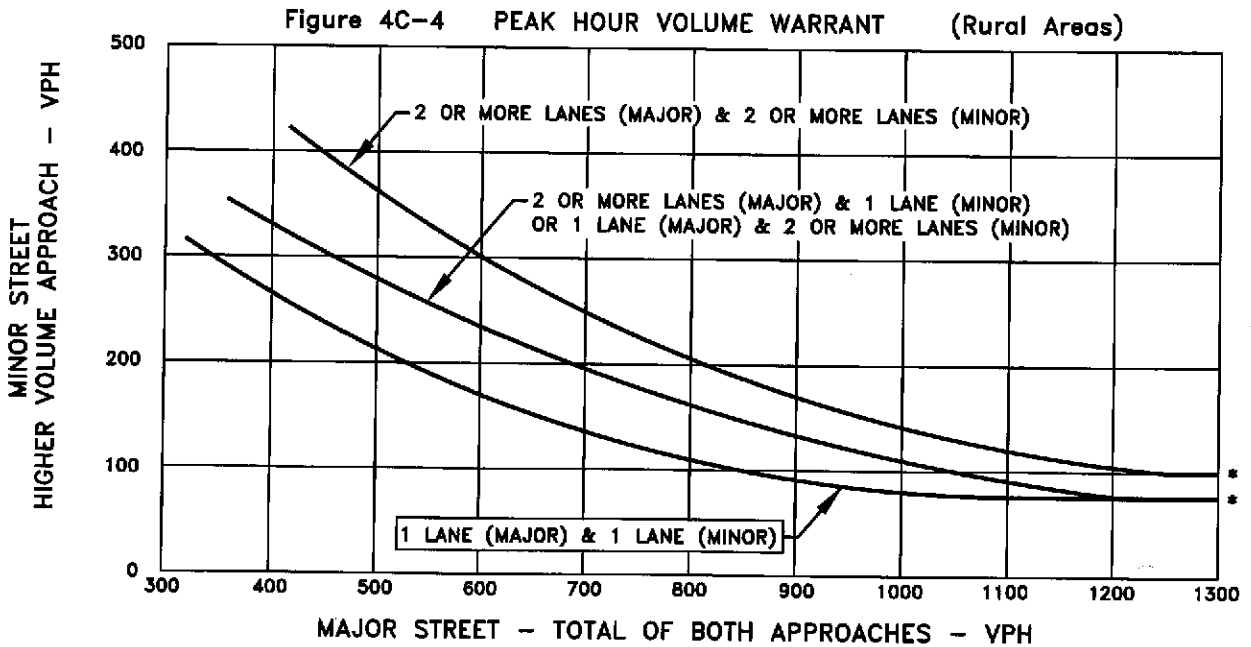
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		149	202		
Highest Approaches - Minor Street	✓		34	25		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: CRANE VALLEY ROAD

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

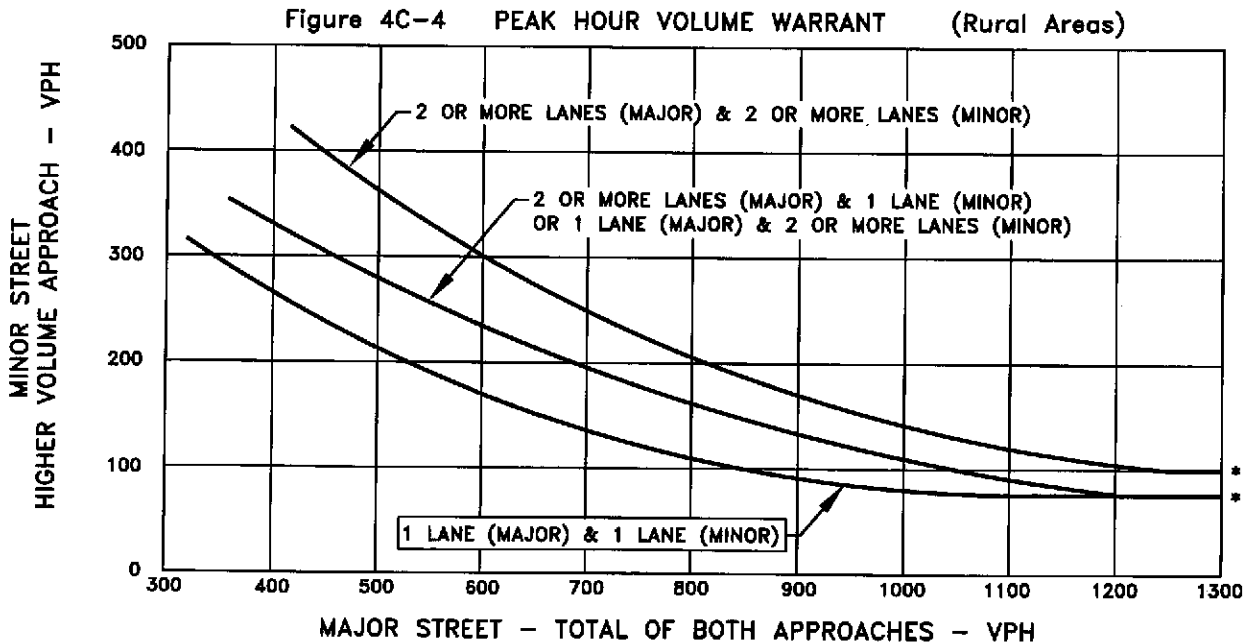
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	193	216		
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21	40		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: SR 41

Critical Approach Speed 55 mph

MINOR STREET: THORNBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

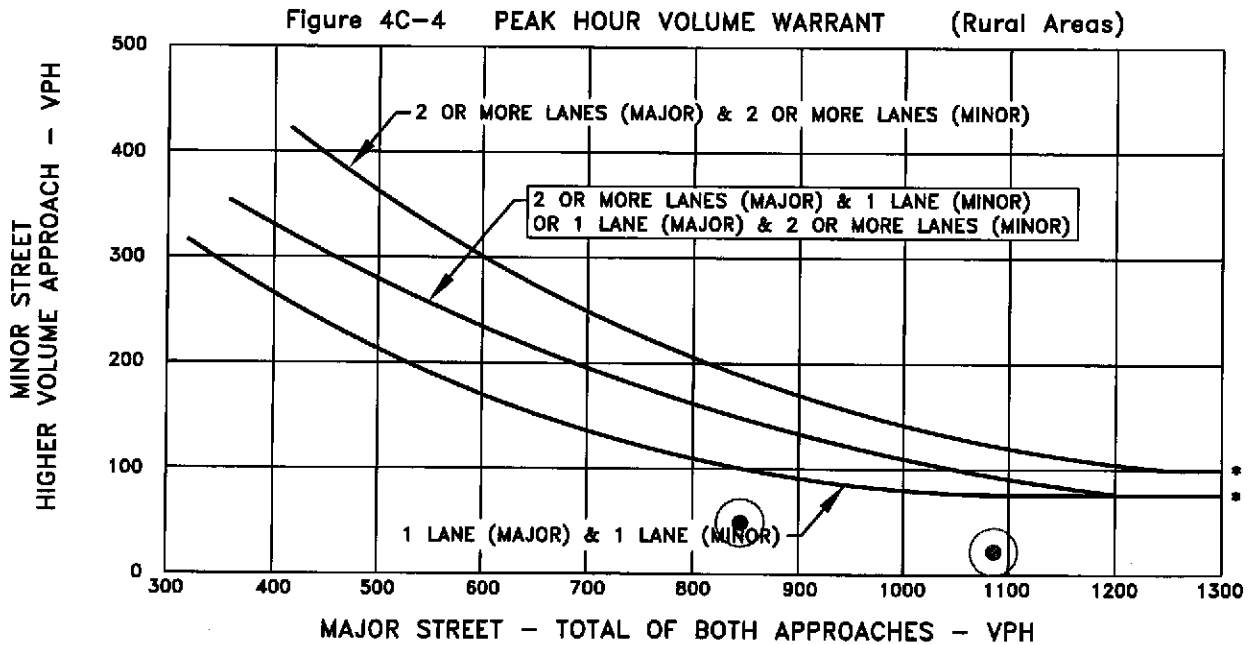
CONDITION: EXISTING

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK		PM PEAK		Hour
	One	2 or more					
Both Approaches - Major Street		✓	845	1086			
Highest Approaches - Minor Street	✓		49	22			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 43










OPENING DAY (2010) NO PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

INTERSECTION LEVEL OF SERVICE CALCULATIONS











1: Mission Drive & Cascadel Road
2010 No Project AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	7	0	4	3	0	15
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	0	5	3	0	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	23	6			8	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	23	6			8	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	993	1076			1612	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	8	17			
Volume Left	8	0	0			
Volume Right	0	3	0			
cSH	993	1700	1612			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.7	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			




















2: Cascadel Road & Road 225
2010 No Project AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	22	41	0	7	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	25	47	0	8	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	89	47			47	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	89	47			47	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	100	98			99	
cM capacity (veh/h)	902	1017			1511	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	26	47	8	26		
Volume Left	1	0	8	0		
Volume Right	25	0	0	0		
cSH	1011	1700	1511	1700		
Volume to Capacity	0.03	0.03	0.01	0.02		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	8.7	0.0	7.4	0.0		
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.7			
Approach LOS	A					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			15.8%		ICU Level of Service	A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2010 No Project AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	51	34	12	2	60	22	8	0	2	5	2	30
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	58	39	14	2	68	25	9	0	2	6	2	34
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	97	14	70	25	11	8	34					
Volume Left (vph)	58	0	2	0	9	6	0					
Volume Right (vph)	0	14	0	25	2	0	34					
Hadj (s)	0.42	-0.58	0.05	-0.67	0.07	0.41	-0.65					
Departure Headway (s)	5.1	4.1	4.8	4.0	5.1	5.4	4.3					
Degree Utilization, x	0.14	0.02	0.09	0.03	0.02	0.01	0.04					
Capacity (veh/h)	692	851	744	865	671	633	785					
Control Delay (s)	7.7	6.0	7.1	6.0	8.2	7.3	6.3					
Approach Delay (s)	7.5		6.8		8.2	6.5						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			7.1									
HCM Level of Service			A									
Intersection Capacity Utilization			25.2%		ICU Level of Service		A					
Analysis Period (min)			15									







4: Northfork Road & Auberry Road/Driveway
2010 No Project AM

















9/18/2008







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↗			↕	↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	76	6	21	54	2	6	4	27	4	2	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	2	86	7	24	61	2	7	5	31	5	2	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	64			93			203	202	86	234	208	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			93			203	202	86	234	208	62
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	100			98			99	99	97	99	100	100
cM capacity (veh/h)	1532			1495			733	675	961	685	677	1002
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	89	7	24	64	11	31	9					
Volume Left	2	0	24	0	7	0	5					
Volume Right	0	7	0	2	0	31	2					
cSH	1532	1700	1495	1700	708	961	741					
Volume to Capacity	0.00	0.00	0.02	0.04	0.02	0.03	0.01					
Queue Length 95th (ft)	0	0	1	0	1	2	1					
Control Delay (s)	0.2	0.0	7.4	0.0	10.2	8.9	9.9					
Lane LOS	A		A		B	A	A					
Approach Delay (s)	0.2		2.0		9.2		9.9					
Approach LOS					A		A					
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			20.8%		ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
 2010 No Project AM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	17	87	60	35	10	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	19	99	68	40	11	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	108				226	88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108				226	88
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	1483				753	970
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	118	108	27			
Volume Left	19	0	11			
Volume Right	0	40	16			
cSH	1483	1700	866			
Volume to Capacity	0.01	0.06	0.03			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	1.3	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s)	1.3	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization		22.2%		ICU Level of Service		A
Analysis Period (min)			15			

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 		 	 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3367	1553	3303	3406	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3367	1553	3303	3406	3505	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		153				462
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	366	135	159	368	347	407
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	6%	6%	3%	3%
Adj. Flow (vph)	416	153	181	418	394	462
Lane Group Flow (vph)	416	153	181	418	394	462
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	12.3	12.3	6.1	18.7	11.4	12.3
Actuated g/C Ratio	0.31	0.31	0.15	0.47	0.29	0.31
v/c Ratio	0.40	0.26	0.37	0.26	0.39	0.57
Control Delay	12.9	4.1	20.5	6.8	14.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	4.1	20.5	6.8	14.0	4.9
LOS	B	A	C	A	B	A
Approach Delay	10.5			10.9	9.1	
Approach LOS	B			B	A	

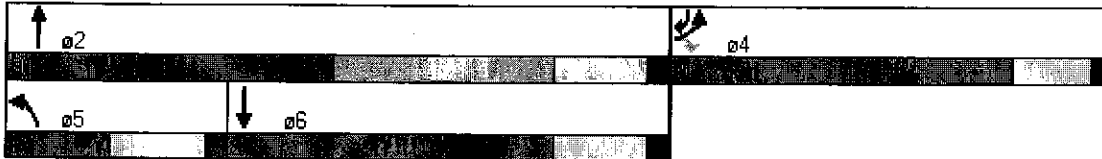
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	39	0	20	25	40	0
Queue Length 95th (ft)	73	28	47	50	73	46
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1276	684	486	1921	1305	881
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.22	0.37	0.22	0.30	0.52

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 39.6
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 10.0
 Intersection Capacity Utilization 36.4%
 Analysis Period (min) 15











Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41



7: Thornberry Road/Road 420 & SR 41
2010 No Project AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	18	33	473	11	24	374
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	20	38	538	12	27	425
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	811	275			550	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	811	275			550	
tC, single (s)	6.8	6.9			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	93	95			97	
cM capacity (veh/h)	308	722			969	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	58	358	192	27	212	212
Volume Left	20	0	0	27	0	0
Volume Right	38	0	12	0	0	0
cSH	490	1700	1700	969	1700	1700
Volume to Capacity	0.12	0.21	0.11	0.03	0.13	0.13
Queue Length 95th (ft)	10	0	0	2	0	0
Control Delay (s)	13.3	0.0	0.0	8.8	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.3	0.0		0.5		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			29.9%		ICU Level of Service	A
Analysis Period (min)			15			

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1612	1442	3343	1495	1752	3505
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1612	1442	3343	1495	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		31		65		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	108	27	260	57	53	688
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	12%	12%	8%	8%	3%	3%
Adj. Flow (vph)	123	31	295	65	60	782
Lane Group Flow (vph)	123	31	295	65	60	782
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	13.4	13.4	36.5	36.5	9.0	45.4
Actuated g/C Ratio	0.20	0.20	0.56	0.56	0.13	0.69
v/c Ratio	0.39	0.10	0.16	0.08	0.27	0.32
Control Delay	20.5	7.5	9.5	4.0	23.7	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	7.5	9.5	4.0	23.7	5.0
LOS	C	A	A	A	C	A
Approach Delay	17.9		8.5			6.3
Approach LOS	B		A			A

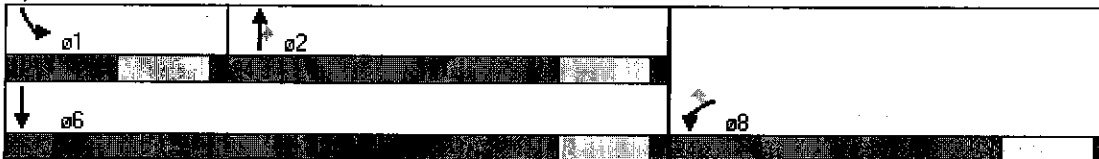
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	31	0	29	0	16	48
Queue Length 95th (ft)	66	15	56	19	45	90
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	474	446	1858	860	226	2424
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.07	0.16	0.08	0.27	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 65.7
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 8.2
 Intersection Capacity Utilization 31.7%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A













Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2010 No Project AM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.953			0.992			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1776	1509	1570	1575	0	1703	3378	0	1752	3442	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1776	1509	1570	1575	0	1703	3378	0	1752	3442	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		19			5			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	65	35	64	20	50	23	11	238	14	39	652	88
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	7%	7%	15%	15%	15%	6%	6%	6%	3%	3%	3%
Adj. Flow (vph)	74	40	73	23	57	26	12	270	16	44	741	100
Lane Group Flow (vph)	74	40	73	23	83	0	12	286	0	44	841	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.7	16.1	16.1	9.7	11.6		9.1	51.4		10.4	57.5	
Actuated g/C Ratio	0.14	0.19	0.19	0.11	0.13		0.10	0.63		0.12	0.70	
v/c Ratio	0.32	0.12	0.21	0.13	0.36		0.07	0.13		0.21	0.35	
Control Delay	34.4	27.2	9.2	37.3	28.8		39.0	13.6		35.1	11.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.4	27.2	9.2	37.3	28.8		39.0	13.6		35.1	11.0	
LOS	C	C	A	D	C		D	B		D	B	
Approach Delay		23.0			30.7			14.7			12.2	
Approach LOS		C			C			B			B	

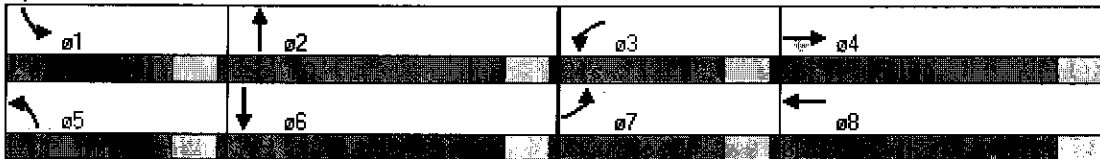
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	33	14	0	10	29		5	45		20	109	
Queue Length 95th (ft)	76	45	33	34	73		22	87		53	254	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	381	587	548	339	510		358	2126		391	2427	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.07	0.13	0.07	0.16		0.03	0.13		0.11	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 81.7
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 15.4
 Intersection Capacity Utilization 44.4%
 Analysis Period (min) 15










Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 9: SR 145 & SR 41













1: Mission Drive & Cascadel Road
2010 No Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	3	1	22	5	1	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	1	25	6	1	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	37	28			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	37	28			31	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	100	100			100	
cM capacity (veh/h)	975	1047			1508	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	5	31	8			
Volume Left	3	0	1			
Volume Right	1	6	0			
cSH	992	1700	1508			
Volume to Capacity	0.00	0.02	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	8.6	0.0	1.1			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	1.1			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			

2: Cascadel Road & Road 225
2010 No Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	11	32	0	21	54
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	12	36	0	24	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	145	36			36	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	145	36			36	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	99			98	
cM capacity (veh/h)	820	1019			1574	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	14	36	24	61		
Volume Left	1	0	24	0		
Volume Right	12	0	0	0		
cSH	999	1700	1574	1700		
Volume to Capacity	0.01	0.02	0.02	0.04		
Queue Length 95th (ft)	1	0	1	0		
Control Delay (s)	8.7	0.0	7.3	0.0		
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	2.1			
Approach LOS	A					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization		17.8%		ICU Level of Service		A
Analysis Period (min)			15			













3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2010 No Project PM

9/18/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	77	5	0	58	14	9	1	2	29	3	52
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	35	88	6	0	66	16	10	1	2	33	3	59
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	123	6	66	16	14	36	59					
Volume Left (vph)	35	0	0	0	10	33	0					
Volume Right (vph)	0	6	0	16	2	0	59					
Hadj (s)	0.19	-0.65	0.05	-0.65	0.19	0.49	-0.67					
Departure Headway (s)	5.0	4.2	4.9	4.2	5.3	5.5	4.4					
Degree Utilization, x	0.17	0.01	0.09	0.02	0.02	0.06	0.07					
Capacity (veh/h)	699	829	703	818	645	622	784					
Control Delay (s)	7.9	6.0	7.2	6.1	8.4	7.6	6.5					
Approach Delay (s)	7.8		7.0		8.4	6.9						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			7.4									
HCM Level of Service			A									
Intersection Capacity Utilization			26.4%		ICU Level of Service				A			
Analysis Period (min)			15									







4: Northfork Road & Auberry Road/Driveway
2010 No Project PM













9/18/2008







												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	86	11	22	95	4	4	2	23	3	2	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	2	98	12	25	108	5	5	2	26	3	2	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
platoon unblocked												
vC, conflicting volume	112			110			274	271	104	296	275	110
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			110			274	271	104	296	275	110
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			99	100	97	99	100	99
cM capacity (veh/h)	1477			1480			662	624	951	627	621	943
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total	112	25	112	7	26	12						
Volume Left	2	25	0	5	0	3						
Volume Right	12	0	5	0	26	7						
cSH	1477	1480	1700	649	951	766						
Volume to Capacity	0.00	0.02	0.07	0.01	0.03	0.02						
Queue Length 95th (ft)	0	1	0	1	2	1						
Control Delay (s)	0.2	7.5	0.0	10.6	8.9	9.8						
Lane LOS	A	A		B	A	A						
Approach Delay (s)	0.2	1.4		9.2		9.8						
Approach LOS				A		A						
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			22.0%		ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
 2010 No Project PM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	43	87	78	17	26	18
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	49	99	89	19	30	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	108				295	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108				295	98
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	98
cM capacity (veh/h)	1483				671	955
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	148	108	50			
Volume Left	49	0	30			
Volume Right	0	19	20			
cSH	1483	1700	764			
Volume to Capacity	0.03	0.06	0.07			
Queue Length 95th (ft)	3	0	5			
Control Delay (s)	2.7	0.0	10.0			
Lane LOS	A		B			
Approach Delay (s)	2.7	0.0	10.0			
Approach LOS			B			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization		23.6%		ICU Level of Service		A
Analysis Period (min)			15			

Lane Group						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	1583	3400	3505	3539	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3433	1583	3400	3505	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		157				519
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	560	138	174	441	583	457
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	636	157	198	501	662	519
Lane Group Flow (vph)	636	157	198	501	662	519
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	14.1	14.1	6.1	21.5	14.2	14.1
Actuated g/C Ratio	0.32	0.32	0.13	0.49	0.32	0.32
v/c Ratio	0.58	0.26	0.44	0.29	0.58	0.60
Control Delay	15.9	4.1	23.5	7.2	15.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	4.1	23.5	7.2	15.9	5.1
LOS	B	A	C	A	B	A
Approach Delay	13.6			11.8	11.2	
Approach LOS	B			B	B	

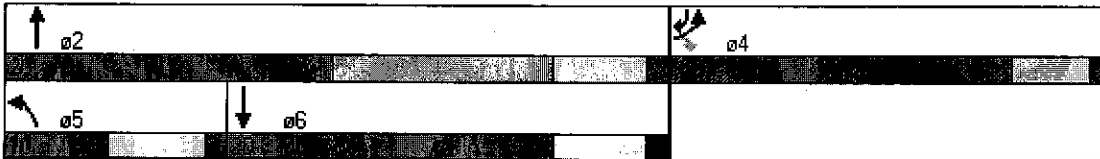
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	78	0	28	38	83	0
Queue Length 95th (ft)	117	29	52	59	123	49
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1224	665	450	1904	1266	898
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.24	0.44	0.26	0.52	0.58











Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 44.2
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 47.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A













Splits and Phases: 6: SR 49 & SR 41



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	9	16	535	19	31	547
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	18	608	22	35	622
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	1000	315			630	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1000	315			630	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	97			96	
cM capacity (veh/h)	226	672			942	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	28	405	224	35	311	311
Volume Left	10	0	0	35	0	0
Volume Right	18	0	22	0	0	0
cSH	393	1700	1700	942	1700	1700
Volume to Capacity	0.07	0.24	0.13	0.04	0.18	0.18
Queue Length 95th (ft)	6	0	0	3	0	0
Control Delay (s)	14.9	0.0	0.0	9.0	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	14.9	0.0		0.5		
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

8: Road 200 & SR 41
2010 No Project PM

9/18/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Fr		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1553	3505	1568	1719	3438
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1736	1553	3505	1568	1719	3438
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		58		97		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	62	51	634	85	23	399
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Adj. Flow (vph)	70	58	720	97	26	453
Lane Group Flow (vph)	70	58	720	97	26	453
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.2	11.2	47.0	47.0	8.7	49.9
Actuated g/C Ratio	0.16	0.16	0.73	0.73	0.12	0.78
v/c Ratio	0.25	0.19	0.28	0.08	0.13	0.17
Control Delay	19.0	7.2	5.8	2.6	22.7	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	7.2	5.8	2.6	22.7	3.1
LOS	B	A	A	A	C	A
Approach Delay	13.6		5.4			4.2
Approach LOS	B		A			A

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	17	0	37	0	7	21
Queue Length 95th (ft)	43	21	124	21	23	41
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	492	481	2572	1177	208	2682
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.12	0.28	0.08	0.13	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 64
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 5.7
 Intersection Capacity Utilization 29.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2010 No Project PM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.950			0.996			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1687	0	1752	3491	0	1719	3359	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1810	1538	1687	1687	0	1752	3491	0	1719	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			19		20			2			17	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	95	107	17	23	97	48	44	709	19	22	367	67
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	108	122	19	26	110	55	50	806	22	25	417	76
Lane Group Flow (vph)	108	122	19	26	165	0	50	828	0	25	493	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	13.3	25.4	25.4	9.3	15.2		10.3	50.6		9.1	46.9	
Actuated g/C Ratio	0.14	0.27	0.27	0.09	0.16		0.11	0.55		0.09	0.51	
v/c Ratio	0.45	0.25	0.04	0.17	0.57		0.27	0.43		0.16	0.29	
Control Delay	39.0	25.1	11.9	41.9	35.9		40.6	18.4		41.9	18.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.0	25.1	11.9	41.9	35.9		40.6	18.4		41.9	18.5	
LOS	D	C	B	D	D		D	B		D	B	
Approach Delay		30.1			36.7			19.7			19.6	
Approach LOS		C			D			B			B	

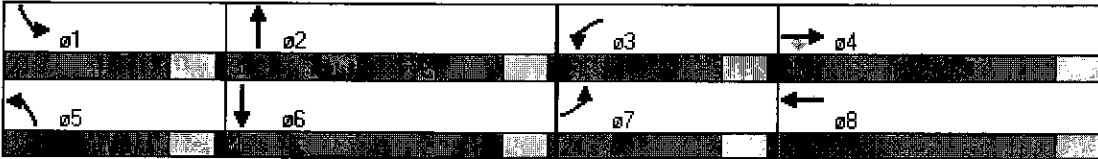
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	53	43	0	13	71		25	131		12	95	
Queue Length 95th (ft)	111	105	17	41	141		64	302		40	172	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	352	596	519	313	513		336	1911		318	1712	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.31	0.20	0.04	0.08	0.32		0.15	0.43		0.08	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 92.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 22.8
 Intersection Capacity Utilization 50.2%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 9: SR 145 & SR 41



ATTACHMENT VI – C - 44

OPENING DAY (2010) NO PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: CASCADEL

Critical Approach Speed NPS mph

MINOR STREET: MISSION

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

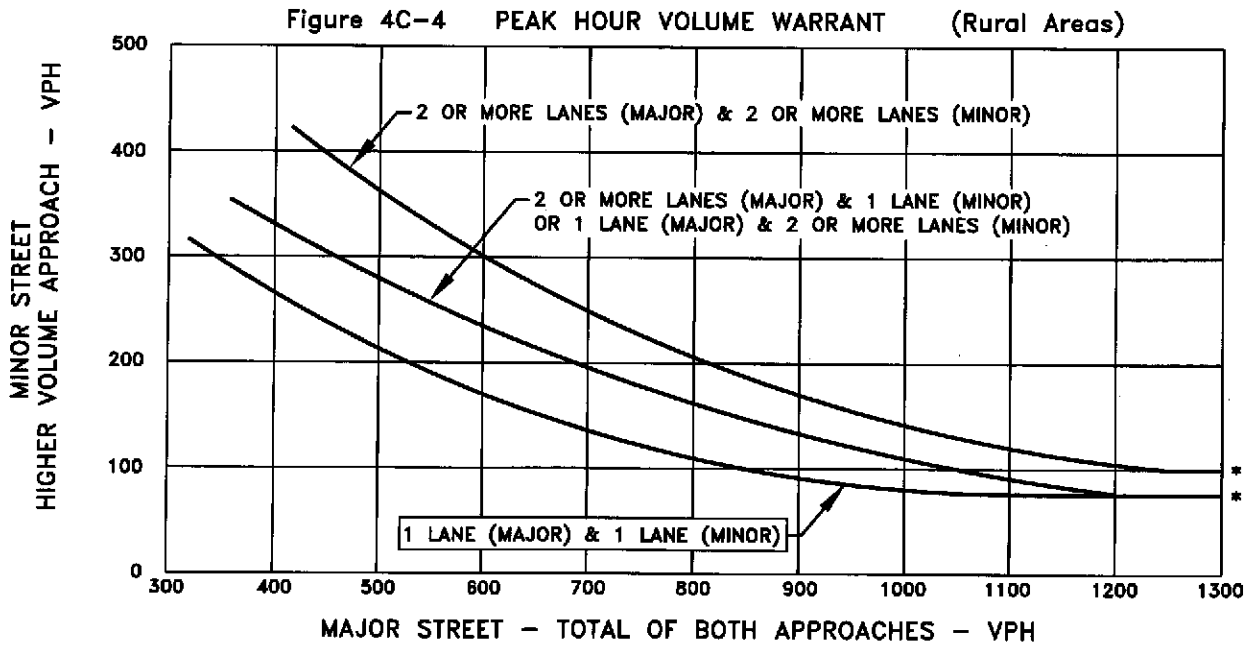
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK		PM PEAK		Hour
			AM PEAK	PM PEAK	AM PEAK	PM PEAK	
Both Approaches - Major Street	✓		22	34			
Highest Approaches - Minor Street	✓		6	4			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

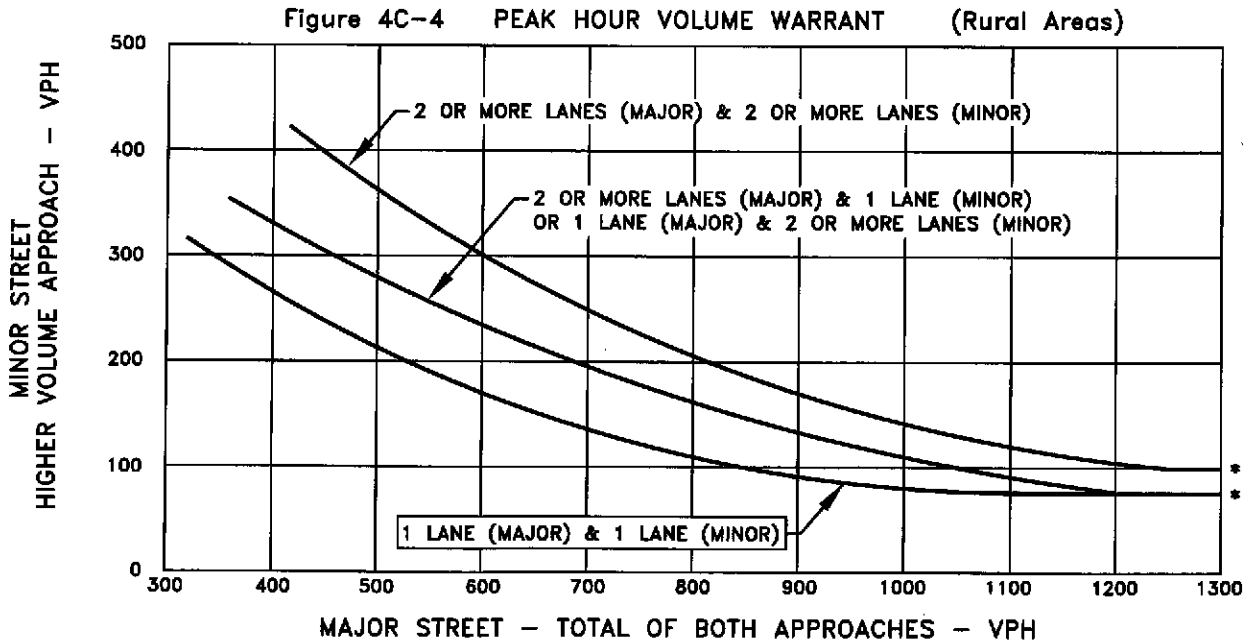
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK		PM PEAK		Hour
	One	2 or more					
Both Approaches - Major Street	✓		71	107			
Highest Approaches - Minor Street	✓		23	12			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: ROAD 274

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

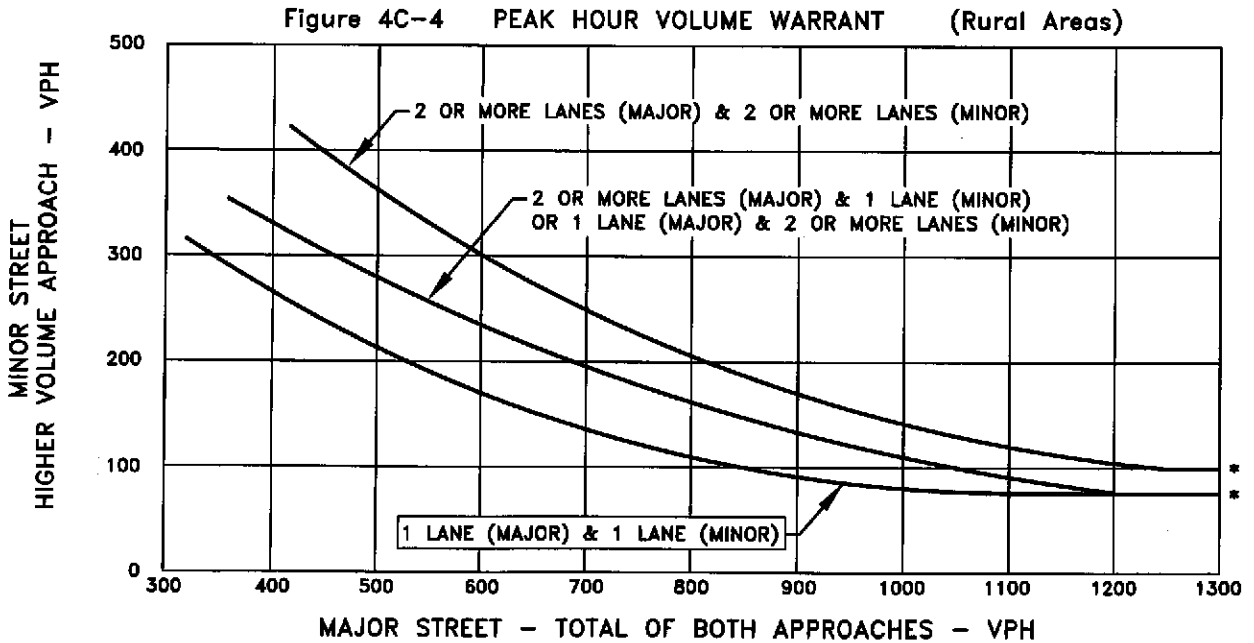
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		181	185				
Highest Approaches - Minor Street	✓		33	79				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: AUBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

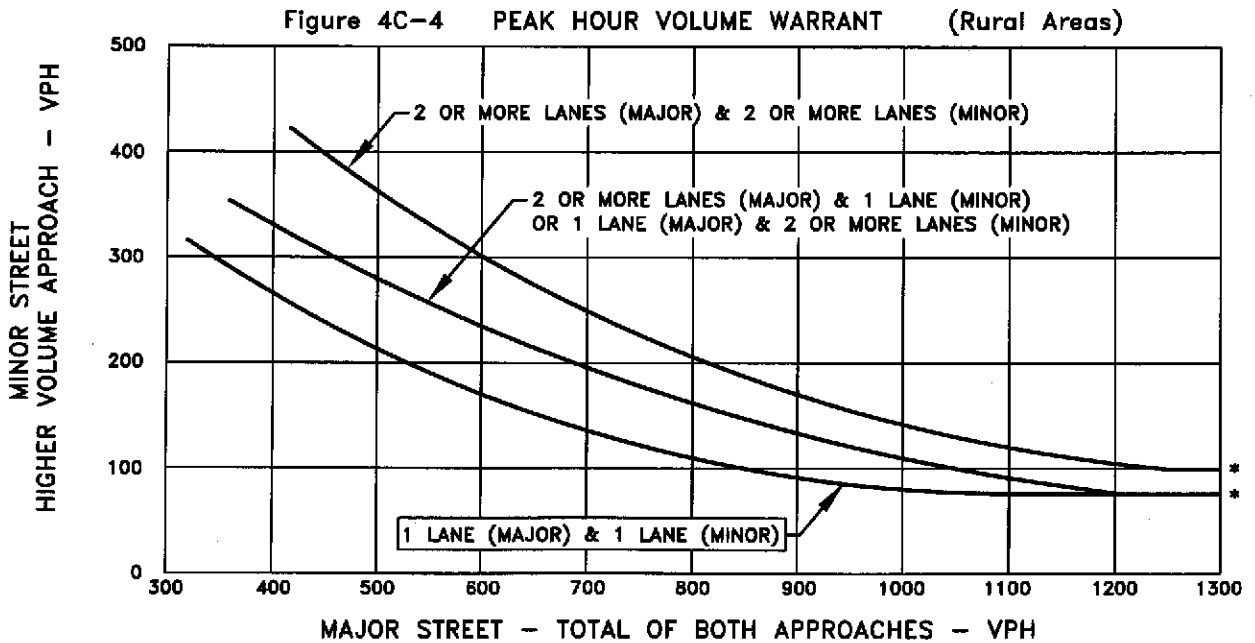
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		161	220		
Highest Approaches - Minor Street	✓		34	25		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: CRANE VALLEY ROAD

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

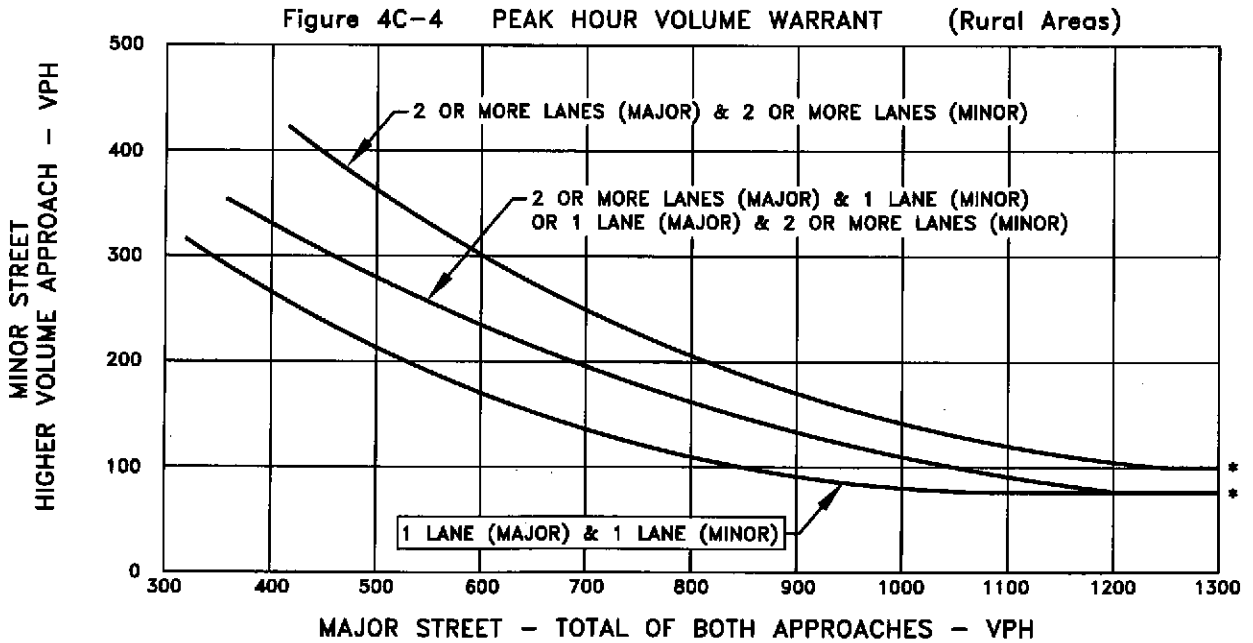
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	199	225			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21	40			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: SR 41

Critical Approach Speed 55 mph

MINOR STREET: THORNBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

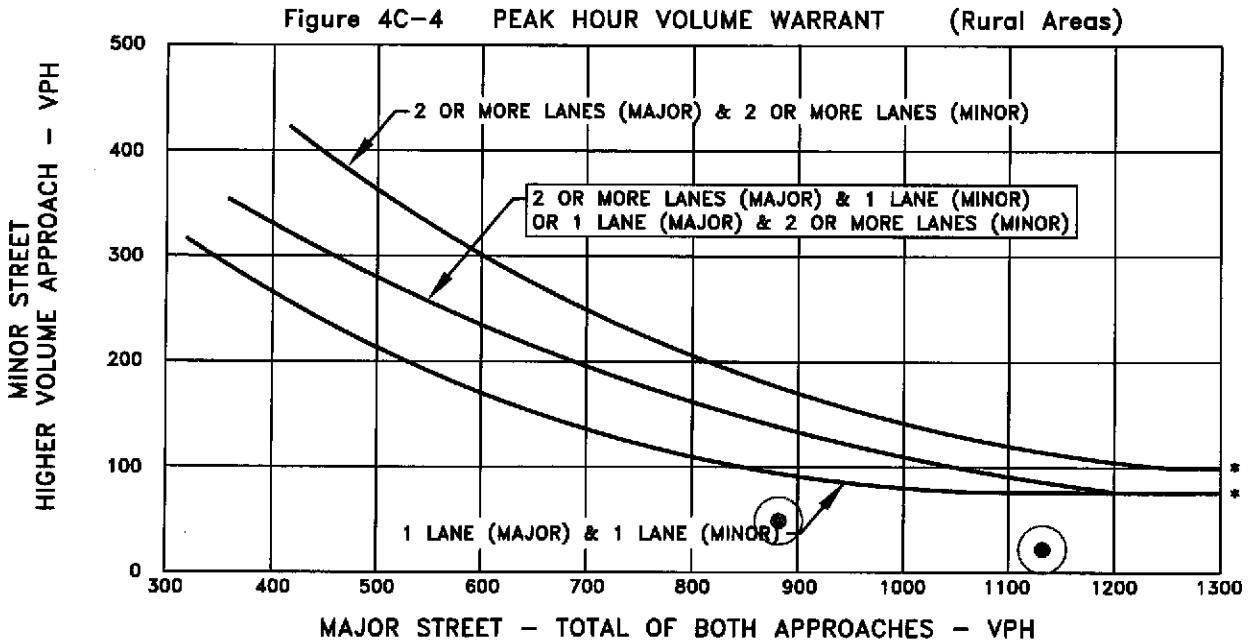
CONDITION: 2010 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK		PM PEAK		Hour
	One	2 or more					
Both Approaches - Major Street		✓	882	1132			
Highest Approaches - Minor Street	✓		49	22			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.










The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.











ATTACHMENT VI – C - 45

OPENING DAY (2010) PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D




















INTERSECTION LEVEL OF SERVICE CALCULATIONS

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	17	4	10	39	15
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	11	19	5	11	44	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	116	10			16	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	116	10			16	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			97	
cM capacity (veh/h)	856	1071			1602	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	31	16	61			
Volume Left	11	0	44			
Volume Right	19	11	0			
cSH	980	1700	1602			
Volume to Capacity	0.03	0.01	0.03			
Queue Length 95th (ft)	2	0	2			
Control Delay (s)	8.8	0.0	5.3			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	5.3			
Approach LOS	A					
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization		19.6%		ICU Level of Service		A
Analysis Period (min)			15			

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	39	41	0	46	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	44	47	0	52	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	177	47			47	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	47			47	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	100	96			97	
cM capacity (veh/h)	780	1017			1511	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	45	47	52	26		
Volume Left	1	0	52	0		
Volume Right	44	0	0	0		
cSH	1009	1700	1511	1700		
Volume to Capacity	0.05	0.03	0.03	0.02		
Queue Length 95th (ft)	4	0	3	0		
Control Delay (s)	8.7	0.0	7.5	0.0		
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	5.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			19.2%		ICU Level of Service	A
Analysis Period (min)			15			













3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2010 Project AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	51	56	12	2	69	27	8	0	2	16	2	30
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	58	64	14	2	78	31	9	0	2	18	2	34
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	122	14	81	31	11	20	34					
Volume Left (vph)	58	0	2	0	9	18	0					
Volume Right (vph)	0	14	0	31	2	0	34					
Hadj (s)	0.36	-0.58	0.05	-0.67	0.07	0.50	-0.65					
Departure Headway (s)	5.1	4.2	4.8	4.1	5.2	5.6	4.4					
Degree Utilization, x	0.17	0.02	0.11	0.04	0.02	0.03	0.04					
Capacity (veh/h)	693	838	723	850	653	610	764					
Control Delay (s)	8.0	6.0	7.2	6.1	8.3	7.6	6.4					
Approach Delay (s)	7.8		6.9		8.3	6.9						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			7.3									
HCM Level of Service			A									
Intersection Capacity Utilization			26.3%		ICU Level of Service				A			
Analysis Period (min)			15									







4: Northfork Road & Auberry Road/Driveway
2010 Project AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↘	↖			↕	↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	76	6	21	54	2	6	6	27	5	2	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	12	86	7	24	61	2	7	7	31	6	2	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	64			93			228	223	86	256	228	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			93			228	223	86	256	228	62
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			98			99	99	97	99	100	99
cM capacity (veh/h)	1532			1495			699	653	961	658	655	1002
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	99	7	24	64	14	31	15					
Volume Left	12	0	24	0	7	0	6					
Volume Right	0	7	0	2	0	31	7					
cSH	1532	1700	1495	1700	675	961	781					
Volume to Capacity	0.01	0.00	0.02	0.04	0.02	0.03	0.02					
Queue Length 95th (ft)	1	0	1	0	2	2	1					
Control Delay (s)	1.0	0.0	7.4	0.0	10.4	8.9	9.7					
Lane LOS	A		A		B	A	A					
Approach Delay (s)	0.9		2.0		9.4		9.7					
Approach LOS					A		A					
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			23.2%		ICU Level of Service				A			
Analysis Period (min)			15									













5: Northfork Road/Road 200 & Crane Valley Road
2010 Project AM







9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	17	90	60	36	13	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	19	102	68	41	15	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	109				230	89
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109				230	89
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	1481				749	969
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	122	109	31			
Volume Left	19	0	15			
Volume Right	0	41	16			
cSH	1481	1700	849			
Volume to Capacity	0.01	0.06	0.04			
Queue Length 95th (ft)	1	0	3			
Control Delay (s)	1.3	0.0	9.4			
Lane LOS	A		A			
Approach Delay (s)	1.3	0.0	9.4			
Approach LOS			A			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization		22.3%		ICU Level of Service		A
Analysis Period (min)			15			

6: SR 49 & SR 41
2010 Project AM

9/18/2008

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Fr		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3367	1553	3303	3406	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3367	1553	3303	3406	3505	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		153				462
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	366	135	159	368	347	407
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	6%	6%	3%	3%
Adj. Flow (vph)	416	153	181	418	394	462
Lane Group Flow (vph)	416	153	181	418	394	462
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Efect Green (s)	12.3	12.3	6.1	18.7	11.4	12.3
Actuated g/C Ratio	0.31	0.31	0.15	0.47	0.29	0.31
v/c Ratio	0.40	0.26	0.37	0.26	0.39	0.57
Control Delay	12.9	4.1	20.5	6.8	14.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	4.1	20.5	6.8	14.0	4.9
LOS	B	A	C	A	B	A
Approach Delay	10.5			10.9	9.1	
Approach LOS	B			B	A	

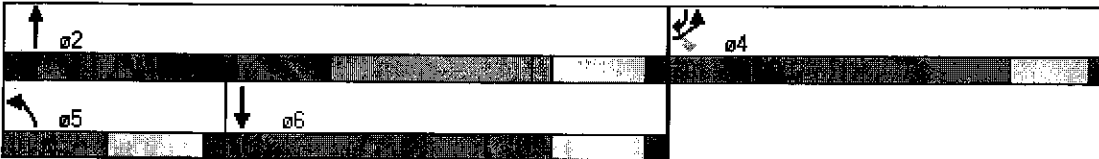
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	39	0	20	25	40	0
Queue Length 95th (ft)	73	28	47	50	73	46
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1276	684	486	1921	1305	881
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.22	0.37	0.22	0.30	0.52











Intersection Summary













Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 39.6
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 10.0
 Intersection Capacity Utilization 36.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	18	33	473	11	24	374
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	20	38	538	12	27	425
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	811	275			550	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	811	275			550	
tC, single (s)	6.8	6.9			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	93	95			97	
cM capacity (veh/h)	308	722			969	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	58	358	192	27	212	212
Volume Left	20	0	0	27	0	0
Volume Right	38	0	12	0	0	0
cSH	490	1700	1700	969	1700	1700
Volume to Capacity	0.12	0.21	0.11	0.03	0.13	0.13
Queue Length 95th (ft)	10	0	0	2	0	0
Control Delay (s)	13.3	0.0	0.0	8.8	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.3	0.0		0.5		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			29.9%		ICU Level of Service	A
Analysis Period (min)			15			

Lane Group						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1612	1442	3343	1495	1752	3505
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1612	1442	3343	1495	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		31		67		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	109	27	260	59	53	688
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	12%	12%	8%	8%	3%	3%
Adj. Flow (vph)	124	31	295	67	60	782
Lane Group Flow (vph)	124	31	295	67	60	782
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	13.5	13.5	36.5	36.5	9.0	45.5
Actuated g/C Ratio	0.20	0.20	0.55	0.55	0.13	0.69
v/c Ratio	0.39	0.10	0.16	0.08	0.27	0.32
Control Delay	20.5	7.5	9.5	4.0	23.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	7.5	9.5	4.0	23.8	5.0
LOS	C	A	A	A	C	A
Approach Delay	17.9		8.5			6.4
Approach LOS	B		A			A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	32	0	30	0	16	48
Queue Length 95th (ft)	66	15	56	19	45	90
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	474	446	1857	860	225	2423
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.07	0.16	0.08	0.27	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 65.8
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 8.2
 Intersection Capacity Utilization 31.7%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2010 Project AM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.953			0.992			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1776	1509	1570	1575	0	1703	3378	0	1752	3442	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1776	1509	1570	1575	0	1703	3378	0	1752	3442	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		19			5			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	66	35	64	20	50	23	11	239	14	39	653	88
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	7%	7%	15%	15%	15%	6%	6%	6%	3%	3%	3%
Adj. Flow (vph)	75	40	73	23	57	26	12	272	16	44	742	100
Lane Group Flow (vph)	75	40	73	23	83	0	12	288	0	44	842	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.7	16.2	16.2	9.7	11.6		9.1	51.4		10.4	57.6	
Actuated g/C Ratio	0.14	0.19	0.19	0.11	0.13		0.10	0.63		0.12	0.70	
v/c Ratio	0.33	0.12	0.21	0.13	0.36		0.07	0.14		0.21	0.35	
Control Delay	34.4	27.2	9.2	37.3	28.9		39.1	13.7		35.1	11.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.4	27.2	9.2	37.3	28.9		39.1	13.7		35.1	11.0	
LOS	C	C	A	D	C		D	B		D	B	
Approach Delay		23.1			30.7			14.7			12.2	
Approach LOS		C			C			B			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	34	14	0	10	29		5	46		20	110	
Queue Length 95th (ft)	77	45	33	34	72		22	87		53	254	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	381	587	548	339	510		358	2125		391	2426	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.07	0.13	0.07	0.16		0.03	0.14		0.11	0.35	










Intersection Summary











Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 81.8
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 15.4
 Intersection Capacity Utilization 44.5%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 9: SR 145 & SR 41















						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	45	22	13	50	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	11	51	25	15	57	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	153	32			40	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153	32			40	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	99	95			96	
cM capacity (veh/h)	807	1041			1496	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	62	40	64			
Volume Left	11	0	57			
Volume Right	51	15	0			
cSH	989	1700	1496			
Volume to Capacity	0.06	0.02	0.04			
Queue Length 95th (ft)	5	0	3			
Control Delay (s)	8.9	0.0	6.7			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	6.7			
Approach LOS	A					
Intersection Summary						
Average Delay			5.9			
Intersection Capacity Utilization		19.8%		ICU Level of Service		A
Analysis Period (min)			15			

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	54	32	0	70	54
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	61	36	0	80	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	257	36			36	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257	36			36	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	94			95	
cM capacity (veh/h)	683	1019			1574	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	62	36	80	61		
Volume Left	1	0	80	0		
Volume Right	61	0	0	0		
cSH	1010	1700	1574	1700		
Volume to Capacity	0.06	0.02	0.05	0.04		
Queue Length 95th (ft)	5	0	4	0		
Control Delay (s)	8.8	0.0	7.4	0.0		
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	4.2			
Approach LOS	A					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization		20.6%		ICU Level of Service		A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2010 Project PM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗		↕			↕	↗
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	104	5	0	82	26	9	1	2	42	3	52
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	35	118	6	0	93	30	10	1	2	48	3	59
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	153	6	93	30	14	51	59					
Volume Left (vph)	35	0	0	0	10	48	0					
Volume Right (vph)	0	6	0	30	2	0	59					
Hadj (s)	0.17	-0.65	0.05	-0.65	0.19	0.50	-0.67					
Departure Headway (s)	5.1	4.3	5.0	4.3	5.5	5.7	4.5					
Degree Utilization, x	0.22	0.01	0.13	0.04	0.02	0.08	0.07					
Capacity (veh/h)	689	808	690	801	615	597	747					
Control Delay (s)	8.3	6.1	7.6	6.3	8.6	8.0	6.7					
Approach Delay (s)	8.2		7.3		8.6	7.3						
Approach LOS	A		A		A	A						







Intersection Summary

















Delay		7.7										
HCM Level of Service		A										
Intersection Capacity Utilization		27.9%		ICU Level of Service		A						
Analysis Period (min)		15										

4: Northfork Road & Auberry Road/Driveway
2010 Project PM

9/18/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	86	11	22	95	4	4	4	23	5	2	15
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	98	12	25	108	5	5	5	26	6	2	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
platoon unblocked												
vC, conflicting volume	112			110			310	296	104	322	300	110
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			110			310	296	104	322	300	110
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	99	97	99	100	98
cM capacity (veh/h)	1477			1480			617	599	951	597	596	943
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total	125	25	112	9	26	25						
Volume Left	15	25	0	5	0	6						
Volume Right	12	0	5	0	26	17						
cSH	1477	1480	1700	608	951	796						
Volume to Capacity	0.01	0.02	0.07	0.01	0.03	0.03						
Queue Length 95th (ft)	1	1	0	1	2	2						
Control Delay (s)	1.0	7.5	0.0	11.0	8.9	9.7						
Lane LOS	A	A		B	A	A						
Approach Delay (s)	1.0	1.4		9.4		9.7						
Approach LOS				A		A						
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization		25.1%			ICU Level of Service				A			
Analysis Period (min)			15									

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	43	91	78	20	29	18
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	49	103	89	23	33	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	111				301	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	111				301	100
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				95	98
cM capacity (veh/h)	1478				666	953
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	152	111	53			
Volume Left	49	0	33			
Volume Right	0	23	20			
cSH	1478	1700	752			
Volume to Capacity	0.03	0.07	0.07			
Queue Length 95th (ft)	3	0	6			
Control Delay (s)	2.6	0.0	10.1			
Lane LOS	A		B			
Approach Delay (s)	2.6	0.0	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		23.8%		ICU Level of Service		A
Analysis Period (min)			15			

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 		 	 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frnt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	1583	3400	3505	3539	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3433	1583	3400	3505	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		157				519
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	560	138	174	441	583	457
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	636	157	198	501	662	519
Lane Group Flow (vph)	636	157	198	501	662	519
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	14.1	14.1	6.1	21.5	14.2	14.1
Actuated g/C Ratio	0.32	0.32	0.13	0.49	0.32	0.32
v/c Ratio	0.58	0.26	0.44	0.29	0.58	0.60
Control Delay	15.9	4.1	23.5	7.2	15.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	4.1	23.5	7.2	15.9	5.1
LOS	B	A	C	A	B	A
Approach Delay	13.6			11.8	11.2	
Approach LOS	B			B	B	

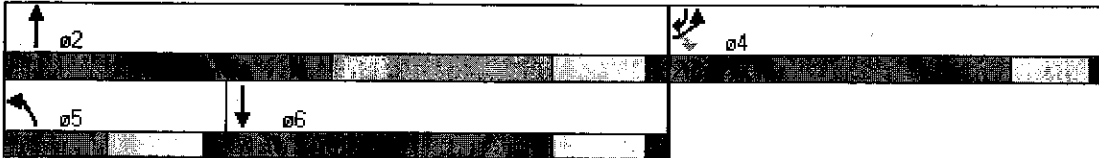
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	78	0	28	38	83	0
Queue Length 95th (ft)	117	29	52	59	123	49
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1224	665	450	1904	1266	898
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.24	0.44	0.26	0.52	0.58













Intersection Summary













Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 44.2
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 47.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	9	16	535	19	31	547
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	18	608	22	35	622
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	1000	315			630	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1000	315			630	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	97			96	
cM capacity (veh/h)	226	672			942	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	28	405	224	35	311	311
Volume Left	10	0	0	35	0	0
Volume Right	18	0	22	0	0	0
cSH	393	1700	1700	942	1700	1700
Volume to Capacity	0.07	0.24	0.13	0.04	0.18	0.18
Queue Length 95th (ft)	6	0	0	3	0	0
Control Delay (s)	14.9	0.0	0.0	9.0	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	14.9	0.0		0.5		
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		32.1%		ICU Level of Service		A
Analysis Period (min)			15			

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Fr't		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1553	3505	1568	1719	3438
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1736	1553	3505	1568	1719	3438
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		59		99		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	63	52	634	87	24	399
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Adj. Flow (vph)	72	59	720	99	27	453
Lane Group Flow (vph)	72	59	720	99	27	453
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.4	11.4	46.8	46.8	8.7	49.8
Actuated g/C Ratio	0.17	0.17	0.73	0.73	0.12	0.78
v/c Ratio	0.25	0.19	0.28	0.08	0.13	0.17
Control Delay	19.0	7.1	5.8	2.6	22.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	7.1	5.8	2.6	22.9	3.2
LOS	B	A	A	A	C	A
Approach Delay	13.7		5.4			4.3
Approach LOS	B		A			A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	18	0	37	0	7	21
Queue Length 95th (ft)	43	21	125	21	24	41
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	493	483	2569	1176	209	2679
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.12	0.28	0.08	0.13	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 63.9
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 5.8
 Intersection Capacity Utilization 30.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.950			0.996			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1687	0	1752	3491	0	1719	3359	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1810	1538	1687	1687	0	1752	3491	0	1719	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			19		20			2			17	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	96	107	17	23	97	48	44	710	19	22	368	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	109	122	19	26	110	55	50	807	22	25	418	77
Lane Group Flow (vph)	109	122	19	26	165	0	50	829	0	25	495	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	13.3	25.4	25.4	9.3	15.2		10.4	50.7		9.2	46.9	
Actuated g/C Ratio	0.14	0.27	0.27	0.09	0.16		0.11	0.55		0.09	0.51	
v/c Ratio	0.45	0.25	0.04	0.17	0.57		0.27	0.43		0.16	0.29	
Control Delay	39.1	25.1	11.9	42.0	35.9		40.5	18.5		42.0	18.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.1	25.1	11.9	42.0	35.9		40.5	18.5		42.0	18.5	
LOS	D	C	B	D	D		D	B		D	B	
Approach Delay		30.2			36.8			19.7			19.6	
Approach LOS		C			D			B			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	54	43	0	13	71		25	132		12	96	
Queue Length 95th (ft)	112	105	17	41	141		64	303		40	173	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	352	596	519	312	513		336	1911		318	1711	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.31	0.20	0.04	0.08	0.32		0.15	0.43		0.08	0.29	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 92.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 22.9

Intersection LOS: C

Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: SR 145 & SR 41



ATTACHMENT VI – C - 46

OPENING DAY (2010) PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

MINOR STREET: MISSION DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

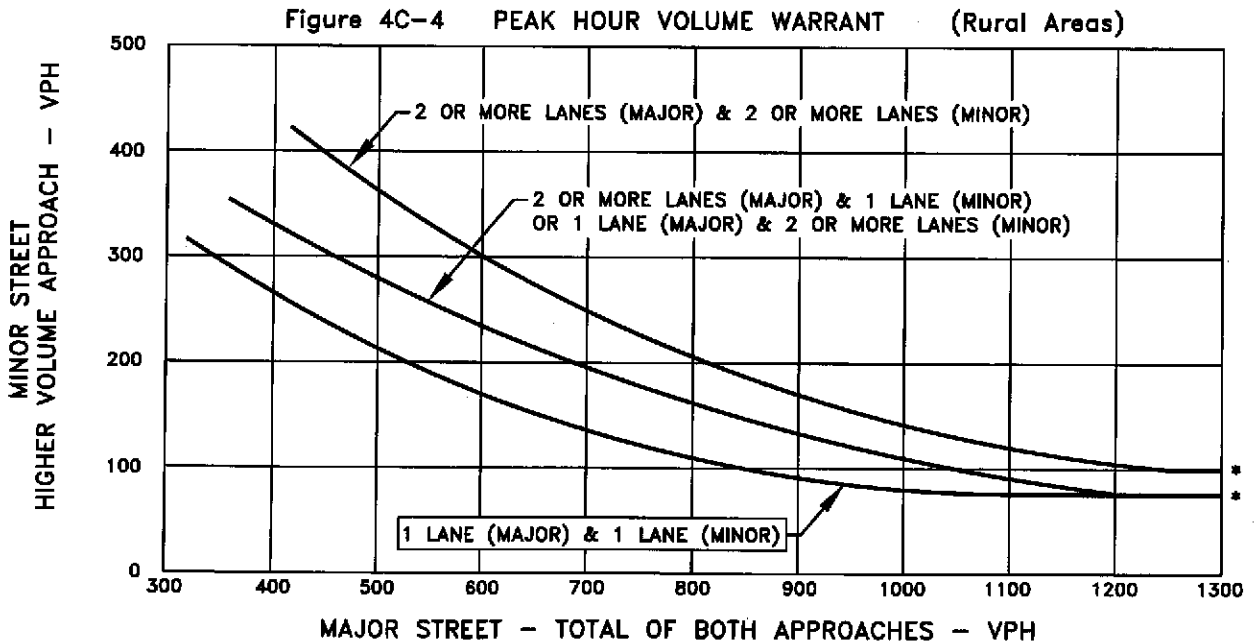
CONDITION: 2010 PROJECT - ALTERNATIVE D

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		68	91				
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		27	55				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



*** NOTE:**
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

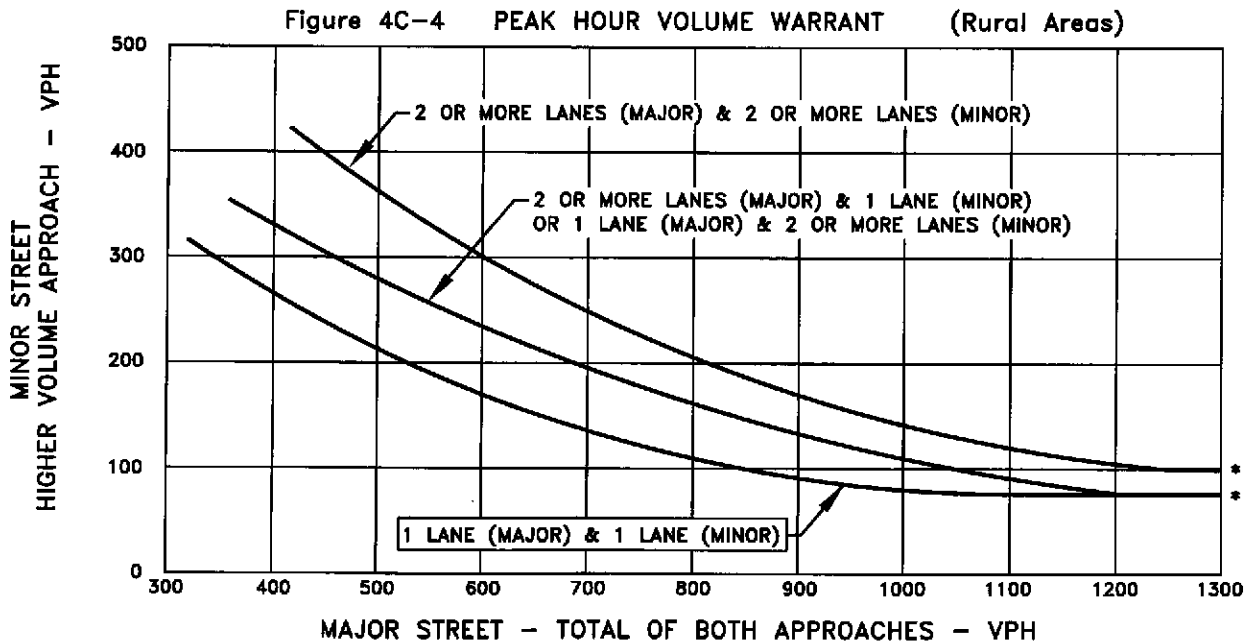
CONDITION: 2010 PROJECT - ALTERNATIVE D

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		110	156				
Highest Approaches - Minor Street	✓		40	55				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: ROAD 274

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

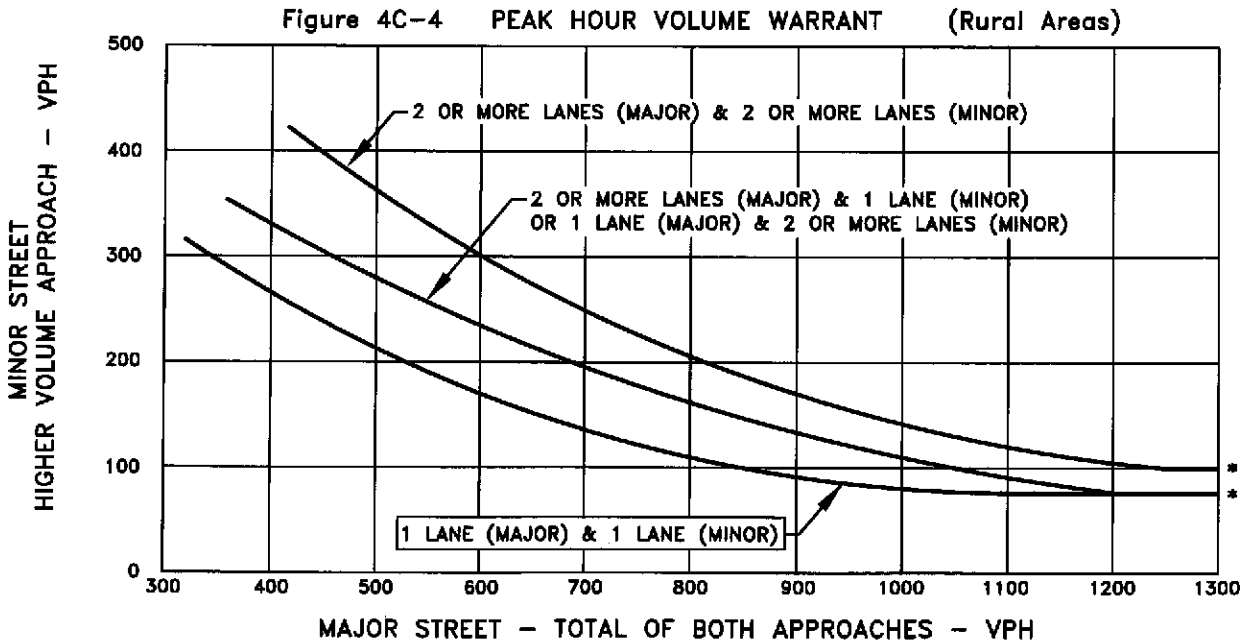
CONDITION: 2010 PROJECT - ALTERNATIVE D

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	<i>AM PEAK</i>	<i>PM PEAK</i>			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	217	248			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	48	97			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: AUBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

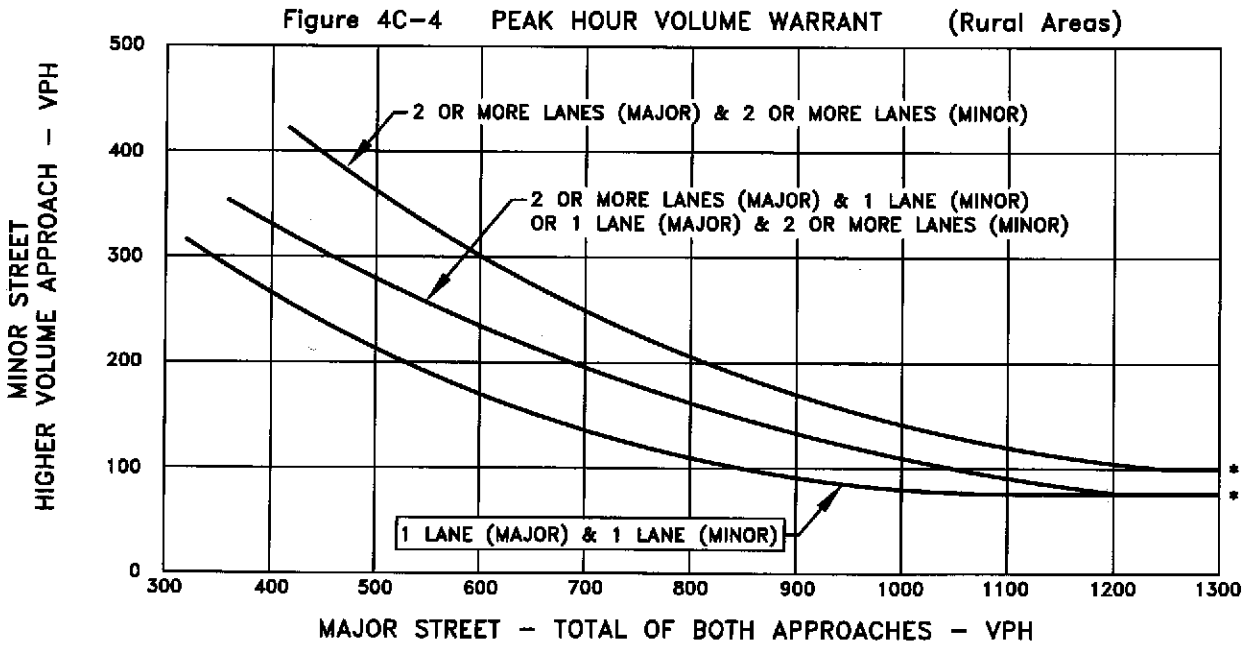
CONDITION: 2010 PROJECT - ALTERNATIVE D

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		170	231				
Highest Approaches - Minor Street	✓		39	31				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: CRANE VALLEY ROAD

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

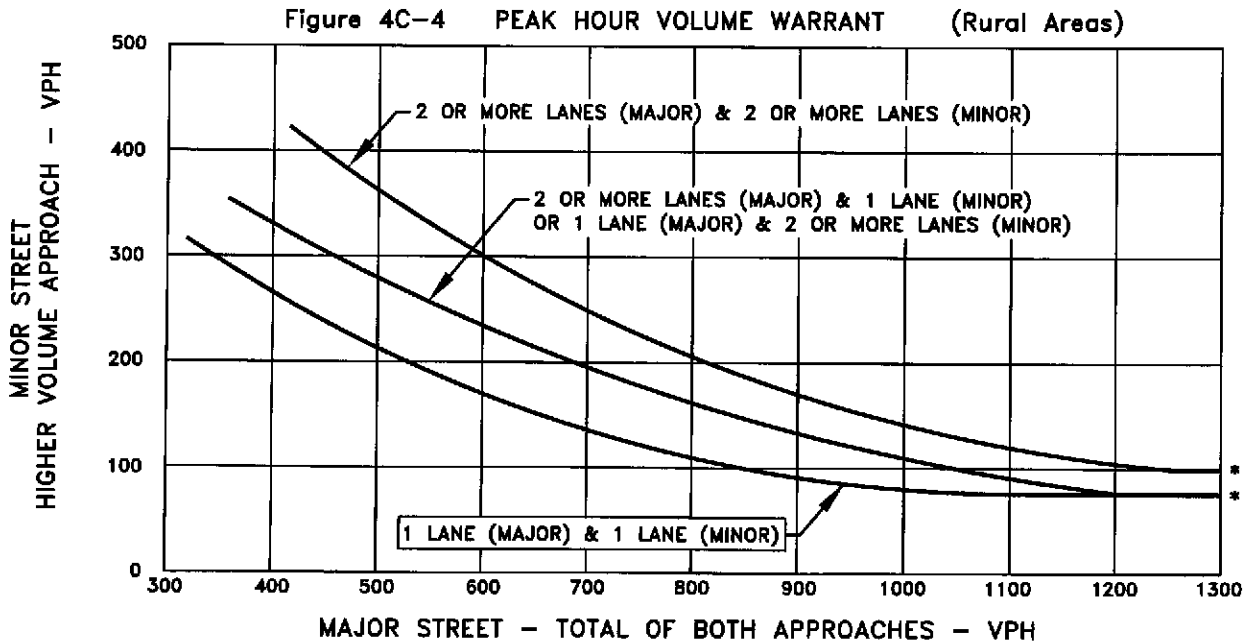
CONDITION: 2010 PROJECT - ALTERNATIVE D

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		204	235		
Highest Approaches - Minor Street	✓		27	47		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: SR 41

Critical Approach Speed 55 mph

MINOR STREET: THORNBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

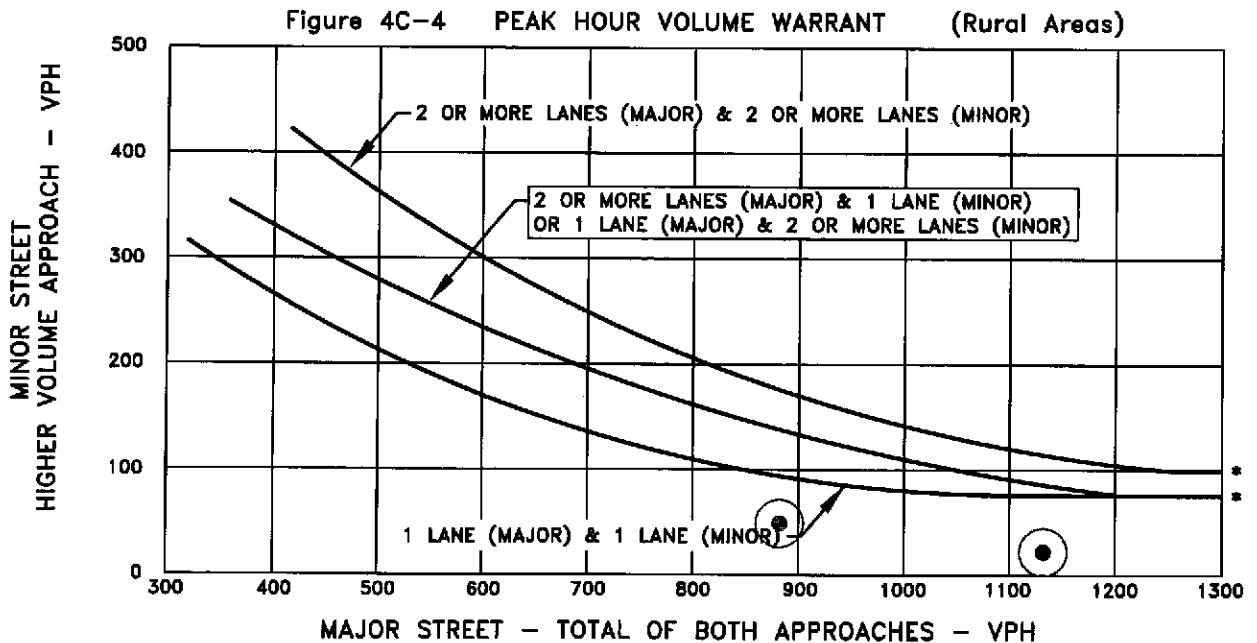
CONDITION: 2010 PROJECT - ALTERNATIVE D

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street		✓	882	1132		
Highest Approaches - Minor Street	✓		51	25		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 47










2030 NO PROJECT CONDITIONS











NORTH FORK SITE - ALTERNATIVE D

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Mission Drive & Cascadel Road
2030 No Project AM




















9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	11	0	7	5	0	28
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	12	0	8	6	0	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	43	11			14	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	43	11			14	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	968	1070			1605	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	12	14	32			
Volume Left	12	0	0			
Volume Right	0	6	0			
cSH	968	1700	1605			
Volume to Capacity	0.01	0.01	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.8	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.8	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	31	61	0	15	37
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	35	69	0	17	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	145	69			69	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	145	69			69	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	96			99	
cM capacity (veh/h)	833	988			1482	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	50	69	17	42		
Volume Left	15	0	17	0		
Volume Right	35	0	0	0		
cSH	936	1700	1482	1700		
Volume to Capacity	0.05	0.04	0.01	0.02		
Queue Length 95th (ft)	4	0	1	0		
Control Delay (s)	9.1	0.0	7.5	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization		17.5%			ICU Level of Service	A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2030 No Project AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	87	65	22	3	91	32	15	0	4	14	5	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	99	74	25	3	103	36	17	0	5	16	6	77
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	173	25	107	36	22	22	77					
Volume Left (vph)	99	0	3	0	17	16	0					
Volume Right (vph)	0	25	0	36	5	0	77					
Hadj (s)	0.41	-0.58	0.05	-0.67	0.07	0.42	-0.65					
Departure Headway (s)	5.3	4.4	5.0	4.3	5.5	5.8	4.7					
Degree Utilization, x	0.26	0.03	0.15	0.04	0.03	0.03	0.10					
Capacity (veh/h)	649	797	687	799	610	585	715					
Control Delay (s)	9.0	6.3	7.7	6.3	8.7	7.8	7.0					
Approach Delay (s)	8.6		7.4		8.7	7.2						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			7.9									
HCM Level of Service			A									
Intersection Capacity Utilization			29.3%	ICU Level of Service	A							
Analysis Period (min)			15									










4: Northfork Road & Auberry Road/Driveway
2030 No Project AM

9/18/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕			↕	↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	18	113	6	28	86	24	6	26	29	42	14	17
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	20	128	7	32	98	27	7	30	33	48	16	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
platoon unblocked												
vC, conflicting volume	125			135			358	358	128	392	351	111
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125			135			358	358	128	392	351	111
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			98			99	95	96	91	97	98
cM capacity (veh/h)	1455			1443			550	542	911	510	553	942
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	149	7	32	125	36	33	83					
Volume Left	20	0	32	0	7	0	48					
Volume Right	0	7	0	27	0	33	19					
cSH	1455	1700	1443	1700	543	911	580					
Volume to Capacity	0.01	0.00	0.02	0.07	0.07	0.04	0.14					
Queue Length 95th (ft)	1	0	2	0	5	3	12					
Control Delay (s)	1.1	0.0	7.6	0.0	12.1	9.1	12.2					
Lane LOS	A		A		B	A	B					
Approach Delay (s)	1.1		1.5		10.7		12.2					
Approach LOS					B		B					
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			31.0%		ICU Level of Service				A			
Analysis Period (min)			15									

















5: Northfork Road/Road 200 & Crane Valley Road
2030 No Project AM







9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	28	111	76	62	28	33
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	32	126	86	70	32	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	157				311	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	157				311	122
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	96
cM capacity (veh/h)	1423				666	930
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	158	157	69			
Volume Left	32	0	32			
Volume Right	0	70	38			
cSH	1423	1700	787			
Volume to Capacity	0.02	0.09	0.09			
Queue Length 95th (ft)	2	0	7			
Control Delay (s)	1.7	0.0	10.0			
Lane LOS	A		B			
Approach Delay (s)	1.7	0.0	10.0			
Approach LOS			B			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization		28.8%		ICU Level of Service	A	
Analysis Period (min)			15			

6: SR 49 & SR 41
2030 No Project AM

9/18/2008

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 		 	 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3367	1553	3303	3406	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3367	1553	3303	3406	3505	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		202				538
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	432	178	203	495	476	473
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	6%	6%	3%	3%
Adj. Flow (vph)	491	202	231	562	541	538
Lane Group Flow (vph)	491	202	231	562	541	538
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effect Green (s)	13.5	13.5	6.1	20.4	13.1	13.5
Actuated g/C Ratio	0.32	0.32	0.14	0.48	0.31	0.32
v/c Ratio	0.46	0.32	0.51	0.34	0.50	0.62
Control Delay	14.1	4.2	23.9	7.5	15.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	4.2	23.9	7.5	15.0	5.3
LOS	B	A	C	A	B	A
Approach Delay	11.2			12.3	10.2	
Approach LOS	B			B	B	

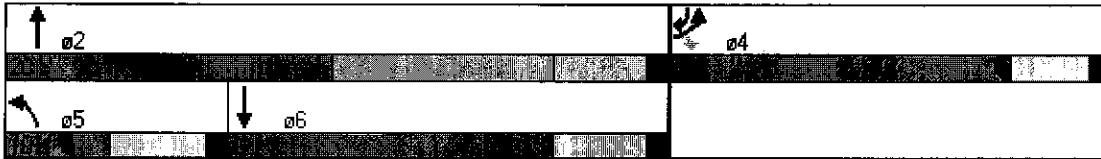
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	52	0	31	44	65	0
Queue Length 95th (ft)	89	32	60	67	100	50
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1230	695	455	1874	1273	914
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.29	0.51	0.30	0.42	0.59

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 42.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 41.7%
 Analysis Period (min) 15













Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41

















7: Thornberry Road/Road 420 & SR 41
2030 No Project AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	30	50	639	22	42	542
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	57	726	25	48	616
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	1142	376			751	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1142	376			751	
tC, single (s)	6.8	6.9			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	81	91			94	
cM capacity (veh/h)	182	622			810	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	91	484	267	48	308	308
Volume Left	34	0	0	48	0	0
Volume Right	57	0	25	0	0	0
cSH	327	1700	1700	810	1700	1700
Volume to Capacity	0.28	0.28	0.16	0.06	0.18	0.18
Queue Length 95th (ft)	28	0	0	5	0	0
Control Delay (s)	20.2	0.0	0.0	9.7	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	20.2	0.0		0.7		
Approach LOS	C					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			36.4%		ICU Level of Service	A
Analysis Period (min)			15			

8: Road 200 & SR 41
2030 No Project AM

9/18/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Flt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1612	1442	3343	1495	1752	3505
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1612	1442	3343	1495	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		48		90		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	135	42	373	79	74	794
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	12%	12%	8%	8%	3%	3%
Adj. Flow (vph)	153	48	424	90	84	902
Lane Group Flow (vph)	153	48	424	90	84	902
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	13.5	13.5	33.1	33.1	8.4	41.1
Actuated g/C Ratio	0.22	0.22	0.55	0.55	0.13	0.68
v/c Ratio	0.44	0.14	0.23	0.10	0.37	0.38
Control Delay	21.0	6.6	10.4	3.9	26.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	6.6	10.4	3.9	26.5	5.8
LOS	C	A	B	A	C	A
Approach Delay	17.6		9.3			7.6
Approach LOS	B		A			A

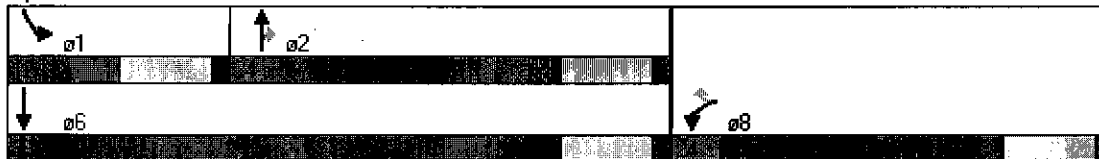
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	40	0	46	0	23	62
Queue Length 95th (ft)	79	18	84	22	60	116
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	487	470	1834	861	228	2388
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.10	0.23	0.10	0.37	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60.3
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 9.3
 Intersection Capacity Utilization 36.1%
 Analysis Period (min) 15

























Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41















9: SR 145 & SR 41
2030 No Project AM

9/18/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frnt			0.850		0.958			0.971			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1776	1509	1570	1583	0	1703	3307	0	1752	3449	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1776	1509	1570	1583	0	1703	3307	0	1752	3449	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100		16			23			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	65	126	88	88	166	65	19	331	78	112	722	88
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	7%	7%	15%	15%	15%	6%	6%	6%	3%	3%	3%
Adj. Flow (vph)	74	143	100	100	189	74	22	376	89	127	820	100
Lane Group Flow (vph)	74	143	100	100	263	0	22	465	0	127	920	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.6	19.5	19.5	13.2	21.1		9.2	35.0		13.8	44.4	
Actuated g/C Ratio	0.12	0.21	0.21	0.14	0.23		0.09	0.39		0.15	0.49	
v/c Ratio	0.35	0.38	0.25	0.45	0.69		0.14	0.36		0.49	0.54	
Control Delay	47.0	37.1	8.9	47.3	42.6		48.7	26.1		46.8	22.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.0	37.1	8.9	47.3	42.6		48.7	26.1		46.8	22.6	
LOS	D	D	A	D	D		D	C		D	C	
Approach Delay		30.5			43.9			27.1			25.5	
Approach LOS		C			D			C			C	

9: SR 145 & SR 41
2030 No Project AM

9/18/2008

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	42	75	0	57	139		13	108		72	180	
Queue Length 95th (ft)	96	144	40	119	244		41	194		143	381	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	342	569	552	323	526		324	1287		362	1689	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.25	0.18	0.31	0.50		0.07	0.36		0.35	0.54	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 90.9
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 29.6
 Intersection Capacity Utilization 55.7%
 Analysis Period (min) 15










Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 9: SR 145 & SR 41













1: Mission Drive & Cascadel Road
 2030 No Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	1	41	9	2	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	7	1	47	10	2	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	69	52			57	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69	52			57	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	99	100			100	
cM capacity (veh/h)	935	1016			1474	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	57	15			
Volume Left	7	0	2			
Volume Right	1	10	0			
cSH	945	1700	1474			
Volume to Capacity	0.01	0.03	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.8	0.0	1.2			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	1.2			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			




















2: Cascadel Road & Road 225
 2030 No Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	15	8	57	0	40	61
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	17	9	65	0	45	69
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	225	65			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	225	65			65	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	98	99			97	
cM capacity (veh/h)	728	983			1537	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	26	65	45	69		
Volume Left	17	0	45	0		
Volume Right	9	0	0	0		
cSH	800	1700	1537	1700		
Volume to Capacity	0.03	0.04	0.03	0.04		
Queue Length 95th (ft)	3	0	2	0		
Control Delay (s)	9.7	0.0	7.4	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	2.9			
Approach LOS	A					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization		18.9%		ICU Level of Service		A
Analysis Period (min)			15			













3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2030 No Project PM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	79	121	10	0	98	26	19	2	2	37	5	103
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	90	138	11	0	111	30	22	2	2	42	6	117
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	227	11	111	30	26	48	117					
Volume Left (vph)	90	0	0	0	22	42	0					
Volume Right (vph)	0	11	0	30	2	0	117					
Hadj (s)	0.25	-0.65	0.05	-0.65	0.25	0.47	-0.67					
Departure Headway (s)	5.4	4.5	5.3	4.6	5.9	6.0	4.8					
Degree Utilization, x	0.34	0.01	0.16	0.04	0.04	0.08	0.16					
Capacity (veh/h)	640	763	647	742	563	565	697					
Control Delay (s)	10.0	6.4	8.1	6.6	9.2	8.3	7.5					
Approach Delay (s)	9.8		7.8		9.2	7.7						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			8.7									
HCM Level of Service			A									
Intersection Capacity Utilization			32.0%		ICU Level of Service			A				
Analysis Period (min)			15									










4: Northfork Road & Auberry Road/Driveway
2030 No Project PM

















9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	22	133	11	35	137	47	4	21	34	34	18	41
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	25	151	12	40	156	53	5	24	39	39	20	47
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	209			164			499	496	157	520	476	182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			164			499	496	157	520	476	182
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			99	95	96	91	96	95
cM capacity (veh/h)	1362			1415			425	453	888	414	466	860
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total	189	40	209	28	39	106						
Volume Left	25	40	0	5	0	39						
Volume Right	12	0	53	0	39	47						
cSH	1362	1415	1700	449	888	552						
Volume to Capacity	0.02	0.03	0.12	0.06	0.04	0.19						
Queue Length 95th (ft)	1	2	0	5	3	18						
Control Delay (s)	1.2	7.6	0.0	13.6	9.2	13.1						
Lane LOS	A	A		B	A	B						
Approach Delay (s)	1.2	1.2		11.1		13.1						
Approach LOS				B		B						
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			41.0%		ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
2030 No Project PM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	69	105	108	39	59	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	78	119	123	44	67	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	167				421	145
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	167				421	145
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				88	96
cM capacity (veh/h)	1411				555	900
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	198	167	103			
Volume Left	78	0	67			
Volume Right	0	44	36			
cSH	1411	1700	641			
Volume to Capacity	0.06	0.10	0.16			
Queue Length 95th (ft)	4	0	14			
Control Delay (s)	3.3	0.0	11.7			
Lane LOS	A		B			
Approach Delay (s)	3.3	0.0	11.7			
Approach LOS			B			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization		32.6%		ICU Level of Service		A
Analysis Period (min)			15			

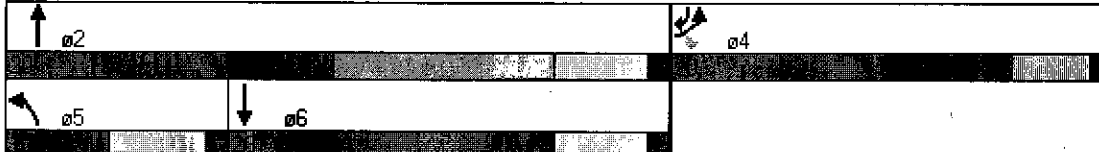
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 		 	 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	1583	3400	3505	3539	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3433	1583	3400	3505	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		207				603
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	652	182	237	590	754	531
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	741	207	269	670	857	603
Lane Group Flow (vph)	741	207	269	670	857	603
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.1	15.1	6.0	25.4	15.3	15.1
Actuated g/C Ratio	0.31	0.31	0.12	0.52	0.32	0.31
v/c Ratio	0.69	0.33	0.64	0.37	0.77	0.66
Control Delay	18.7	4.1	29.4	7.7	20.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	4.1	29.4	7.7	20.9	5.7
LOS	B	A	C	A	C	A
Approach Delay	15.5			13.9	14.6	
Approach LOS	B			B	B	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	94	0	39	54	115	0
Queue Length 95th (ft)	138	33	#77	80	166	52
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1114	653	422	1856	1153	921
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.32	0.64	0.36	0.74	0.65

Intersection Summary













Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 48.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 56.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: SR 49 & SR 41



7: Thornberry Road/Road 420 & SR 41
2030 No Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	23	38	743	34	52	758
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	26	43	844	39	59	861
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	1412	441			883	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1412	441			883	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	77	92			92	
cM capacity (veh/h)	116	555			756	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	69	563	320	59	431	431
Volume Left	26	0	0	59	0	0
Volume Right	43	0	39	0	0	0
cSH	228	1700	1700	756	1700	1700
Volume to Capacity	0.30	0.33	0.19	0.08	0.25	0.25
Queue Length 95th (ft)	31	0	0	6	0	0
Control Delay (s)	27.5	0.0	0.0	10.2	0.0	0.0
Lane LOS	D			B		
Approach Delay (s)	27.5	0.0		0.7		
Approach LOS	D					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		38.6%		ICU Level of Service		A
Analysis Period (min)			15			

8: Road 200 & SR 41
2030 No Project PM

9/18/2008

Lane Group	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Fit		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1736	1553	3505	1568	1719	3438
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1736	1553	3505	1568	1719	3438
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		101		127		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	76	89	756	112	48	532
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Adj. Flow (vph)	86	101	859	127	55	605
Lane Group Flow (vph)	86	101	859	127	55	605
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.8	11.8	39.6	39.6	9.0	45.5
Actuated g/C Ratio	0.18	0.18	0.61	0.61	0.13	0.71
v/c Ratio	0.28	0.28	0.40	0.13	0.25	0.25
Control Delay	19.2	6.5	9.0	2.9	23.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	6.5	9.0	2.9	23.8	4.0
LOS	B	A	A	A	C	A
Approach Delay	12.3		8.2			5.7
Approach LOS	B		A			A

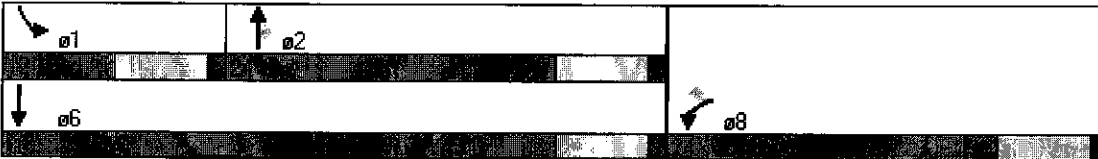
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	21	0	48	0	14	31
Queue Length 95th (ft)	50	27	157	24	40	58
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	511	529	2154	1013	217	2431
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.40	0.13	0.25	0.25

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 64.4
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 7.7
 Intersection Capacity Utilization 38.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2030 No Project PM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.951			0.985			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1689	0	1752	3452	0	1719	3376	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1810	1538	1687	1689	0	1752	3452	0	1719	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22		20			9			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	95	272	19	95	239	117	53	834	90	70	495	67
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	108	309	22	108	272	133	60	948	102	80	562	76
Lane Group Flow (vph)	108	309	22	108	405	0	60	1050	0	80	638	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	13.5	27.5	27.5	13.6	27.6		11.0	34.5		12.1	35.6	
Actuated g/C Ratio	0.14	0.28	0.28	0.14	0.28		0.11	0.36		0.12	0.37	
v/c Ratio	0.46	0.60	0.05	0.47	0.82		0.31	0.85		0.38	0.51	
Control Delay	49.6	38.4	12.1	49.8	48.0		49.5	42.2		49.7	30.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.6	38.4	12.1	49.8	48.0		49.5	42.2		49.7	30.4	
LOS	D	D	B	D	D		D	D		D	C	
Approach Delay		39.8			48.3			42.6			32.6	
Approach LOS		D			D			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	69	177	0	69	239		39	~375		51	188	
Queue Length 95th (ft)	126	293	20	127	#424		82	#583		102	272	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	332	587	514	326	563		332	1233		328	1244	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.53	0.04	0.33	0.72		0.18	0.85		0.24	0.51	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 97.1
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 40.6
 Intersection Capacity Utilization 68.1%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service C

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: SR 145 & SR 41



ATTACHMENT VI – C - 48

2030 No PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

MINOR STREET: MISSION DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

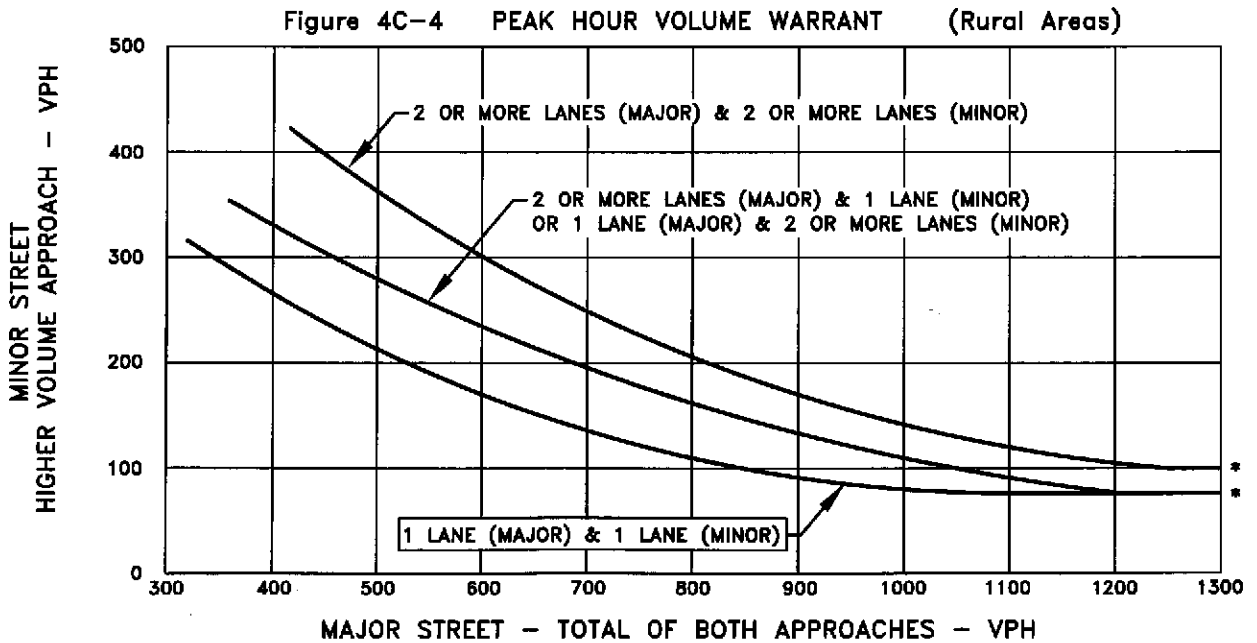
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	40	63			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6	4			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

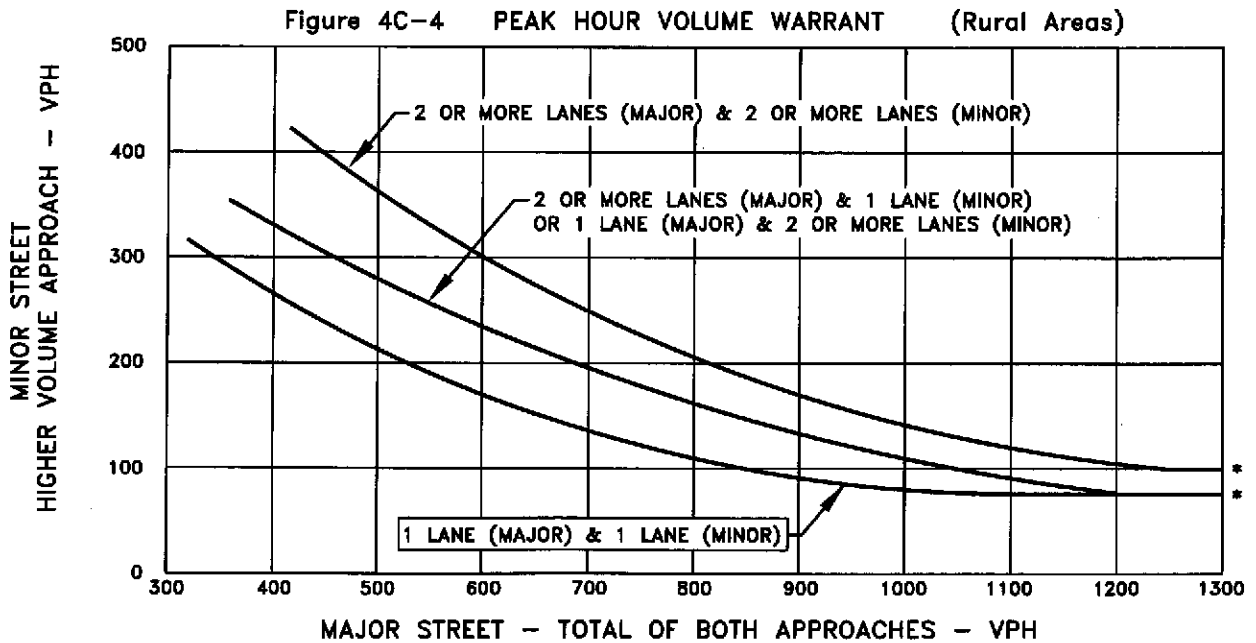
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	113	158				
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	23	12				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: ROAD 274

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

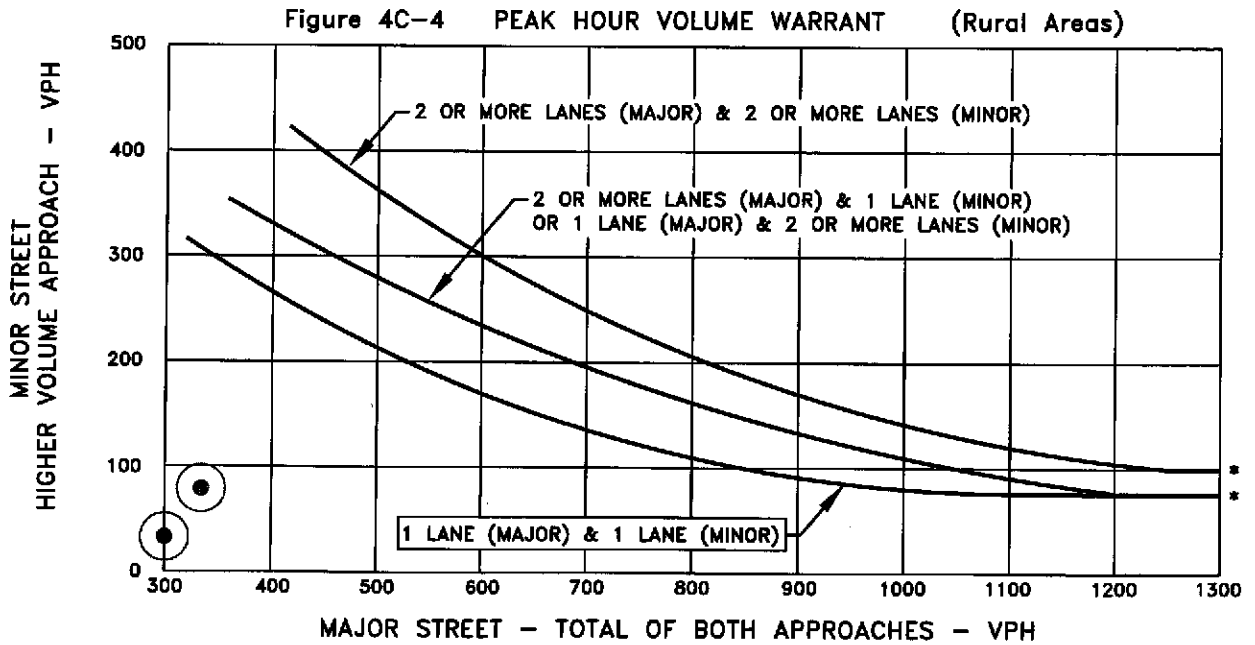
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	Hour			
			AM PEAK	PM PEAK		
Both Approaches - Major Street	✓		300	334		
Highest Approaches - Minor Street	✓		33	79		

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: AUBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

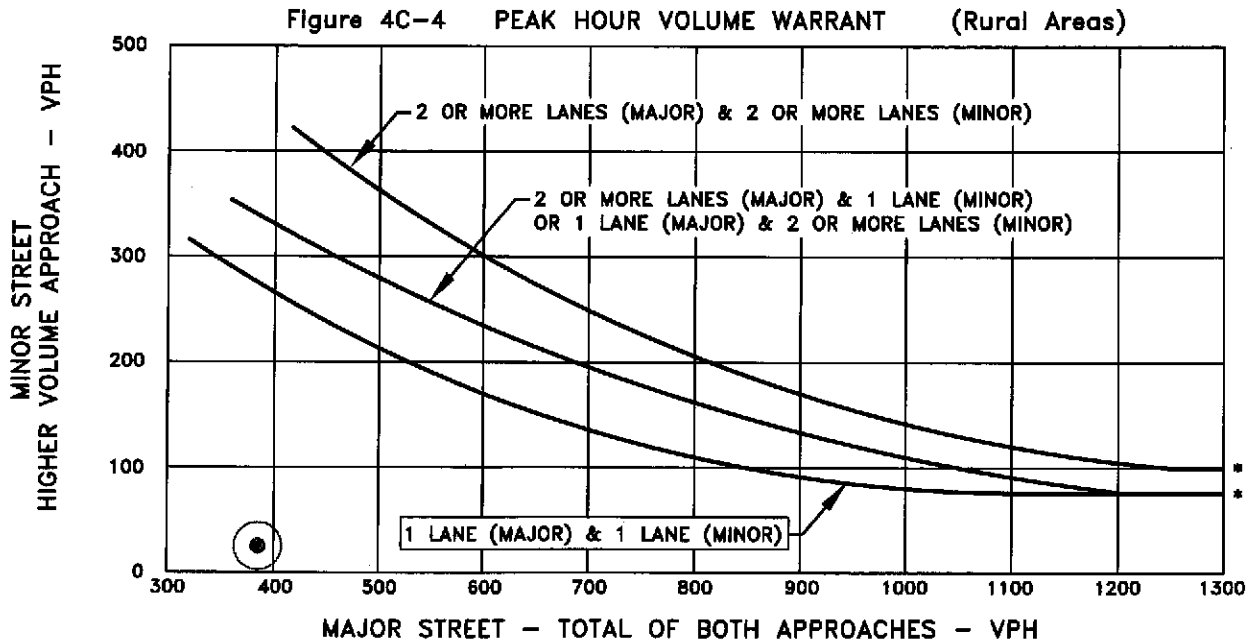
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches - Major Street	✓		275	385				
Highest Approaches - Minor Street	✓		34	25				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: CRANE VALLEY ROAD

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

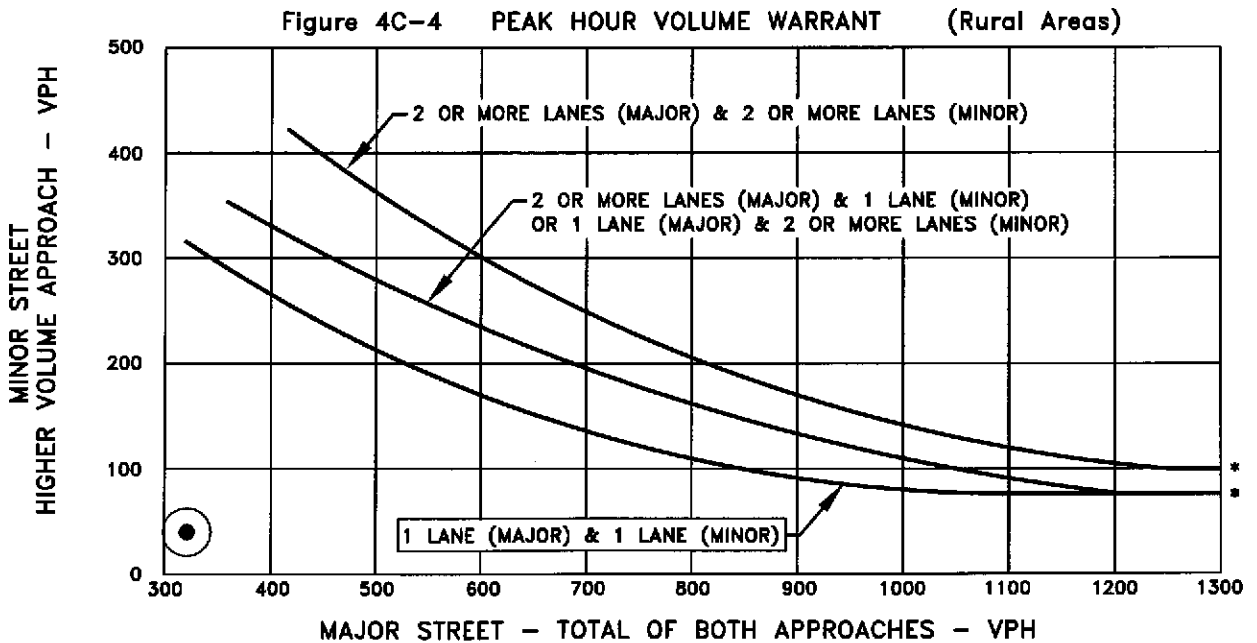
CONDITION: 2030 NO PROJECT

WARRANT 3 – Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK				Hour
Both Approaches – Major Street	✓		277	321				
Highest Approaches – Minor Street	✓		21	40				

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: SR 41

Critical Approach Speed 55 mph

MINOR STREET: THORNBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

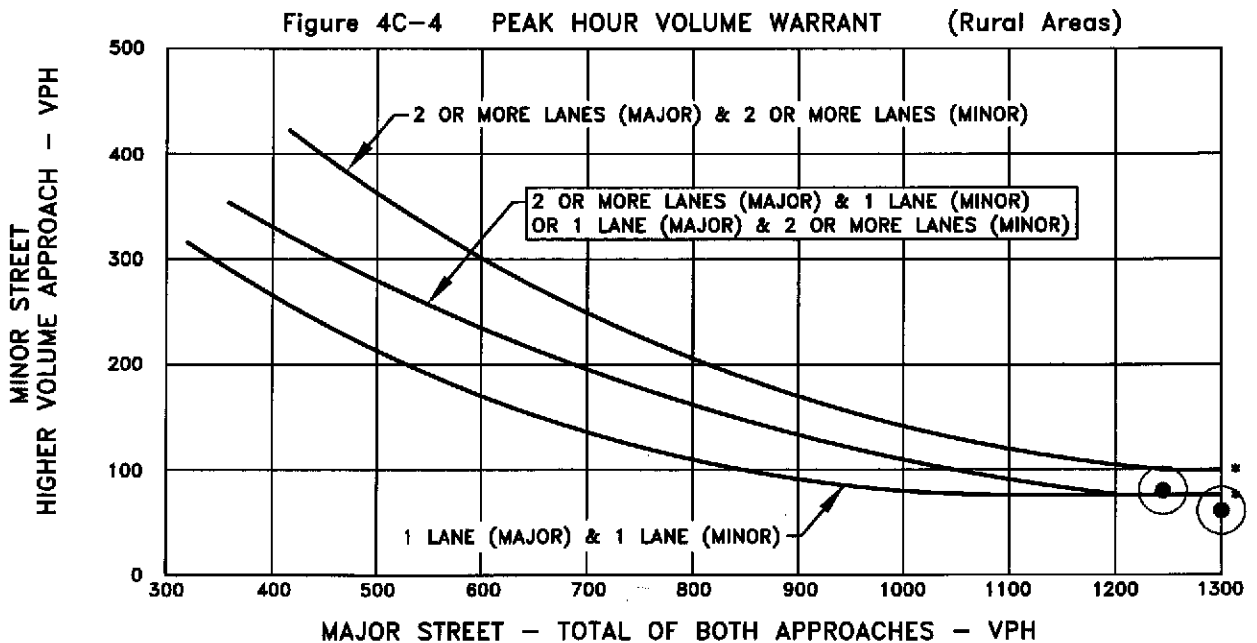
CONDITION: 2030 NO PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	Approach Lanes		AM PEAK		PM PEAK		Hour
	One	2 or more					
Both Approaches - Major Street		✓	1245	1587			
Highest Approaches - Minor Street	✓		80	61			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

ATTACHMENT VI – C - 49










2030 PROJECT CONDITIONS











NORTH FORK SITE - ALTERNATIVE D

INTERSECTION LEVEL OF SERVICE CALCULATIONS

1: Mission Drive & Cascadel Road
2030 Project AM













9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	14	17	7	12	39	28
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	16	19	8	14	44	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	135	15			22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	135	15			22	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			97	
cM capacity (veh/h)	834	1065			1594	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	35	22	76			
Volume Left	16	0	44			
Volume Right	19	14	0			
cSH	947	1700	1594			
Volume to Capacity	0.04	0.01	0.03			
Queue Length 95th (ft)	3	0	2			
Control Delay (s)	8.9	0.0	4.3			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	4.3			
Approach LOS	A					
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization		20.3%		ICU Level of Service		A
Analysis Period (min)		15				

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	48	61	0	54	37
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	55	69	0	61	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	234	69			69	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	234	69			69	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	94			96	
cM capacity (veh/h)	719	988			1482	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	69	69	61	42		
Volume Left	15	0	61	0		
Volume Right	55	0	0	0		
cSH	915	1700	1482	1700		
Volume to Capacity	0.08	0.04	0.04	0.02		
Queue Length 95th (ft)	6	0	3	0		
Control Delay (s)	9.3	0.0	7.5	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		20.0%		ICU Level of Service		A
Analysis Period (min)			15			













3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2030 Project AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗		↕			↕	↗
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	87	87	22	3	100	37	15	0	4	25	5	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	99	99	25	3	114	42	17	0	5	28	6	77
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	198	25	117	42	22	34	77					
Volume Left (vph)	99	0	3	0	17	28	0					
Volume Right (vph)	0	25	0	42	5	0	77					
Hadj (s)	0.37	-0.58	0.05	-0.67	0.07	0.47	-0.65					
Departure Headway (s)	5.4	4.4	5.1	4.4	5.6	5.9	4.8					
Degree Utilization, x	0.29	0.03	0.17	0.05	0.03	0.06	0.10					
Capacity (veh/h)	646	784	676	784	594	568	697					
Control Delay (s)	9.4	6.4	7.9	6.4	8.8	8.1	7.2					
Approach Delay (s)	9.0		7.5		8.8	7.4						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			8.2									
HCM Level of Service			A									
Intersection Capacity Utilization			30.5%		ICU Level of Service				A			
Analysis Period (min)			15									










4: Northfork Road & Auberry Road/Driveway
2030 Project AM













9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕			↕	↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%						0%	
Volume (veh/h)	27	113	6	28	86	24	6	28	29	43	14	21
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	31	128	7	32	98	27	7	32	33	49	16	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	125			135			383	378	128	414	372	111
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125			135			383	378	128	414	372	111
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			98			99	94	96	90	97	97
cM capacity (veh/h)	1455			1443			523	524	911	488	535	942
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	159	7	32	125	39	33	89					
Volume Left	31	0	32	0	7	0	49					
Volume Right	0	7	0	27	0	33	24					
cSH	1455	1700	1443	1700	524	911	571					
Volume to Capacity	0.02	0.00	0.02	0.07	0.07	0.04	0.16					
Queue Length 95th (ft)	2	0	2	0	6	3	14					
Control Delay (s)	1.6	0.0	7.6	0.0	12.4	9.1	12.5					
Lane LOS	A		A		B	A	B					
Approach Delay (s)	1.5		1.5		10.9		12.5					
Approach LOS					B		B					
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			31.8%		ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
2030 Project AM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	28	114	76	63	31	33
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	32	130	86	72	35	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	158				315	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158				315	122
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	96
cM capacity (veh/h)	1422				662	929
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	161	158	73			
Volume Left	32	0	35			
Volume Right	0	72	38			
cSH	1422	1700	777			
Volume to Capacity	0.02	0.09	0.09			
Queue Length 95th (ft)	2	0	8			
Control Delay (s)	1.6	0.0	10.1			
Lane LOS	A		B			
Approach Delay (s)	1.6	0.0	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization		29.1%		ICU Level of Service		A
Analysis Period (min)			15			

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3367	1553	3303	3406	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3367	1553	3303	3406	3505	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		202				538
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	432	178	203	495	476	473
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	6%	6%	3%	3%
Adj. Flow (vph)	491	202	231	562	541	538
Lane Group Flow (vph)	491	202	231	562	541	538
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	13.5	13.5	6.1	20.4	13.1	13.5
Actuated g/C Ratio	0.32	0.32	0.14	0.48	0.31	0.32
v/c Ratio	0.46	0.32	0.51	0.34	0.50	0.62
Control Delay	14.1	4.2	23.9	7.5	15.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	4.2	23.9	7.5	15.0	5.3
LOS	B	A	C	A	B	A
Approach Delay	11.2			12.3	10.2	
Approach LOS	B			B	B	

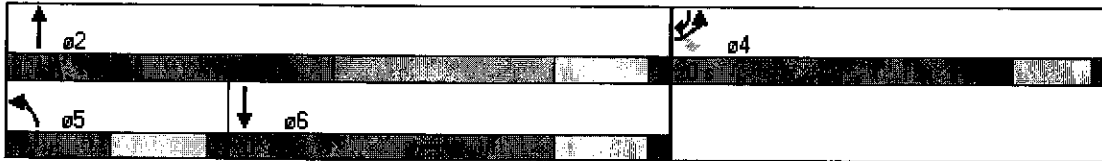
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	52	0	31	44	65	0
Queue Length 95th (ft)	89	32	60	67	100	50
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1230	695	455	1874	1273	914
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.29	0.51	0.30	0.42	0.59











Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 42.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 41.7%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	30	50	639	22	42	542
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	57	726	25	48	616
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	1142	376			751	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1142	376			751	
tC, single (s)	6.8	6.9			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	81	91			94	
cM capacity (veh/h)	182	622			810	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	91	484	267	48	308	308
Volume Left	34	0	0	48	0	0
Volume Right	57	0	25	0	0	0
cSH	327	1700	1700	810	1700	1700
Volume to Capacity	0.28	0.28	0.16	0.06	0.18	0.18
Queue Length 95th (ft)	28	0	0	5	0	0
Control Delay (s)	20.2	0.0	0.0	9.7	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	20.2	0.0		0.7		
Approach LOS	C					

Intersection Summary

Average Delay		1.5				
Intersection Capacity Utilization		36.4%		ICU Level of Service		A
Analysis Period (min)		15				

8: Road 200 & SR 41
2030 Project AM

9/18/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Fr _t		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1612	1442	3343	1495	1752	3505
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1612	1442	3343	1495	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		48		92		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	136	42	373	81	74	794
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	12%	12%	8%	8%	3%	3%
Adj. Flow (vph)	155	48	424	92	84	902
Lane Group Flow (vph)	155	48	424	92	84	902
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	13.5	13.5	32.8	32.8	8.4	40.7
Actuated g/C Ratio	0.22	0.22	0.55	0.55	0.13	0.68
v/c Ratio	0.44	0.14	0.23	0.11	0.37	0.38
Control Delay	21.1	6.5	10.4	3.8	26.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	6.5	10.4	3.8	26.5	5.8
LOS	C	A	B	A	C	A
Approach Delay	17.6		9.3			7.6
Approach LOS	B		A			A

Lane Group	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	41	0	46	0	23	63
Queue Length 95th (ft)	80	18	84	23	60	116
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	488	471	1832	861	229	2385
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.10	0.23	0.11	0.37	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 59.8
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 9.3
 Intersection Capacity Utilization 36.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A













Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2030 Project AM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr			0.850		0.958			0.971			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1776	1509	1570	1583	0	1703	3307	0	1752	3449	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1776	1509	1570	1583	0	1703	3307	0	1752	3449	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100		16			23			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	66	126	88	88	166	65	19	332	78	112	723	88
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	7%	7%	15%	15%	15%	6%	6%	6%	3%	3%	3%
Adj. Flow (vph)	75	143	100	100	189	74	22	377	89	127	822	100
Lane Group Flow (vph)	75	143	100	100	263	0	22	466	0	127	922	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.7	19.6	19.6	13.2	21.1		9.2	35.0		13.8	44.4	
Actuated g/C Ratio	0.13	0.22	0.22	0.14	0.23		0.09	0.38		0.15	0.49	
v/c Ratio	0.35	0.37	0.25	0.45	0.69		0.14	0.36		0.49	0.55	
Control Delay	47.0	37.0	8.8	47.5	42.7		48.8	26.1		46.9	22.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.0	37.0	8.8	47.5	42.7		48.8	26.1		46.9	22.7	
LOS	D	D	A	D	D		D	C		D	C	
Approach Delay		30.5			44.0			27.1			25.6	
Approach LOS		C			D			C			C	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	43	75	0	57	139		13	108		72	180	
Queue Length 95th (ft)	97	144	40	119	244		41	195		144	383	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	342	569	552	323	526		323	1286		362	1688	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.25	0.18	0.31	0.50		0.07	0.36		0.35	0.55	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 91

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 29.6

Intersection LOS: C










Intersection Capacity Utilization 55.8%

ICU Level of Service B

Analysis Period (min) 15











Splits and Phases: 9: SR 145 & SR 41



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	45	41	17	51	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	51	47	19	58	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	185	56			66	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185	56			66	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	95			96	
cM capacity (veh/h)	773	1010			1463	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	66	66	70			
Volume Left	15	0	58			
Volume Right	51	19	0			
cSH	945	1700	1463			
Volume to Capacity	0.07	0.04	0.04			
Queue Length 95th (ft)	6	0	3			
Control Delay (s)	9.1	0.0	6.3			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	6.3			
Approach LOS	A					
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization		20.2%		ICU Level of Service		A
Analysis Period (min)			15			













2: Cascadel Road & Road 225
2030 Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	15	51	57	0	89	61
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	17	58	65	0	101	69
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	336	65			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336	65			65	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	94			93	
cM capacity (veh/h)	604	983			1537	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	75	65	101	69		
Volume Left	17	0	101	0		
Volume Right	58	0	0	0		
cSH	860	1700	1537	1700		
Volume to Capacity	0.09	0.04	0.07	0.04		
Queue Length 95th (ft)	7	0	5	0		
Control Delay (s)	9.6	0.0	7.5	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization		22.2%		ICU Level of Service		A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2030 Project PM

9/18/2008













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗		↕			↕	↗
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	79	148	10	0	122	38	19	2	2	50	5	103
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	90	168	11	0	139	43	22	2	2	57	6	117
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	258	11	139	43	26	63	117					
Volume Left (vph)	90	0	0	0	22	57	0					
Volume Right (vph)	0	11	0	43	2	0	117					
Hadj (s)	0.23	-0.65	0.05	-0.65	0.25	0.49	-0.67					
Departure Headway (s)	5.5	4.6	5.4	4.7	6.1	6.2	5.0					
Degree Utilization, x	0.39	0.01	0.21	0.06	0.04	0.11	0.16					
Capacity (veh/h)	631	744	635	726	537	545	667					
Control Delay (s)	10.8	6.5	8.6	6.8	9.4	8.7	7.8					
Approach Delay (s)	10.6		8.2		9.4	8.1						
Approach LOS	B		A		A	A						

Intersection Summary

Delay		9.2		
HCM Level of Service		A		
Intersection Capacity Utilization	36.5%		ICU Level of Service	A
Analysis Period (min)	15			







4: Northfork Road & Auberry Road/Driveway
2030 Project PM













9/18/2008







												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	33	133	11	35	137	47	4	23	34	36	18	50
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	38	151	12	40	156	53	5	26	39	41	20	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	209			164			535	521	157	546	501	182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			164			535	521	157	546	501	182
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			99	94	96	90	95	93
cM capacity (veh/h)	1362			1415			394	435	888	392	446	860
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total	201	40	209	31	39	118						
Volume Left	38	40	0	5	0	41						
Volume Right	12	0	53	0	39	57						
cSH	1362	1415	1700	428	888	547						
Volume to Capacity	0.03	0.03	0.12	0.07	0.04	0.22						
Queue Length 95th (ft)	2	2	0	6	3	20						
Control Delay (s)	1.6	7.6	0.0	14.1	9.2	13.4						
Lane LOS	A	A		B	A	B						
Approach Delay (s)	1.6	1.2		11.4		13.4						
Approach LOS				B		B						
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization		42.2%		ICU Level of Service					A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
2030 Project PM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	69	109	108	42	62	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	78	124	123	48	70	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	170				427	147
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	170				427	147
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				87	96
cM capacity (veh/h)	1407				550	898
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	202	170	107			
Volume Left	78	0	70			
Volume Right	0	48	36			
cSH	1407	1700	633			
Volume to Capacity	0.06	0.10	0.17			
Queue Length 95th (ft)	4	0	15			
Control Delay (s)	3.3	0.0	11.8			
Lane LOS	A		B			
Approach Delay (s)	3.3	0.0	11.8			
Approach LOS			B			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			33.2%	ICU Level of Service		A
Analysis Period (min)			15			

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frnt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	1583	3400	3505	3539	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3433	1583	3400	3505	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		207				603
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	652	182	237	590	754	531
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	741	207	269	670	857	603
Lane Group Flow (vph)	741	207	269	670	857	603
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.1	15.1	6.0	25.4	15.3	15.1
Actuated g/C Ratio	0.31	0.31	0.12	0.52	0.32	0.31
v/c Ratio	0.69	0.33	0.64	0.37	0.77	0.66
Control Delay	18.7	4.1	29.4	7.7	20.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	4.1	29.4	7.7	20.9	5.7
LOS	B	A	C	A	C	A
Approach Delay	15.5			13.9	14.6	
Approach LOS	B			B	B	

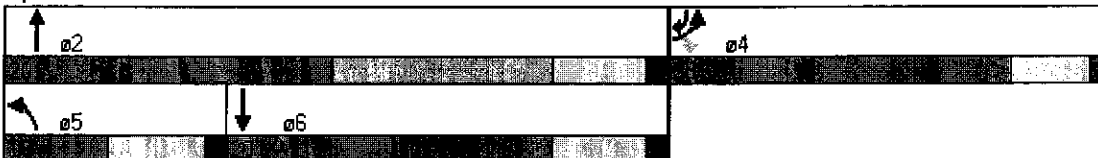
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	94	0	39	54	115	0
Queue Length 95th (ft)	138	33	#77	80	166	52
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1114	653	422	1856	1153	921
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.32	0.64	0.36	0.74	0.65

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 48.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 56.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.











Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 6: SR 49 & SR 41



7: Thornberry Road/Road 420 & SR 41
2030 Project PM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	23	38	743	34	52	758
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	26	43	844	39	59	861
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	1412	441			883	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1412	441			883	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	77	92			92	
cM capacity (veh/h)	116	555			756	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	69	563	320	59	431	431
Volume Left	26	0	0	59	0	0
Volume Right	43	0	39	0	0	0
cSH	228	1700	1700	756	1700	1700
Volume to Capacity	0.30	0.33	0.19	0.08	0.25	0.25
Queue Length 95th (ft)	31	0	0	6	0	0
Control Delay (s)	27.5	0.0	0.0	10.2	0.0	0.0
Lane LOS	D			B		
Approach Delay (s)	27.5	0.0		0.7		
Approach LOS	D					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			38.6%		ICU Level of Service	A
Analysis Period (min)			15			

8: Road 200 & SR 41
2030 Project PM

9/18/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1553	3505	1568	1719	3438
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1736	1553	3505	1568	1719	3438
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		102		130		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	77	90	756	114	49	532
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Adj. Flow (vph)	88	102	859	130	56	605
Lane Group Flow (vph)	88	102	859	130	56	605
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.9	11.9	36.5	36.5	9.1	45.6
Actuated g/C Ratio	0.18	0.18	0.57	0.57	0.13	0.71
v/c Ratio	0.28	0.28	0.43	0.14	0.25	0.25
Control Delay	19.2	6.5	10.6	3.0	22.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	6.5	10.6	3.0	22.5	4.1
LOS	B	A	B	A	C	A
Approach Delay	12.4		9.6			5.6
Approach LOS	B		A			A

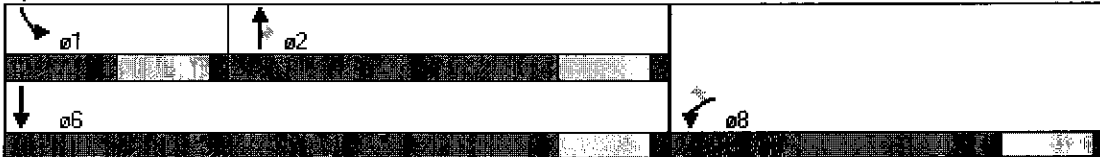
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	22	0	98	0	14	31
Queue Length 95th (ft)	50	27	158	24	41	58
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	511	530	1984	944	227	2429
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.43	0.14	0.25	0.25

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 64.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 8.5
 Intersection Capacity Utilization 38.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2030 Project PM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.951			0.985			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1689	0	1752	3452	0	1719	3376	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1810	1538	1687	1689	0	1752	3452	0	1719	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22		20			9			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	96	272	19	95	239	117	53	835	90	70	496	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	109	309	22	108	272	133	60	949	102	80	564	77
Lane Group Flow (vph)	109	309	22	108	405	0	60	1051	0	80	641	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	13.5	27.5	27.5	13.6	27.6		11.0	34.5		12.1	35.6	
Actuated g/C Ratio	0.14	0.28	0.28	0.14	0.28		0.11	0.35		0.12	0.37	
v/c Ratio	0.47	0.60	0.05	0.47	0.82		0.31	0.85		0.38	0.52	
Control Delay	49.7	38.3	12.1	49.8	48.1		49.5	42.3		49.8	30.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.7	38.3	12.1	49.8	48.1		49.5	42.3		49.8	30.5	
LOS	D	D	B	D	D		D	D		D	C	
Approach Delay		39.8			48.4			42.7			32.6	
Approach LOS		D			D			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	70	177	0	69	239		39	~377		51	189	
Queue Length 95th (ft)	127	293	20	127	#425		82	#584		102	273	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	332	587	514	326	562		332	1233		328	1244	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.53	0.04	0.33	0.72		0.18	0.85		0.24	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 97.2
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 40.7
 Intersection Capacity Utilization 68.2%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service C

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: SR 145 & SR 41



ATTACHMENT VI – C - 50

2030 PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

SIGNAL WARRANTS

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

MINOR STREET: MISSION DRIVE

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

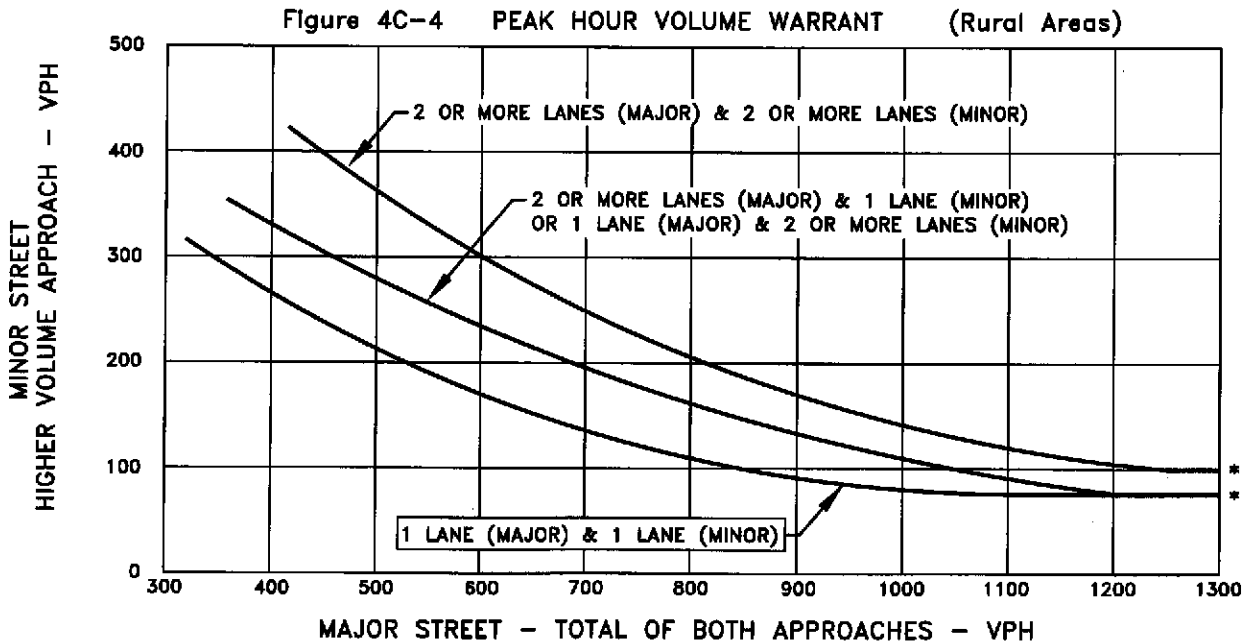
CONDITION: 2030 PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	✓		86	120			
Highest Approaches - Minor Street	✓		31	58			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: CASCADEL ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

CONDITION: 2030 PROJECT

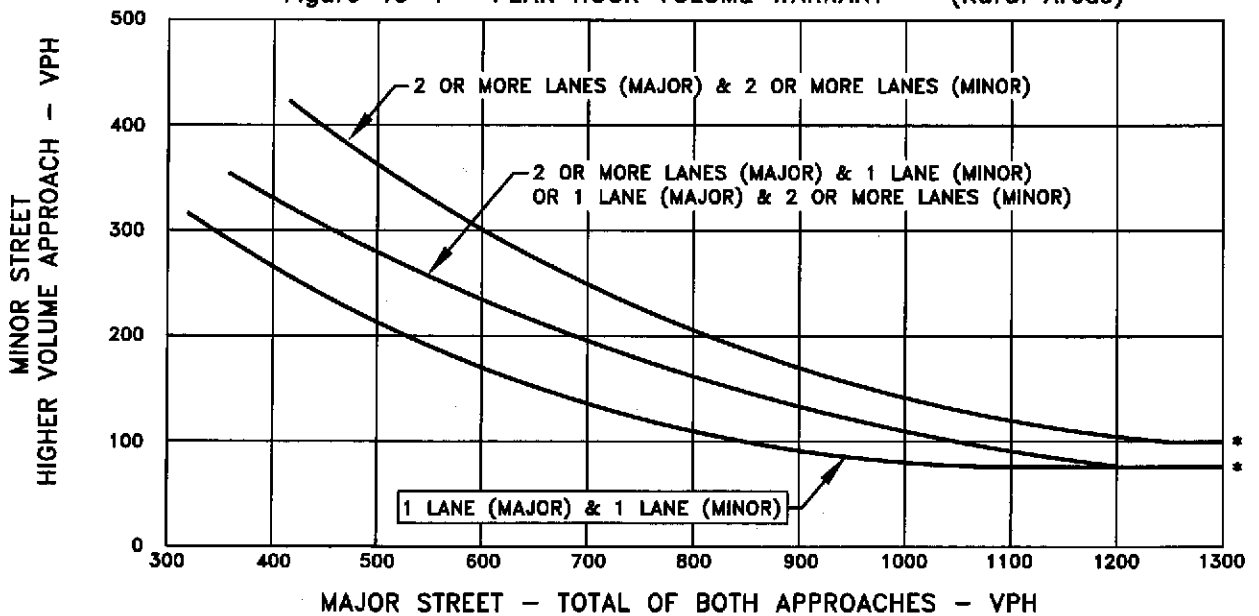
WARRANT 3 – Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches – Major Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	152	207			
Highest Approaches – Minor Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	61	66			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-4 PEAK HOUR VOLUME WARRANT (Rural Areas)



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: ROAD 225

Critical Approach Speed 35 mph

MINOR STREET: ROAD 274

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

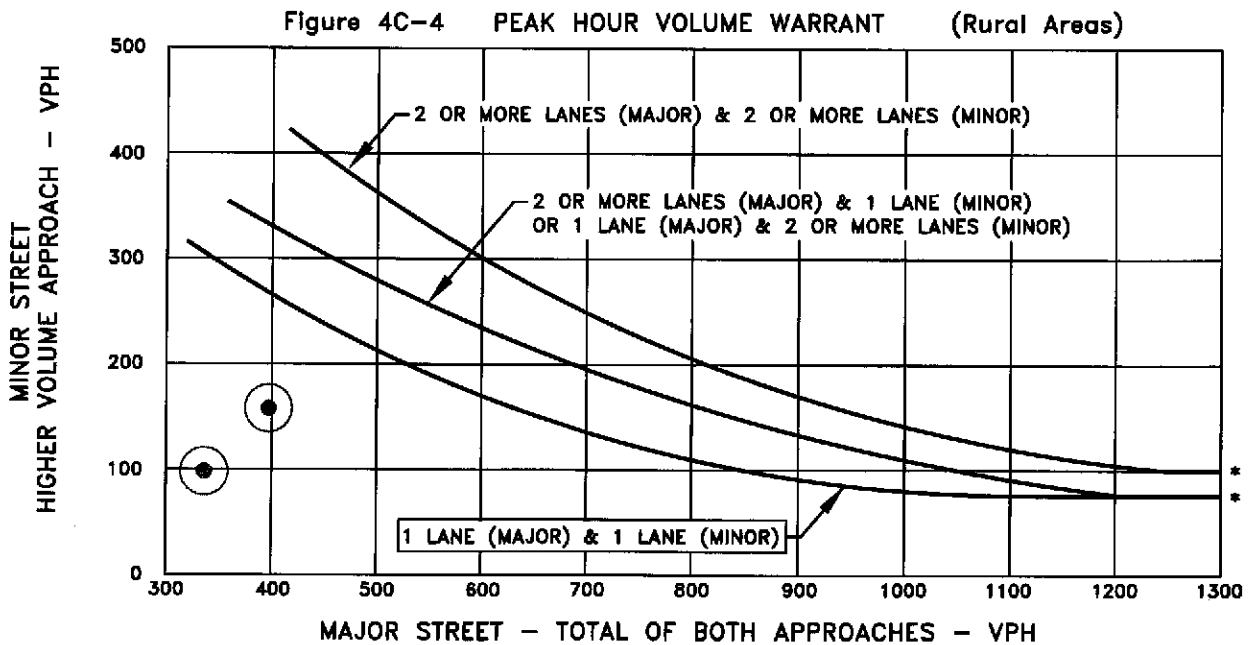
CONDITION: 2030 PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	✓		336	397			
Highest Approaches - Minor Street	✓		98	158			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: AUBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

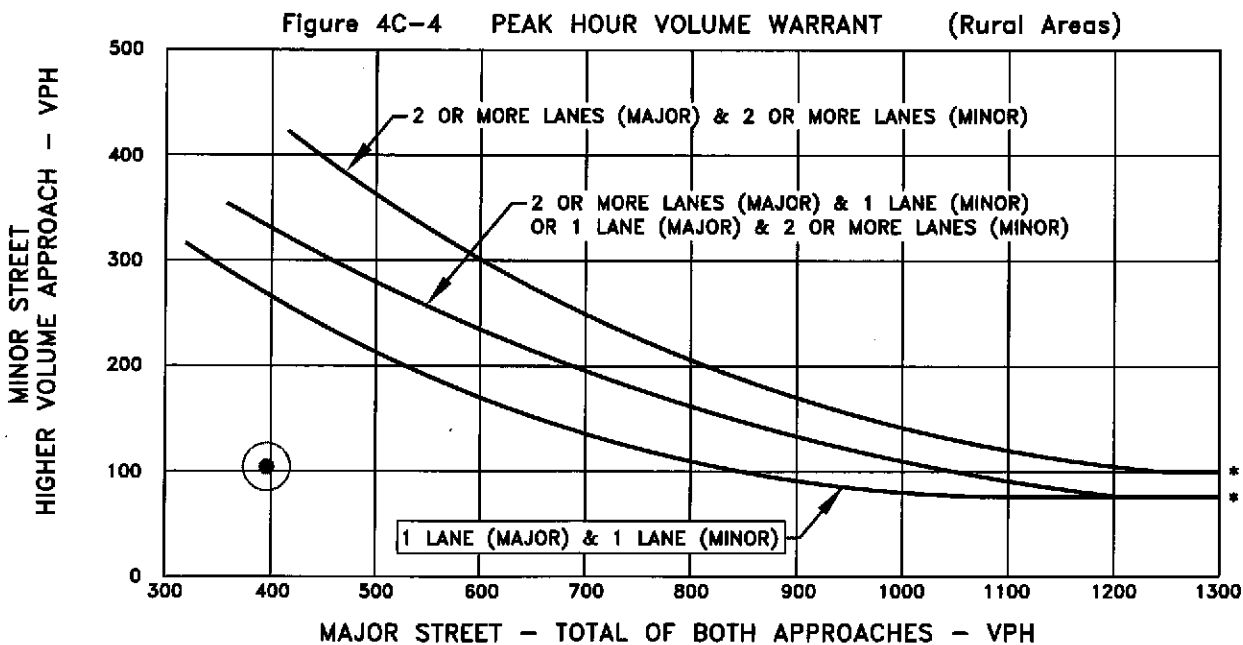
CONDITION: 2030 PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		284	396			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		78	104			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: NORTHFORK ROAD

Critical Approach Speed 55 mph

MINOR STREET: CRANE VALLEY ROAD

Critical Approach Speed 55 mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

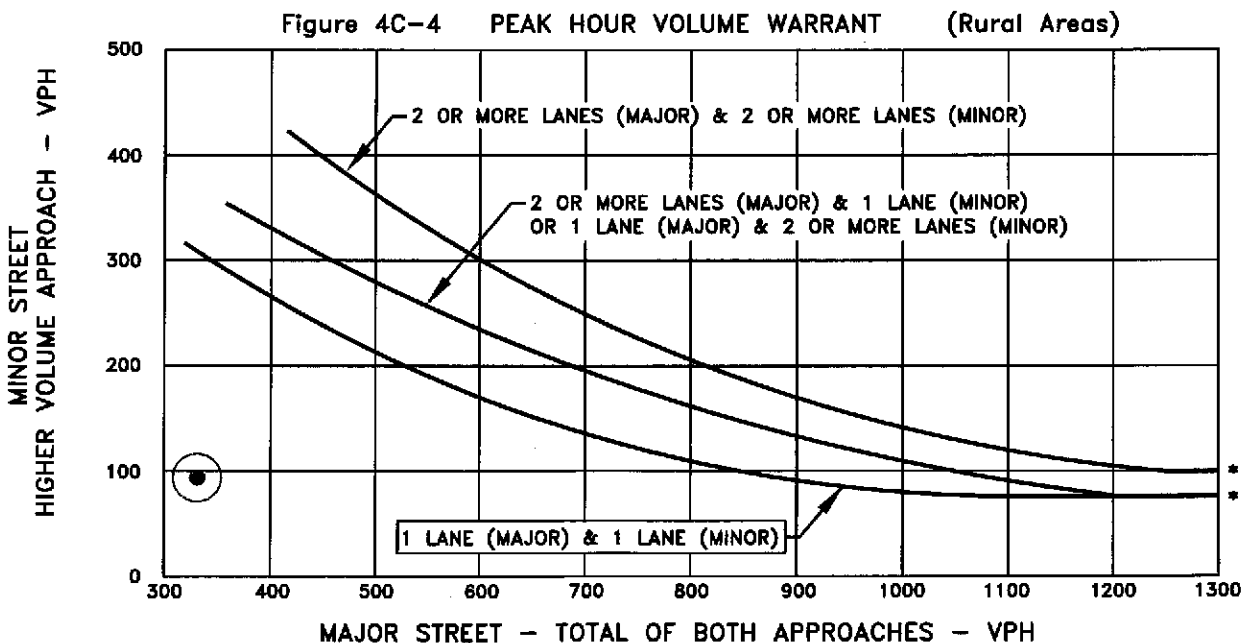
CONDITION: 2030 PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street	<input checked="" type="checkbox"/>		282	331			
Highest Approaches - Minor Street	<input checked="" type="checkbox"/>		64	94			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



*** NOTE:**
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC WH DATE 10/18/08

CHK _____ DATE _____

MAJOR STREET: SR 41

Critical Approach Speed 55 mph

MINOR STREET: THORNBERRY ROAD

Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph -----

or RURAL (R)

In built up area of isolated community of < 10,000 pop. -----

URBAN (U)

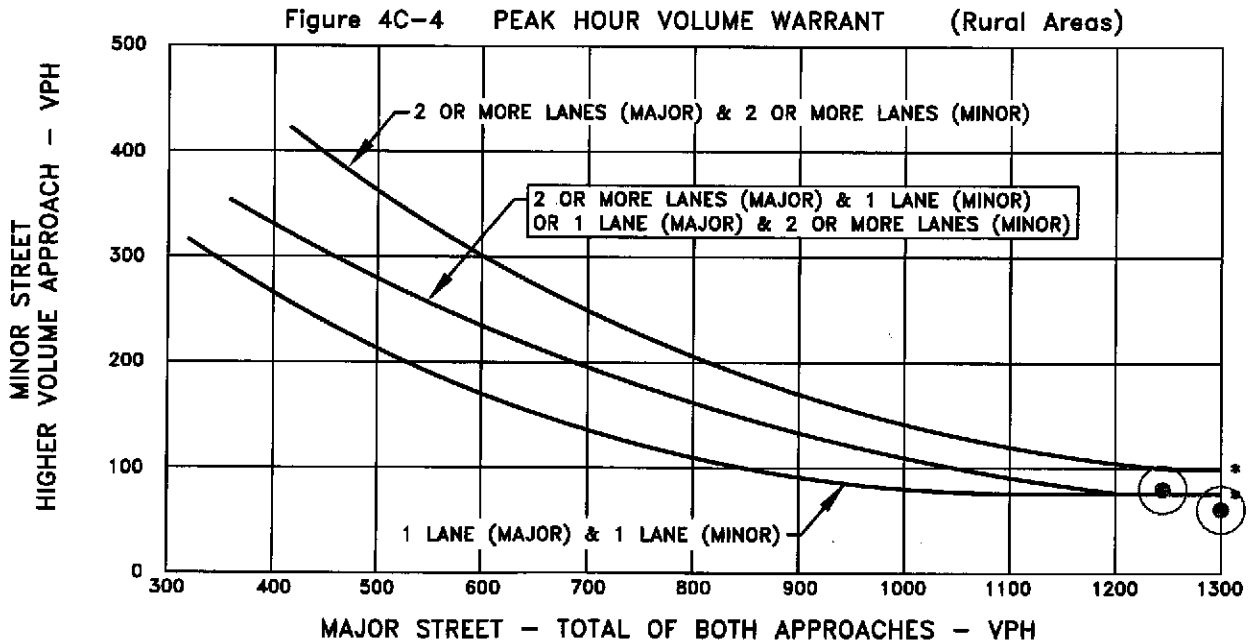
CONDITION: 2030 PROJECT

WARRANT 3 - Peak Hour Volume

SATISFIED* YES NO

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			Hour
Both Approaches - Major Street		✓	1245	1587			
Highest Approaches - Minor Street	✓		80	61			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* NOTE:
 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.



ATTACHMENT VI – C - 51










MITIGATED 2030 PROJECT CONDITIONS

NORTH FORK SITE - ALTERNATIVE D

INTERSECTION LEVEL OF SERVICE CALCULATIONS











1: Mission Drive & Cascadel Road
2030 Project AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	14	17	7	12	39	28
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	16	19	8	14	44	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	135	15			22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	135	15			22	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			97	
cM capacity (veh/h)	834	1065			1594	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	35	22	76			
Volume Left	16	0	44			
Volume Right	19	14	0			
cSH	947	1700	1594			
Volume to Capacity	0.04	0.01	0.03			
Queue Length 95th (ft)	3	0	2			
Control Delay (s)	8.9	0.0	4.3			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	4.3			
Approach LOS	A					
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization		20.3%		ICU Level of Service		A
Analysis Period (min)			15			













2: Cascadel Road & Road 225
2030 Project AM

9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	48	61	0	54	37
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	55	69	0	61	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	234	69			69	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	234	69			69	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	94			96	
cM capacity (veh/h)	719	988			1482	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	69	69	61	42		
Volume Left	15	0	61	0		
Volume Right	55	0	0	0		
cSH	915	1700	1482	1700		
Volume to Capacity	0.08	0.04	0.04	0.02		
Queue Length 95th (ft)	6	0	3	0		
Control Delay (s)	9.3	0.0	7.5	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			20.0%		ICU Level of Service	A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2030 Project AM

9/18/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗		↕			↕	↗
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	87	87	22	3	100	37	15	0	4	25	5	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	99	99	25	3	114	42	17	0	5	28	6	77
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	198	25	117	42	22	34	77					
Volume Left (vph)	99	0	3	0	17	28	0					
Volume Right (vph)	0	25	0	42	5	0	77					
Hadj (s)	0.37	-0.58	0.05	-0.67	0.07	0.47	-0.65					
Departure Headway (s)	5.4	4.4	5.1	4.4	5.6	5.9	4.8					
Degree Utilization, x	0.29	0.03	0.17	0.05	0.03	0.06	0.10					
Capacity (veh/h)	646	784	676	784	594	568	697					
Control Delay (s)	9.4	6.4	7.9	6.4	8.8	8.1	7.2					
Approach Delay (s)	9.0		7.5		8.8	7.4						
Approach LOS	A		A		A	A						

Intersection Summary

Delay	8.2											
HCM Level of Service	A											
Intersection Capacity Utilization	30.5%				ICU Level of Service				A			
Analysis Period (min)	15											










4: Northfork Road & Auberry Road/Driveway
2030 Project AM













9/18/2008







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕			↕	↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	27	113	6	28	86	24	6	28	29	43	14	21
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	31	128	7	32	98	27	7	32	33	49	16	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	125			135			383	378	128	414	372	111
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125			135			383	378	128	414	372	111
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			98			99	94	96	90	97	97
cM capacity (veh/h)	1455			1443			523	524	911	488	535	942
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	159	7	32	125	39	33	89					
Volume Left	31	0	32	0	7	0	49					
Volume Right	0	7	0	27	0	33	24					
cSH	1455	1700	1443	1700	524	911	571					
Volume to Capacity	0.02	0.00	0.02	0.07	0.07	0.04	0.16					
Queue Length 95th (ft)	2	0	2	0	6	3	14					
Control Delay (s)	1.6	0.0	7.6	0.0	12.4	9.1	12.5					
Lane LOS	A		A		B	A	B					
Approach Delay (s)	1.5		1.5		10.9		12.5					
Approach LOS					B		B					
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			31.8%		ICU Level of Service				A			
Analysis Period (min)			15									

5: Northfork Road/Road 200 & Crane Valley Road
2030 Project AM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	28	114	76	63	31	33
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	32	130	86	72	35	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	158				315	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158				315	122
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	96
cM capacity (veh/h)	1422				662	929
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	161	158	73			
Volume Left	32	0	35			
Volume Right	0	72	38			
cSH	1422	1700	777			
Volume to Capacity	0.02	0.09	0.09			
Queue Length 95th (ft)	2	0	8			
Control Delay (s)	1.6	0.0	10.1			
Lane LOS	A		B			
Approach Delay (s)	1.6	0.0	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			29.1%	ICU Level of Service		A
Analysis Period (min)			15			

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3367	1553	3303	3406	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3367	1553	3303	3406	3505	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		202				538
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	432	178	203	495	476	473
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	6%	6%	3%	3%
Adj. Flow (vph)	491	202	231	562	541	538
Lane Group Flow (vph)	491	202	231	562	541	538
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	13.5	13.5	6.1	20.4	13.1	13.5
Actuated g/C Ratio	0.32	0.32	0.14	0.48	0.31	0.32
v/c Ratio	0.46	0.32	0.51	0.34	0.50	0.62
Control Delay	14.1	4.2	23.9	7.5	15.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	4.2	23.9	7.5	15.0	5.3
LOS	B	A	C	A	B	A
Approach Delay	11.2			12.3	10.2	
Approach LOS	B			B	B	

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	52	0	31	44	65	0
Queue Length 95th (ft)	89	32	60	67	100	50
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1230	695	455	1874	1273	914
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.29	0.51	0.30	0.42	0.59

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 42.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 41.7%
 Analysis Period (min) 15











Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: SR 49 & SR 41



7: Thornberry Road/Road 420 & SR 41
Mitigated 2030 Project AM

9/18/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	425	
Storage Lanes	1	0		0	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50		50		50	50
Trailing Detector (ft)	0		0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.915		0.995			
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1674	0	3326	0	1656	3312
Flt Permitted	0.982				0.950	
Satd. Flow (perm)	1674	0	3326	0	1656	3312
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	57		6			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	3275		3105			3469
Travel Time (s)	40.6		38.5			43.0
Volume (vph)	30	50	639	22	42	542
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	8%	8%	9%	9%
Adj. Flow (vph)	34	57	726	25	48	616
Lane Group Flow (vph)	91	0	751	0	48	616
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Detector Phases	8		2		1	6
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	20.0		20.0		10.0	20.0
Total Split (s)	29.0	0.0	31.0	0.0	10.0	31.0
Total Split (%)	41.4%	0.0%	44.3%	0.0%	14.3%	44.3%
Maximum Green (s)	23.0		25.0		4.0	25.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	1.0		1.0		1.0	1.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Min		None	Min
Act Effct Green (s)	10.7		43.0		6.9	47.8
Actuated g/C Ratio	0.16		0.69		0.10	0.77
v/c Ratio	0.29		0.33		0.29	0.24
Control Delay	10.3		6.8		23.6	3.3
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	10.3		6.8		23.6	3.3
LOS	B		A		C	A
Approach Delay	10.3		6.8			4.8
Approach LOS	B		A			A

7: Thornberry Road/Road 420 & SR 41
 Mitigated 2030 Project AM

9/18/2008

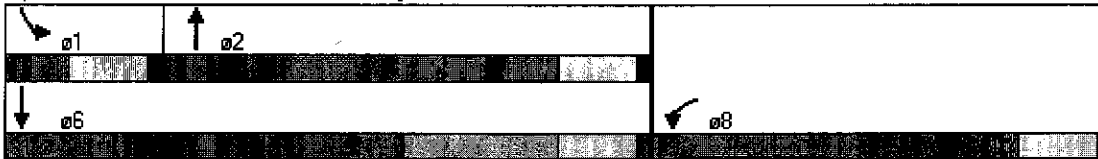
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	6		35		10	28
Queue Length 95th (ft)	38		120		40	55
Internal Link Dist (ft)	3195		3025			3389
Turn Bay Length (ft)					425	
Base Capacity (vph)	607		2394		168	2666
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.15		0.31		0.29	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 61.9
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.33
 Intersection Signal Delay: 6.1
 Intersection Capacity Utilization 36.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 7: Thornberry Road/Road 420 & SR 41



8: Road 200 & SR 41
2030 Project AM

9/18/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1612	1442	3343	1495	1752	3505
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1612	1442	3343	1495	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		48		92		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	136	42	373	81	74	794
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	12%	12%	8%	8%	3%	3%
Adj. Flow (vph)	155	48	424	92	84	902
Lane Group Flow (vph)	155	48	424	92	84	902
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	13.5	13.5	32.8	32.8	8.4	40.7
Actuated g/C Ratio	0.22	0.22	0.55	0.55	0.13	0.68
v/c Ratio	0.44	0.14	0.23	0.11	0.37	0.38
Control Delay	21.1	6.5	10.4	3.8	26.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	6.5	10.4	3.8	26.5	5.8
LOS	C	A	B	A	C	A
Approach Delay	17.6		9.3			7.6
Approach LOS	B		A			A

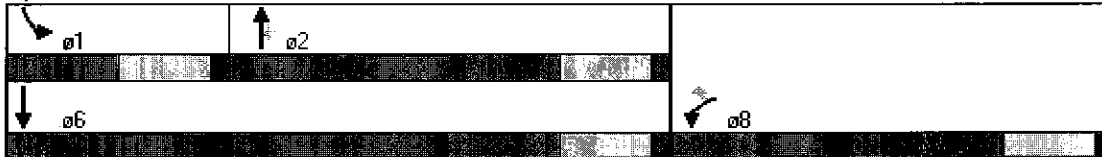
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	41	0	46	0	23	63
Queue Length 95th (ft)	80	18	84	23	60	116
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	488	471	1832	861	229	2385
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.10	0.23	0.11	0.37	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 59.8
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 9.3
 Intersection Capacity Utilization 36.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



9: SR 145 & SR 41
2030 Project AM

9/18/2008

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.958			0.971			0.984	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1776	1509	1570	1583	0	1703	3307	0	1752	3449	0
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1776	1509	1570	1583	0	1703	3307	0	1752	3449	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100		16			23			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	66	126	88	88	166	65	19	332	78	112	723	88
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	7%	7%	15%	15%	15%	6%	6%	6%	3%	3%	3%
Adj. Flow (vph)	75	143	100	100	189	74	22	377	89	127	822	100
Lane Group Flow (vph)	75	143	100	100	263	0	22	466	0	127	922	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.7	19.6	19.6	13.2	21.1		9.2	35.0		13.8	44.4	
Actuated g/C Ratio	0.13	0.22	0.22	0.14	0.23		0.09	0.38		0.15	0.49	
v/c Ratio	0.35	0.37	0.25	0.45	0.69		0.14	0.36		0.49	0.55	
Control Delay	47.0	37.0	8.8	47.5	42.7		48.8	26.1		46.9	22.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.0	37.0	8.8	47.5	42.7		48.8	26.1		46.9	22.7	
LOS	D	D	A	D	D		D	C		D	C	
Approach Delay		30.5			44.0			27.1			25.6	
Approach LOS		C			D			C			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	43	75	0	57	139		13	108		72	180	
Queue Length 95th (ft)	97	144	40	119	244		41	195		144	383	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	342	569	552	323	526		323	1286		362	1688	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.25	0.18	0.31	0.50		0.07	0.36		0.35	0.55	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 91
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 29.6
 Intersection Capacity Utilization 55.8%
 Analysis Period (min) 15










Intersection LOS: C
 ICU Level of Service B











Splits and Phases: 9: SR 145 & SR 41



1: Mission Drive & Cascadel Road
2030 Project PM




















9/18/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	45	41	17	51	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	51	47	19	58	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	185	56			66	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185	56			66	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	95			96	
cM capacity (veh/h)	773	1010			1463	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	66	66	70			
Volume Left	15	0	58			
Volume Right	51	19	0			
cSH	945	1700	1463			
Volume to Capacity	0.07	0.04	0.04			
Queue Length 95th (ft)	6	0	3			
Control Delay (s)	9.1	0.0	6.3			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	6.3			
Approach LOS	A					
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization			20.2%		ICU Level of Service	A
Analysis Period (min)			15			

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	15	51	57	0	89	61
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	17	58	65	0	101	69
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pXplatoon unblocked						
vC, conflicting volume	336	65			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336	65			65	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	94			93	
cM capacity (veh/h)	604	983			1537	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	75	65	101	69		
Volume Left	17	0	101	0		
Volume Right	58	0	0	0		
cSH	860	1700	1537	1700		
Volume to Capacity	0.09	0.04	0.07	0.04		
Queue Length 95th (ft)	7	0	5	0		
Control Delay (s)	9.6	0.0	7.5	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			22.2%		ICU Level of Service	A
Analysis Period (min)			15			

3: Road 225/Mammoth Pool & Road 274/Malum Ridge Rd
2030 Project PM

9/18/2008



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	79	148	10	0	122	38	19	2	2	50	5	103
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	90	168	11	0	139	43	22	2	2	57	6	117
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	258	11	139	43	26	63	117					
Volume Left (vph)	90	0	0	0	22	57	0					
Volume Right (vph)	0	11	0	43	2	0	117					
Hadj (s)	0.23	-0.65	0.05	-0.65	0.25	0.49	-0.67					
Departure Headway (s)	5.5	4.6	5.4	4.7	6.1	6.2	5.0					
Degree Utilization, x	0.39	0.01	0.21	0.06	0.04	0.11	0.16					
Capacity (veh/h)	631	744	635	726	537	545	667					
Control Delay (s)	10.8	6.5	8.6	6.8	9.4	8.7	7.8					
Approach Delay (s)	10.6		8.2		9.4	8.1						
Approach LOS	B		A		A	A						

Intersection Summary

Delay		9.2										
HCM Level of Service		A										
Intersection Capacity Utilization		36.5%	ICU Level of Service		A							
Analysis Period (min)		15										










4: Northfork Road & Auberry Road/Driveway
2030 Project PM













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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	33	133	11	35	137	47	4	23	34	36	18	50
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	38	151	12	40	156	53	5	26	39	41	20	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pXplatoon unblocked												
vC, conflicting volume	209			164			535	521	157	546	501	182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			164			535	521	157	546	501	182
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			99	94	96	90	95	93
cM capacity (veh/h)	1362			1415			394	435	888	392	446	860
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total	201	40	209	31	39	118						
Volume Left	38	40	0	5	0	41						
Volume Right	12	0	53	0	39	57						
cSH	1362	1415	1700	428	888	547						
Volume to Capacity	0.03	0.03	0.12	0.07	0.04	0.22						
Queue Length 95th (ft)	2	2	0	6	3	20						
Control Delay (s)	1.6	7.6	0.0	14.1	9.2	13.4						
Lane LOS	A	A		B	A	B						
Approach Delay (s)	1.6	1.2		11.4		13.4						
Approach LOS				B		B						
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization		42.2%		ICU Level of Service				A				
Analysis Period (min)		15										

5: Northfork Road/Road 200 & Crane Valley Road
2030 Project PM

9/18/2008

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	69	109	108	42	62	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	78	124	123	48	70	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
platoon unblocked						
vC, conflicting volume	170				427	147
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	170				427	147
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				87	96
cM capacity (veh/h)	1407				550	898
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	202	170	107			
Volume Left	78	0	70			
Volume Right	0	48	36			
cSH	1407	1700	633			
Volume to Capacity	0.06	0.10	0.17			
Queue Length 95th (ft)	4	0	15			
Control Delay (s)	3.3	0.0	11.8			
Lane LOS	A		B			
Approach Delay (s)	3.3	0.0	11.8			
Approach LOS			B			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			33.2%	ICU Level of Service		A
Analysis Period (min)			15			

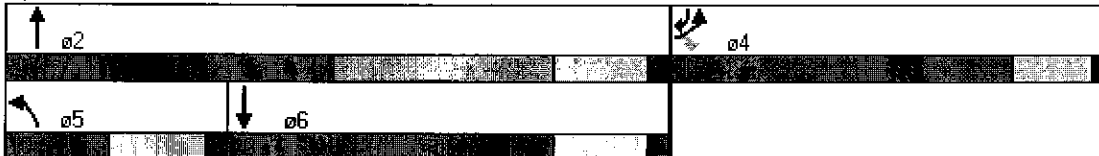
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225	225	125			150
Storage Lanes	2	1	2			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Frnt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	1583	3400	3505	3539	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3433	1583	3400	3505	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		207				603
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	35			45	45	
Link Distance (ft)	3252			3318	2785	
Travel Time (s)	63.4			50.3	42.2	
Volume (vph)	652	182	237	590	754	531
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Adj. Flow (vph)	741	207	269	670	857	603
Lane Group Flow (vph)	741	207	269	670	857	603
Turn Type		Perm	Prot			Over
Protected Phases	4		5	2	6	4
Permitted Phases		4				
Detector Phases	4	4	5	2	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (%)	40.0%	40.0%	20.0%	40.0%	40.0%	40.0%
Maximum Green (s)	15.4	15.4	4.7	14.7	14.7	15.4
Yellow Time (s)	3.6	3.6	4.3	4.3	4.3	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.1	15.1	6.0	25.4	15.3	15.1
Actuated g/C Ratio	0.31	0.31	0.12	0.52	0.32	0.31
v/c Ratio	0.69	0.33	0.64	0.37	0.77	0.66
Control Delay	18.7	4.1	29.4	7.7	20.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	4.1	29.4	7.7	20.9	5.7
LOS	B	A	C	A	C	A
Approach Delay	15.5			13.9	14.6	
Approach LOS	B			B	B	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	94	0	39	54	115	0
Queue Length 95th (ft)	138	33	#77	80	166	52
Internal Link Dist (ft)	3172			3238	2705	
Turn Bay Length (ft)	225	225	125			150
Base Capacity (vph)	1114	653	422	1856	1153	921
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.32	0.64	0.36	0.74	0.65

Intersection Summary











Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 48.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 56.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: SR 49 & SR 41



7: Thornberry Road/Road 420 & SR 41
Mitigated 2030 Project PM

9/18/2008

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	425	
Storage Lanes	1	0		0	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50		50		50	50
Trailing Detector (ft)	0		0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.916		0.993			
Fit Protected	0.982				0.950	
Satd. Flow (prot)	1628	0	3414	0	1752	3505
Fit Permitted	0.982				0.950	
Satd. Flow (perm)	1628	0	3414	0	1752	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	43		9			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	3275		3105			3469
Travel Time (s)	40.6		38.5			43.0
Volume (vph)	23	38	743	34	52	758
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%
Adj. Flow (vph)	26	43	844	39	59	861
Lane Group Flow (vph)	69	0	883	0	59	861
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Detector Phases	8		2		1	6
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	20.0		20.0		10.0	20.0
Total Split (s)	21.0	0.0	28.0	0.0	11.0	39.0
Total Split (%)	35.0%	0.0%	46.7%	0.0%	18.3%	65.0%
Maximum Green (s)	15.0		22.0		5.0	33.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	1.0		1.0		1.0	1.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Min		None	Min
Act Effct Green (s)	10.2		44.0		8.0	52.4
Actuated g/C Ratio	0.14		0.67		0.11	0.80
v/c Ratio	0.25		0.39		0.30	0.31
Control Delay	11.7		8.3		22.9	3.2
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	11.7		8.3		22.9	3.2
LOS	B		A		C	A
Approach Delay	11.7		8.3			4.5
Approach LOS	B		A			A

7: Thornberry Road/Road 420 & SR 41
 Mitigated 2030 Project PM

9/18/2008

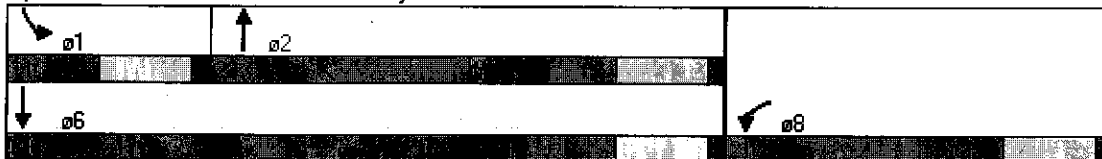
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	6		91		15	42
Queue Length 95th (ft)	32		147		44	77
Internal Link Dist (ft)	3195		3025			3389
Turn Bay Length (ft)					425	
Base Capacity (vph)	427		2304		199	2803
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.16		0.38		0.30	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 65.8
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 6.5
 Intersection Capacity Utilization 38.6%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 7: Thornberry Road/Road 420 & SR 41



8: Road 200 & SR 41
2030 Project PM

9/18/2008

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200		475	500	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frnt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1553	3505	1568	1719	3438
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1736	1553	3505	1568	1719	3438
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		102		130		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	55		55			55
Link Distance (ft)	2671		2415			2256
Travel Time (s)	33.1		29.9			28.0
Volume (vph)	77	90	756	114	49	532
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Adj. Flow (vph)	88	102	859	130	56	605
Lane Group Flow (vph)	88	102	859	130	56	605
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	20.0
Total Split (s)	24.0	24.0	24.0	24.0	12.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	20.0%	60.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	6.0	30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.9	11.9	36.5	36.5	9.1	45.6
Actuated g/C Ratio	0.18	0.18	0.57	0.57	0.13	0.71
v/c Ratio	0.28	0.28	0.43	0.14	0.25	0.25
Control Delay	19.2	6.5	10.6	3.0	22.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	6.5	10.6	3.0	22.5	4.1
LOS	B	A	B	A	C	A
Approach Delay	12.4		9.6			5.6
Approach LOS	B		A			A

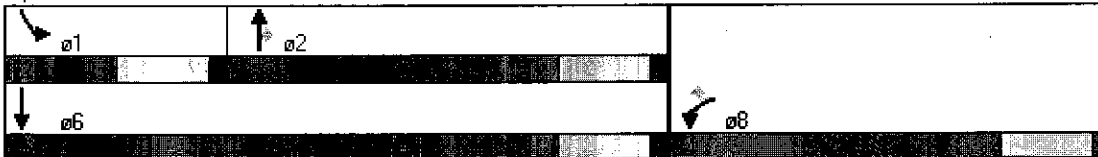
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	22	0	98	0	14	31
Queue Length 95th (ft)	50	27	158	24	41	58
Internal Link Dist (ft)	2591		2335			2176
Turn Bay Length (ft)	200	200		475	500	
Base Capacity (vph)	511	530	1984	944	227	2429
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.43	0.14	0.25	0.25

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 64.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 8.5
 Intersection Capacity Utilization 38.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Road 200 & SR 41



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	175		0	500		0	425		0
Storage Lanes	1		1	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.951			0.985			0.982	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1689	0	1752	3452	0	1719	3376	0
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1810	1538	1687	1689	0	1752	3452	0	1719	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22		20			9			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2969			3227			2899			2761	
Travel Time (s)		36.8			40.0			35.9			34.2	
Volume (vph)	96	272	19	95	239	117	53	835	90	70	496	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	5%	5%	5%	7%	7%	7%	3%	3%	3%	5%	5%	5%
Adj. Flow (vph)	109	309	22	108	272	133	60	949	102	80	564	77
Lane Group Flow (vph)	109	309	22	108	405	0	60	1051	0	80	641	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	24.0	36.0	36.0	24.0	36.0	0.0	24.0	36.0	0.0	24.0	36.0	0.0
Total Split (%)	20.0%	30.0%	30.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%	20.0%	30.0%	0.0%
Maximum Green (s)	18.0	30.0	30.0	18.0	30.0		18.0	30.0		18.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	13.5	27.5	27.5	13.6	27.6		11.0	34.5		12.1	35.6	
Actuated g/C Ratio	0.14	0.28	0.28	0.14	0.28		0.11	0.35		0.12	0.37	
v/c Ratio	0.47	0.60	0.05	0.47	0.82		0.31	0.85		0.38	0.52	
Control Delay	49.7	38.3	12.1	49.8	48.1		49.5	42.3		49.8	30.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.7	38.3	12.1	49.8	48.1		49.5	42.3		49.8	30.5	
LOS	D	D	B	D	D		D	D		D	C	
Approach Delay		39.8			48.4			42.7			32.6	
Approach LOS		D			D			D			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	70	177	0	69	239		39	377		51	189	
Queue Length 95th (ft)	127	293	20	127	#425		82	#584		102	273	
Internal Link Dist (ft)		2889			3147			2819			2681	
Turn Bay Length (ft)	200			175			500			425		
Base Capacity (vph)	332	587	514	326	562		332	1233		328	1244	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.53	0.04	0.33	0.72		0.18	0.85		0.24	0.52	

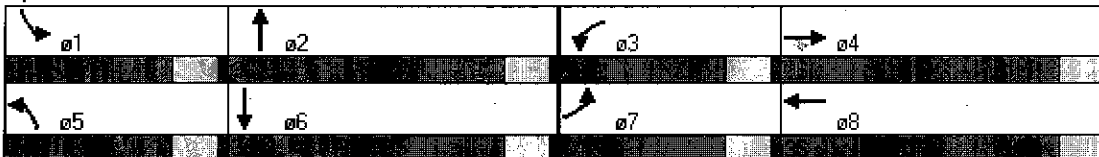
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 97.2
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 40.7
 Intersection Capacity Utilization 68.2%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: SR 145 & SR 41



ATTACHMENT VI – C - 52

RAW COUNT DATA



Metro Traffic Data Inc.
 310 N. Irwin Street - Suite 20
 Hanford, CA 93230
 800-975-6938 Phone/Fax
 www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Ruth Davls
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Ave 18 1/2 @ SR 99 SB Off-ramp / Road 23
COUNTY Madera
COLLECTION DATE 6/24/2008

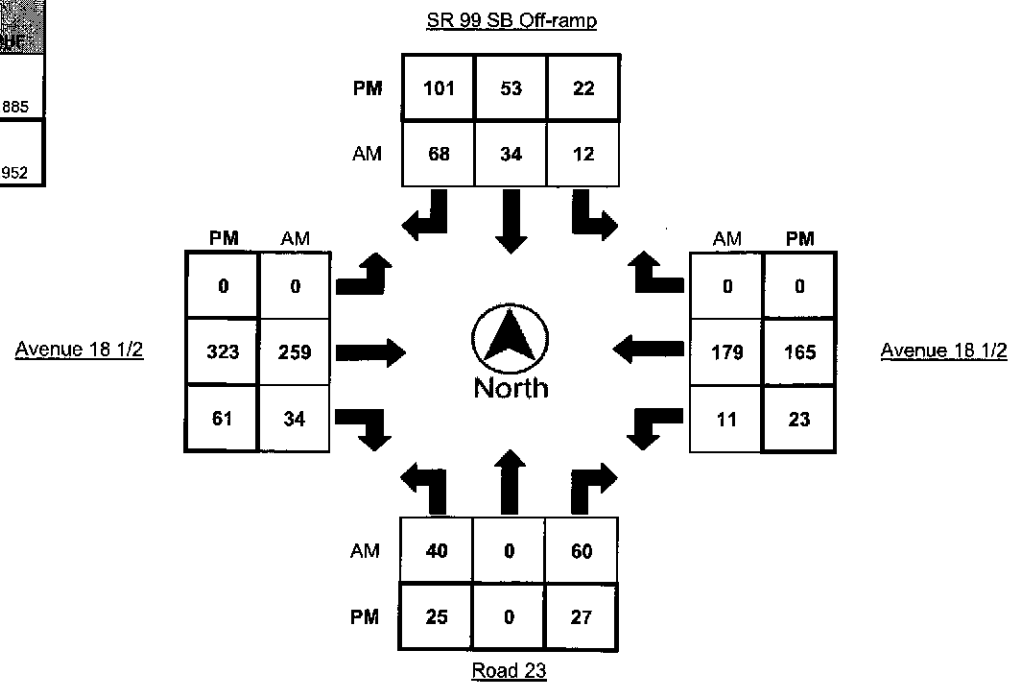
LATITUDE 37° 1'51.5"N
LONGITUDE 120° 7'51.61"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	8	0	10	X	1	9	14	X	0	47	5	X	4	36	0	X
7:15 AM - 7:30 AM	8	0	11	X	2	3	13	X	0	42	4	X	2	43	0	X
7:30 AM - 7:45 AM	14	0	14	X	1	12	18	X	0	68	6	X	1	45	0	X
7:45 AM - 8:00 AM	15	0	13	X	5	9	11	X	0	72	7	X	3	62	0	X
8:00 AM - 8:15 AM	6	0	18	X	3	6	21	X	0	58	8	X	5	44	0	X
8:15 AM - 8:30 AM	5	0	15	X	3	7	18	X	0	61	13	X	2	28	0	X
8:30 AM - 8:45 AM	10	0	7	X	4	9	16	X	0	59	6	X	2	41	0	X
8:45 AM - 9:00 AM	4	0	4	X	2	7	10	X	0	43	9	X	2	37	0	X
TOTAL	70	0	92	X	21	62	121	X	0	450	58	X	21	336	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
1:00 PM - 1:15 PM	5	0	9	X	4	15	30	X	0	76	15	X	5	44	0	X
1:15 PM - 1:30 PM	6	0	6	X	5	19	21	X	0	64	13	X	3	44	0	X
1:30 PM - 1:45 PM	9	0	7	X	6	10	30	X	0	89	11	X	5	43	0	X
1:45 PM - 2:00 PM	5	0	5	X	7	9	20	X	0	94	22	X	10	34	0	X
2:00 PM - 2:15 PM	12	0	18	X	3	14	27	X	0	56	9	X	1	34	0	X
2:15 PM - 2:30 PM	10	0	14	X	4	3	29	X	0	61	12	X	2	45	0	X
2:30 PM - 2:45 PM	3	0	12	X	2	4	32	X	0	76	12	X	1	43	0	X
2:45 PM - 3:00 PM	12	0	6	X	3	10	23	X	0	63	4	X	3	40	0	X
TOTAL	62	0	77	X	34	84	212	X	0	579	98	X	30	327	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	40	0	60	X	12	34	68	X	0	259	34	X	11	179	0	X
4:00 PM - 5:00 PM	25	0	27	X	22	53	101	X	0	323	61	X	23	165	0	X

Time	PLF
AM	0.885
PM	0.952





Metro Traffic Data Inc.
 310 N. Irwin Street - Suite 20
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 www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 18 1/2 @ SR 99 NB Ramps
 COUNTY Madera
 COLLECTION DATE 6/24/2008

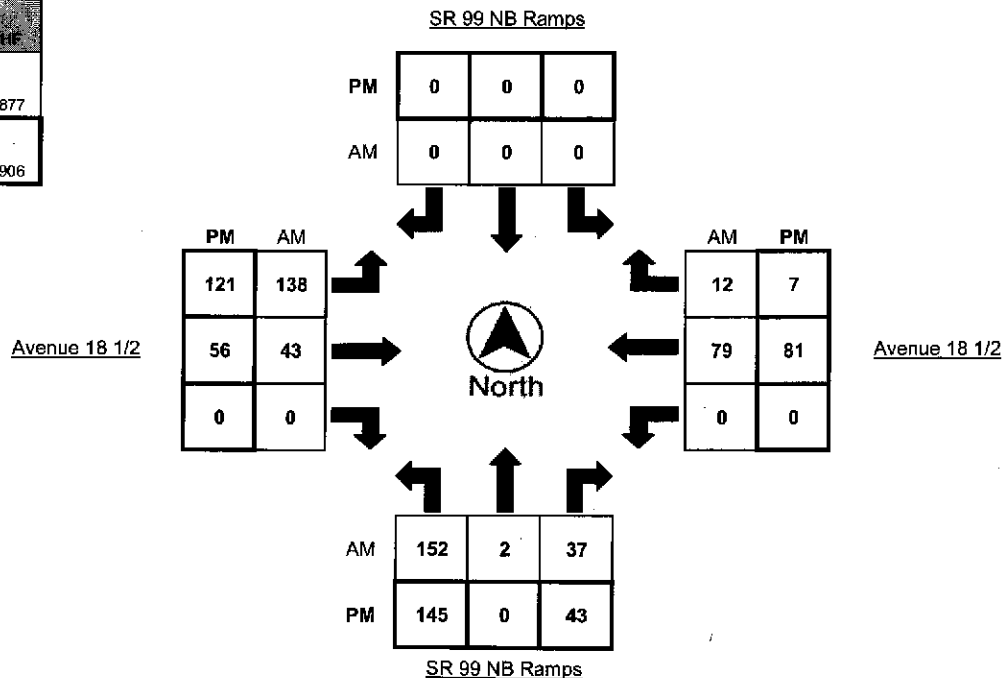
LATITUDE 37° 1'5.50"N
 LONGITUDE 120° 7'40.82"W
 WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	31	1	13	X	0	0	0	X	30	5	0	X	0	19	4	X
7:15 AM - 7:30 AM	32	1	4	X	0	0	0	X	22	2	0	X	0	18	3	X
7:30 AM - 7:45 AM	36	2	6	X	0	0	0	X	32	11	0	X	0	18	3	X
7:45 AM - 8:00 AM	50	0	13	X	0	0	0	X	29	11	0	X	0	25	2	X
8:00 AM - 8:15 AM	40	0	9	X	0	0	0	X	35	13	0	X	0	25	3	X
8:15 AM - 8:30 AM	26	0	9	X	0	0	0	X	42	6	0	X	0	11	4	X
8:30 AM - 8:45 AM	32	0	7	X	0	0	0	X	17	12	0	X	0	15	3	X
8:45 AM - 9:00 AM	35	0	8	X	0	0	0	X	21	7	0	X	0	15	1	X
TOTAL	282	4	69	X	0	0	0	X	228	69	0	X	0	146	23	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	38	0	9	X	0	0	0	X	34	11	0	X	0	19	0	X
4:15 PM - 4:30 PM	41	2	5	X	0	0	0	X	28	8	0	X	0	15	2	X
4:30 PM - 4:45 PM	41	0	11	X	0	0	0	X	19	19	0	X	0	31	3	X
4:45 PM - 5:00 PM	31	0	8	X	0	0	0	X	32	12	0	X	0	18	3	X
5:00 PM - 5:15 PM	32	0	12	X	0	0	0	X	32	10	0	X	0	13	1	X
5:15 PM - 5:30 PM	41	0	12	X	0	0	0	X	38	15	0	X	0	19	0	X
5:30 PM - 5:45 PM	39	0	5	X	0	0	0	X	27	15	0	X	0	12	2	X
5:45 PM - 6:00 PM	28	0	9	X	0	0	0	X	28	8	0	X	0	17	1	X
TOTAL	291	2	71	X	0	0	0	X	238	98	0	X	0	144	12	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	152	2	37	X	0	0	0	X	138	43	0	X	0	79	12	X
4:30 PM - 5:30 PM	145	0	43	X	0	0	0	X	121	56	0	X	0	81	7	X

	PHF
AM	0.877
PM	0.906





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 18 1/2 @ Pistachio
COUNTY Madera
COLLECTION DATE 6/24/2008

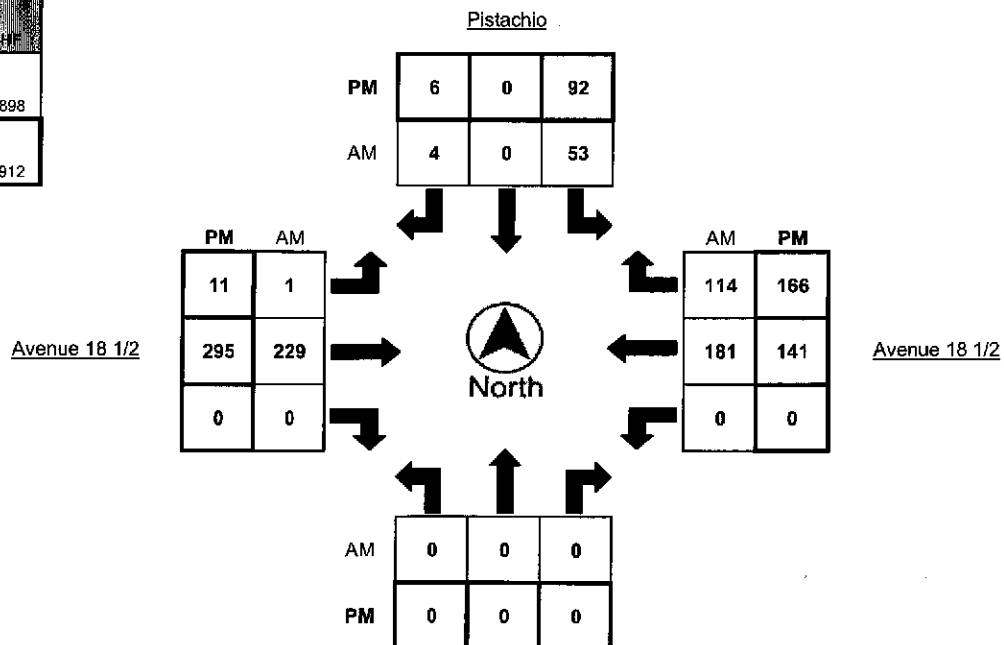
LATITUDE 37° 15.71'N
LONGITUDE 120° 7'55.78"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	7	0	1	X	0	43	0	X	0	40	21	X
7:15 AM - 7:30 AM	0	0	0	X	7	0	2	X	0	37	0	X	0	41	18	X
7:30 AM - 7:45 AM	0	0	0	X	10	0	1	X	0	65	0	X	0	45	41	X
7:45 AM - 8:00 AM	0	0	0	X	18	0	0	X	1	55	0	X	0	60	27	X
8:00 AM - 8:15 AM	0	0	0	X	15	0	1	X	0	49	0	X	0	43	26	X
8:15 AM - 8:30 AM	0	0	0	X	10	0	2	X	0	60	0	X	0	33	20	X
8:30 AM - 8:45 AM	0	0	0	X	14	0	1	X	1	48	0	X	0	37	29	X
8:45 AM - 9:00 AM	0	0	0	X	11	0	1	X	2	39	0	X	0	36	20	X
TOTAL	0	0	0	X	92	0	9	X	4	396	0	X	0	335	202	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 PM	0	0	0	X	26	0	1	X	1	69	0	X	0	35	40	X
9:15 PM - 9:30 PM	0	0	0	X	17	0	1	X	3	61	0	X	0	34	44	X
9:30 PM - 9:45 PM	0	0	0	X	21	0	2	X	4	81	0	X	0	36	49	X
9:45 PM - 10:00 PM	0	0	0	X	28	0	2	X	3	84	0	X	0	34	33	X
10:00 PM - 10:15 PM	0	0	0	X	20	0	4	X	0	46	0	X	0	34	43	X
10:15 PM - 10:30 PM	0	0	0	X	27	0	1	X	0	49	0	X	0	48	33	X
10:30 PM - 10:45 PM	0	0	0	X	31	0	3	X	3	54	0	X	0	39	40	X
10:45 PM - 11:00 PM	0	0	0	X	17	0	2	X	0	54	0	X	0	38	35	X
TOTAL	0	0	0	X	187	0	16	X	14	498	0	X	0	300	317	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 9:00 AM	0	0	0	X	53	0	4	X	1	229	0	X	0	181	114	X
7:00 PM - 9:00 PM	0	0	0	X	92	0	6	X	11	295	0	X	0	141	166	X

Time	PHI
AM	0.898
PM	0.912





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Turning Movement Report

Prepared For: **Ruth Davis**
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248
 903-566-3150

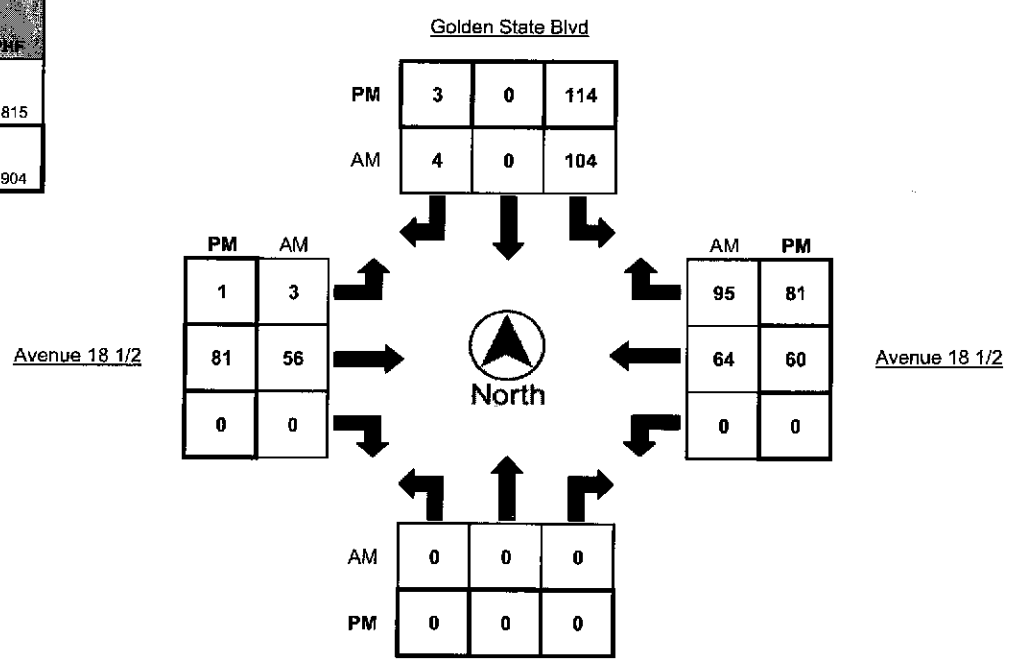
LOCATION Avenue 18 1/2 @ Golden State Blvd **LATITUDE** 37° 1'5.65"N
COUNTY Madera **LONGITUDE** 120° 8'4.27"W
COLLECTION DATE 6/24/2008 **WEATHER** Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	16	0	0	X	0	5	0	X	0	10	30	X
7:15 AM - 7:30 AM	0	0	0	X	16	0	1	X	0	15	0	X	0	19	22	X
7:30 AM - 7:45 AM	0	0	0	X	31	0	2	X	0	13	0	X	0	17	22	X
7:45 AM - 8:00 AM	0	0	0	X	20	0	1	X	2	24	0	X	0	20	33	X
8:00 AM - 8:15 AM	0	0	0	X	22	0	1	X	1	9	0	X	0	10	24	X
8:15 AM - 8:30 AM	0	0	0	X	31	0	0	X	0	10	0	X	0	17	16	X
8:30 AM - 8:45 AM	0	0	0	X	25	0	0	X	2	9	0	X	0	8	30	X
8:45 AM - 9:00 AM	0	0	0	X	21	0	0	X	1	14	0	X	0	9	24	X
TOTAL	0	0	0	X	182	0	5	X	6	99	0	X	0	110	201	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	28	0	0	X	0	16	0	X	0	11	22	X
4:15 PM - 4:30 PM	0	0	0	X	24	0	2	X	0	15	0	X	0	14	22	X
4:30 PM - 4:45 PM	0	0	0	X	32	0	0	X	1	22	0	X	0	15	22	X
4:45 PM - 5:00 PM	0	0	0	X	30	0	1	X	0	28	0	X	0	20	15	X
5:00 PM - 5:15 PM	0	0	0	X	21	0	1	X	1	13	0	X	0	16	20	X
5:15 PM - 5:30 PM	0	0	0	X	21	0	0	X	0	13	0	X	0	21	25	X
5:30 PM - 5:45 PM	0	0	0	X	24	0	1	X	0	15	0	X	0	14	24	X
5:45 PM - 6:00 PM	0	0	0	X	24	0	0	X	0	11	0	X	0	11	17	X
TOTAL	0	0	0	X	204	0	5	X	2	133	0	X	0	122	167	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	0	0	0	X	104	0	4	X	3	56	0	X	0	64	95	X
4:00 PM - 5:00 PM	0	0	0	X	114	0	3	X	1	81	0	X	0	60	81	X

	PMF
AM	0.815
PM	0.904





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 17 @ SR 99 SB Off-ramp
COUNTY Madera
COLLECTION DATE 6/24/2008

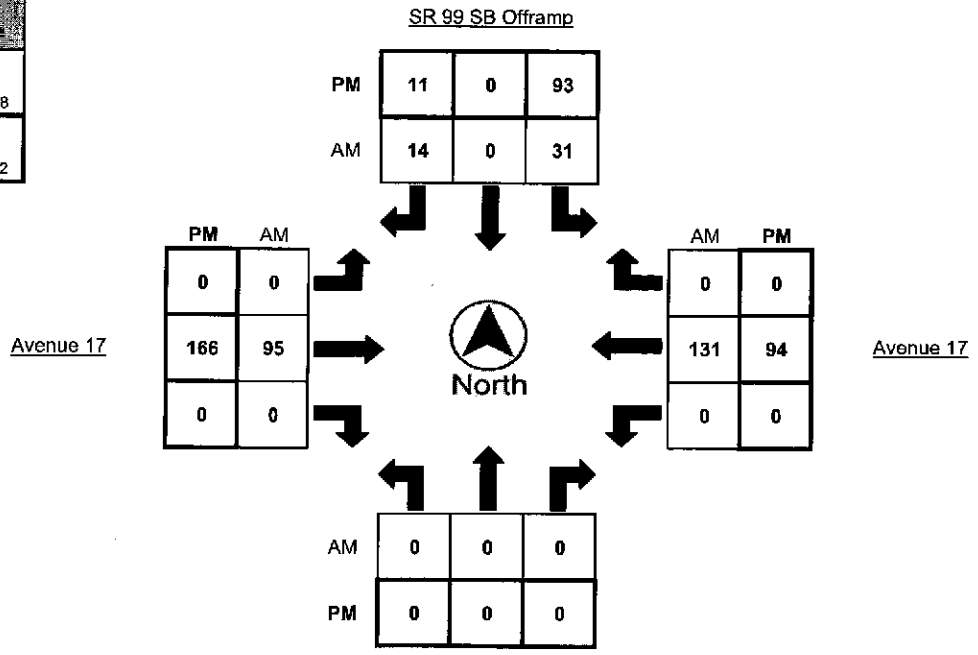
LATITUDE 36°59'47.12"N
LONGITUDE 120° 8'16.72"W
WEATHER Sunny and Clear

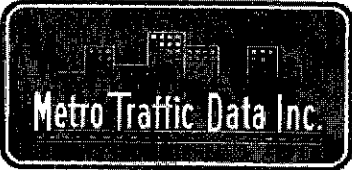
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	8	0	3	X	0	13	0	X	0	29	0	X
7:15 AM - 7:30 AM	0	0	0	X	6	0	3	X	0	16	0	X	0	35	0	X
7:30 AM - 7:45 AM	0	0	0	X	4	0	0	X	0	20	0	X	0	19	0	X
7:45 AM - 8:00 AM	0	0	0	X	11	0	2	X	0	25	0	X	0	55	0	X
8:00 AM - 8:15 AM	0	0	0	X	9	0	4	X	0	27	0	X	0	33	0	X
8:15 AM - 8:30 AM	0	0	0	X	4	0	8	X	0	22	0	X	0	20	0	X
8:30 AM - 8:45 AM	0	0	0	X	7	0	0	X	0	21	0	X	0	23	0	X
8:45 AM - 9:00 AM	0	0	0	X	5	0	0	X	0	28	0	X	0	40	0	X
TOTAL	0	0	0	X	54	0	20	X	0	172	0	X	0	254	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	27	0	2	X	0	49	0	X	0	16	0	X
4:15 PM - 4:30 PM	0	0	0	X	22	0	2	X	0	53	0	X	0	14	0	X
4:30 PM - 4:45 PM	0	0	0	X	27	0	4	X	0	40	0	X	0	16	0	X
4:45 PM - 5:00 PM	0	0	0	X	25	0	2	X	0	29	0	X	0	28	0	X
5:00 PM - 5:15 PM	0	0	0	X	19	0	3	X	0	44	0	X	0	38	0	X
5:15 PM - 5:30 PM	0	0	0	X	22	0	3	X	0	27	0	X	0	12	0	X
5:30 PM - 5:45 PM	0	0	0	X	23	0	0	X	0	18	0	X	0	27	0	X
5:45 PM - 6:00 PM	0	0	0	X	12	0	1	X	0	23	0	X	0	18	0	X
TOTAL	0	0	0	X	177	0	17	X	0	283	0	X	0	167	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:45 AM - 9:15 AM	0	0	0	X	31	0	14	X	0	95	0	X	0	131	0	X
4:15 PM - 5:15 PM	0	0	0	X	93	0	11	X	0	166	0	X	0	94	0	X

Time	PHI
AM	0.728
PM	0.892





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 17 @ SR 99 NB Ramps
COUNTY Madera
COLLECTION DATE 6/24/2008

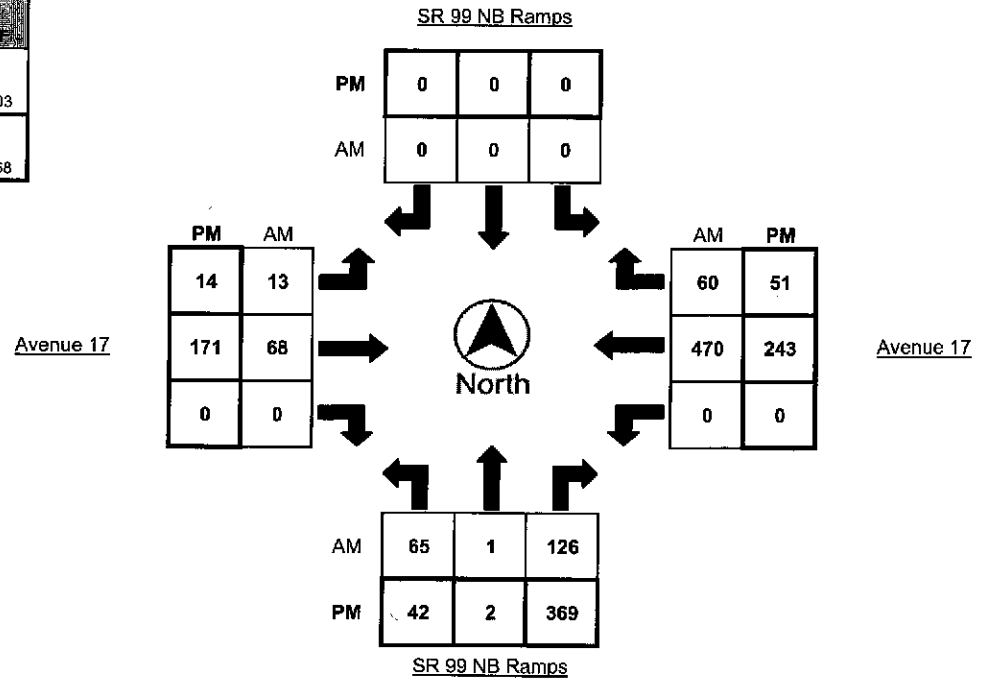
LATITUDE 36°59'47.00"N
LONGITUDE 120° 6'4.62"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
2:00 AM - 2:15 AM	16	0	14	X	0	0	0	X	4	10	0	X	0	77	18	X
2:15 AM - 2:30 AM	14	1	22	X	0	0	0	X	3	11	0	X	0	108	19	X
2:30 AM - 2:45 AM	11	0	24	X	0	0	0	X	3	7	0	X	0	118	12	X
2:45 AM - 3:00 AM	18	0	41	X	0	0	0	X	2	21	0	X	0	148	20	X
3:00 AM - 3:15 AM	22	0	39	X	0	0	0	X	5	29	0	X	0	96	9	X
3:15 AM - 3:30 AM	11	0	33	X	0	0	0	X	1	16	0	X	0	65	15	X
3:30 AM - 3:45 AM	9	0	20	X	0	0	0	X	2	11	0	X	0	53	11	X
3:45 AM - 4:00 AM	32	2	16	X	0	0	0	X	4	21	0	X	0	49	5	X
TOTAL	133	3	209	X	0	0	0	X	24	126	0	X	0	714	109	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	15	0	81	X	0	0	0	X	4	44	0	X	0	53	4	X
4:15 PM - 4:30 PM	7	0	91	X	0	0	0	X	4	61	0	X	0	46	6	X
4:30 PM - 4:45 PM	5	0	80	X	0	0	0	X	3	44	0	X	0	69	15	X
4:45 PM - 5:00 PM	14	0	80	X	0	0	0	X	0	43	0	X	0	51	6	X
5:00 PM - 5:15 PM	12	0	103	X	0	0	0	X	6	48	0	X	0	75	13	X
5:15 PM - 5:30 PM	11	2	106	X	0	0	0	X	5	36	0	X	0	48	17	X
5:30 PM - 5:45 PM	9	0	78	X	0	0	0	X	2	29	0	X	0	76	16	X
5:45 PM - 6:00 PM	15	1	67	X	0	0	0	X	3	32	0	X	0	59	13	X
TOTAL	88	3	686	X	0	0	0	X	27	337	0	X	0	477	90	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	65	1	126	X	0	0	0	X	13	68	0	X	0	470	60	X
4:30 PM - 5:30 PM	42	2	369	X	0	0	0	X	14	171	0	X	0	243	51	X

Time	PM
AM	0.803
PM	0.868





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 12 @ 99 SB Ramps / Golden State

LATITUDE 36°55'28.22"N

COUNTY Madera

LONGITUDE 120° 1'27.65"W

COLLECTION DATE 6/25/2008

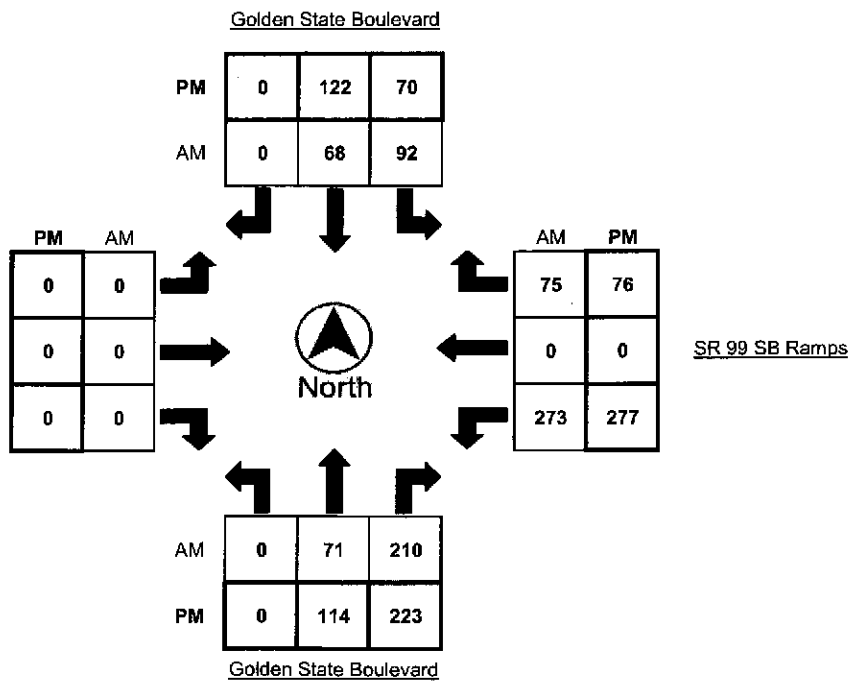
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	18	44	X	22	15	0	X	0	0	0	X	40	0	14	X
7:15 AM - 7:30 AM	0	21	60	X	30	16	0	X	0	0	0	X	64	0	24	X
7:30 AM - 7:45 AM	0	13	53	X	17	19	0	X	0	0	0	X	94	0	15	X
7:45 AM - 8:00 AM	0	19	53	X	23	18	0	X	0	0	0	X	75	0	22	X
8:00 AM - 8:15 AM	0	13	29	X	20	20	0	X	0	0	0	X	43	0	13	X
8:15 AM - 8:30 AM	0	12	30	X	16	10	0	X	0	0	0	X	60	0	17	X
8:30 AM - 8:45 AM	0	15	39	X	14	19	0	X	0	0	0	X	56	0	18	X
8:45 AM - 9:00 AM	0	21	29	X	19	19	0	X	0	0	0	X	64	0	17	X
TOTAL	0	132	337	x	161	136	0	x	0	0	0	x	496	0	140	x

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	24	47	X	19	25	0	X	0	0	0	X	61	0	30	X
4:15 PM - 4:30 PM	0	32	57	X	21	29	0	X	0	0	0	X	68	0	18	X
4:30 PM - 4:45 PM	0	29	58	X	19	23	0	X	0	0	0	X	59	0	22	X
4:45 PM - 5:00 PM	0	29	50	X	16	36	0	X	0	0	0	X	71	0	23	X
5:00 PM - 5:15 PM	0	24	58	X	14	34	0	X	0	0	0	X	79	0	13	X
5:15 PM - 5:30 PM	0	20	51	X	21	22	0	X	0	0	0	X	70	0	28	X
5:30 PM - 5:45 PM	0	25	48	X	18	26	0	X	0	0	0	X	51	0	16	X
5:45 PM - 6:00 PM	0	22	36	X	18	20	0	X	0	0	0	X	31	0	20	X
TOTAL	0	205	405	x	146	215	0	x	0	0	0	x	490	0	170	x

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 8:00 AM	0	71	210	x	92	68	0	x	0	0	0	x	273	0	75	x
4:15 PM - 5:15 PM	0	114	223	x	70	122	0	x	0	0	0	x	277	0	76	x

PHF
0.917
0.980





Metro Traffic Data Inc.
 310 N. Irwin Street - Suite 20
 Hanford, CA 93230
 800-975-6938 Phone/Fax
 www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

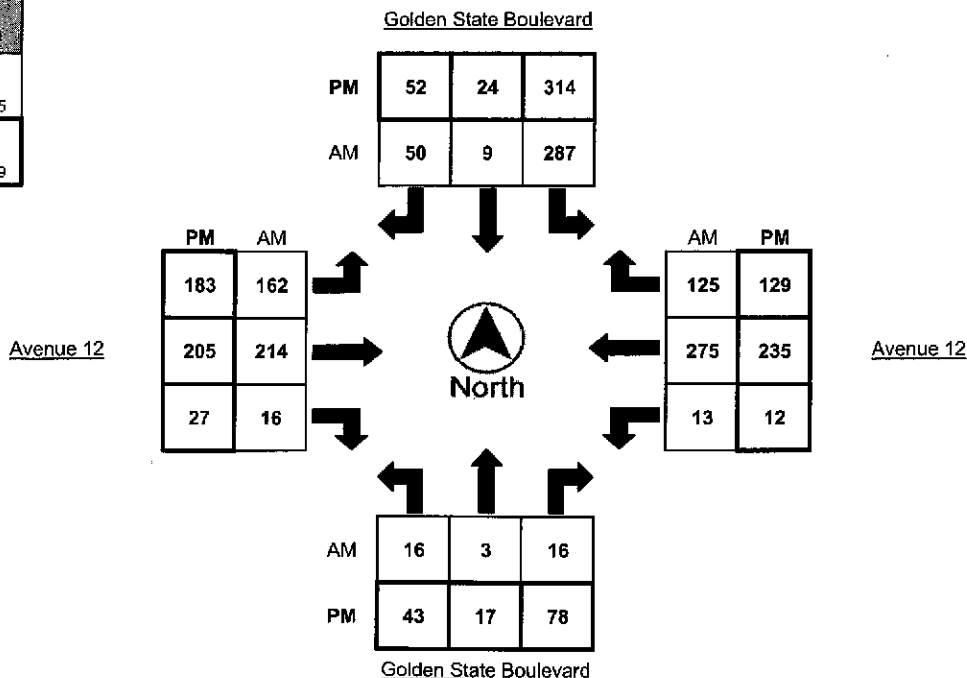
LOCATION Avenue 12 @ Golden State Blvd **LATITUDE** 36°55'24.70"N
COUNTY Madera **LONGITUDE** 120° 1'26.40"W
COLLECTION DATE 6/25/2008 **WEATHER** Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	6	0	2	X	48	1	6	X	36	40	3	X	1	59	31	X
7:15 AM - 7:30 AM	0	0	3	X	67	1	10	X	42	40	4	X	6	85	37	X
7:30 AM - 7:45 AM	5	2	6	X	91	0	15	X	47	59	5	X	3	63	23	X
7:45 AM - 8:00 AM	5	1	5	X	81	7	19	X	37	75	4	X	3	68	34	X
8:00 AM - 8:15 AM	3	0	5	X	49	2	13	X	30	29	8	X	1	42	18	X
8:15 AM - 8:30 AM	4	1	5	X	55	7	10	X	28	32	0	X	1	52	16	X
8:30 AM - 8:45 AM	3	4	9	X	53	1	17	X	31	36	2	X	4	45	21	X
8:45 AM - 9:00 AM	2	0	10	X	60	2	25	X	21	47	1	X	2	50	28	X
TOTAL	28	8	45	X	504	21	115	X	272	358	27	X	21	464	208	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	7	1	8	X	70	5	11	X	36	50	10	X	4	69	39	X
4:15 PM - 4:30 PM	5	5	8	X	74	10	12	X	48	52	7	X	4	55	36	X
4:30 PM - 4:45 PM	4	2	8	X	67	2	10	X	53	49	7	X	3	53	30	X
4:45 PM - 5:00 PM	27	7	51	X	85	4	12	X	37	56	7	X	4	61	24	X
5:00 PM - 5:15 PM	7	3	11	X	88	8	18	X	45	48	6	X	1	66	39	X
5:15 PM - 5:30 PM	1	0	9	X	85	0	13	X	38	53	2	X	1	58	32	X
5:30 PM - 5:45 PM	3	2	7	X	63	4	10	X	44	39	2	X	1	75	33	X
5:45 PM - 6:00 PM	1	2	5	X	46	0	11	X	31	31	3	X	0	54	23	X
TOTAL	55	22	107	X	578	33	97	X	332	378	44	X	18	491	256	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:00 AM	16	3	16	X	287	9	50	X	162	214	16	X	13	275	125	X
4:15 PM - 5:15 PM	43	17	78	X	314	24	52	X	183	205	27	X	12	235	129	X

	PHP
AM	0.875
PM	0.879





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 12 @ SR 99 NB Ramps
COUNTY Madera
COLLECTION DATE 6/25/2008

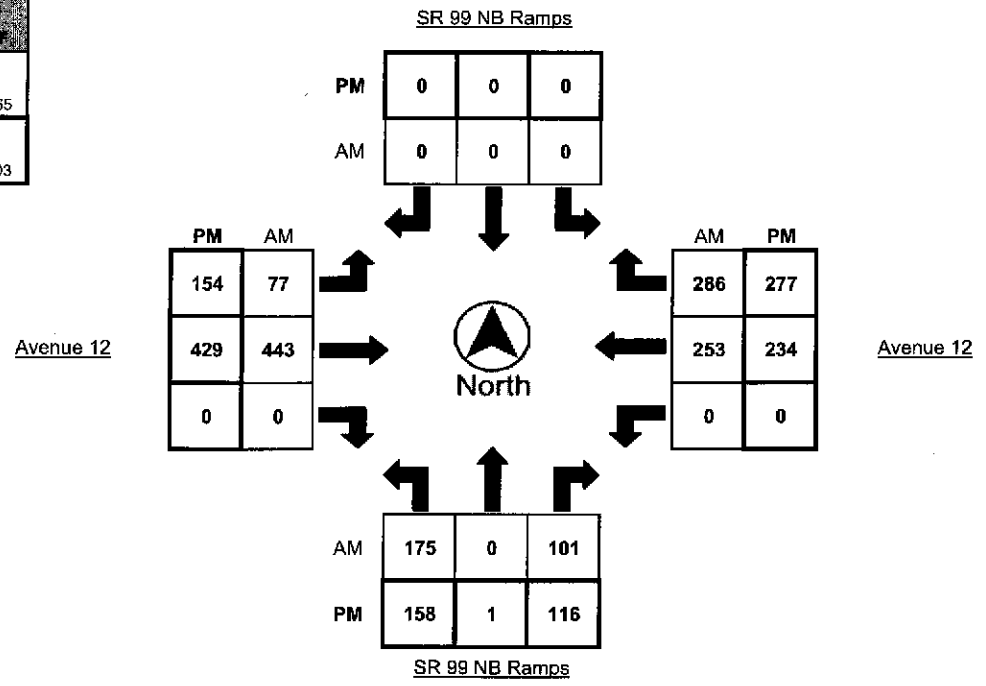
LATITUDE 36°55'24.61"N
LONGITUDE 120° 1'15.79"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	51	0	16	X	0	0	0	X	18	69	0	X	0	50	46	X
7:15 AM - 7:30 AM	54	0	25	X	0	0	0	X	17	93	0	X	0	77	67	X
7:30 AM - 7:45 AM	31	0	30	X	0	0	0	X	22	138	0	X	0	65	100	X
7:45 AM - 8:00 AM	39	0	30	X	0	0	0	X	20	143	0	X	0	61	73	X
8:00 AM - 8:15 AM	32	0	19	X	0	0	0	X	15	65	0	X	0	30	69	X
8:15 AM - 8:30 AM	34	0	17	X	0	0	0	X	14	70	0	X	0	34	68	X
8:30 AM - 8:45 AM	21	0	18	X	0	0	0	X	21	74	0	X	0	45	61	X
8:45 AM - 9:00 AM	35	0	7	X	0	0	0	X	17	90	0	X	0	50	49	X
TOTAL	297	0	162	X	0	0	0	X	144	742	0	X	0	412	533	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 PM	38	1	27	X	0	0	0	X	29	96	0	X	0	75	87	X
9:15 PM - 9:30 PM	46	0	29	X	0	0	0	X	35	101	0	X	0	49	74	X
9:30 PM - 9:45 PM	47	0	22	X	0	0	0	X	30	101	0	X	0	45	58	X
9:45 PM - 10:00 PM	27	0	38	X	0	0	0	X	60	131	0	X	0	65	58	X
10:00 PM - 10:15 PM	43	0	31	X	0	0	0	X	34	120	0	X	0	59	49	X
10:15 PM - 10:30 PM	44	0	35	X	0	0	0	X	32	116	0	X	0	51	48	X
10:30 PM - 10:45 PM	53	0	31	X	0	0	0	X	27	82	0	X	0	59	59	X
10:45 PM - 11:00 PM	46	0	21	X	0	0	0	X	16	66	0	X	0	35	48	X
TOTAL	344	1	234	X	0	0	0	X	263	813	0	X	0	438	481	X

PER HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 9:00 AM	175	0	101	X	0	0	0	X	77	443	0	X	0	253	286	X
9:00 PM - 11:00 PM	158	1	116	X	0	0	0	X	154	429	0	X	0	234	277	X

PHP
0.865
0.903





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 18 @ Road 23
COUNTY Madera
COLLECTION DATE 6/24/2008

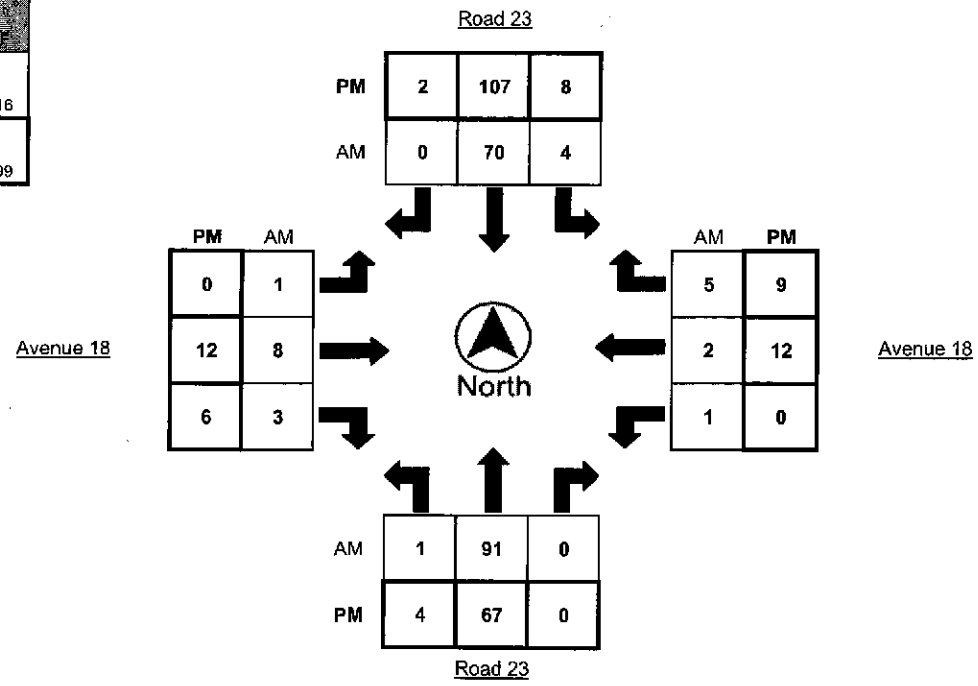
LATITUDE 37° 0'39.14"N
LONGITUDE 120° 7'43.47"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	1	12	0	X	1	12	0	X	1	2	1	X	0	2	1	X
7:15 AM - 7:30 AM	0	17	0	X	0	8	0	X	0	1	1	X	0	0	1	X
7:30 AM - 7:45 AM	0	29	0	X	2	18	0	X	0	5	2	X	1	0	0	X
7:45 AM - 8:00 AM	1	30	0	X	0	18	0	X	0	2	0	X	0	1	2	X
8:00 AM - 8:15 AM	0	19	0	X	1	18	0	X	1	1	1	X	0	1	2	X
8:15 AM - 8:30 AM	0	13	0	X	1	16	0	X	0	0	0	X	0	0	1	X
8:30 AM - 8:45 AM	2	16	0	X	1	15	0	X	0	1	1	X	0	1	3	X
8:45 AM - 9:00 AM	2	7	1	X	2	16	1	X	1	0	0	X	0	2	0	X
TOTAL	6	143	1	X	8	121	1	X	3	12	6	X	1	7	10	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 PM - 9:15 PM	2	16	0	X	4	29	1	X	0	0	0	X	0	1	2	X
9:15 PM - 9:30 PM	2	11	0	X	3	31	0	X	0	4	1	X	0	0	0	X
9:30 PM - 9:45 PM	0	17	0	X	0	21	1	X	0	5	1	X	0	0	1	X
9:45 PM - 10:00 PM	1	10	0	X	3	35	1	X	0	2	2	X	0	0	4	X
10:00 PM - 10:15 PM	1	29	0	X	2	20	0	X	0	1	2	X	0	12	4	X
10:15 PM - 10:30 PM	0	23	0	X	1	18	0	X	1	1	0	X	0	4	1	X
10:30 PM - 10:45 PM	5	13	0	X	0	14	0	X	0	0	3	X	0	3	2	X
10:45 PM - 11:00 PM	0	10	0	X	0	19	0	X	6	1	3	X	0	2	1	X
TOTAL	11	129	0	X	13	187	3	X	7	14	12	X	0	22	15	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	1	91	0	X	4	70	0	X	1	8	3	X	1	2	5	X
4:15 PM - 5:15 PM	4	67	0	X	8	107	2	X	0	12	6	X	0	12	9	X

	PHF
AM	0.816
PM	0.799





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 17 @ Road 23
COUNTY Madera
COLLECTION DATE 6/24/2008

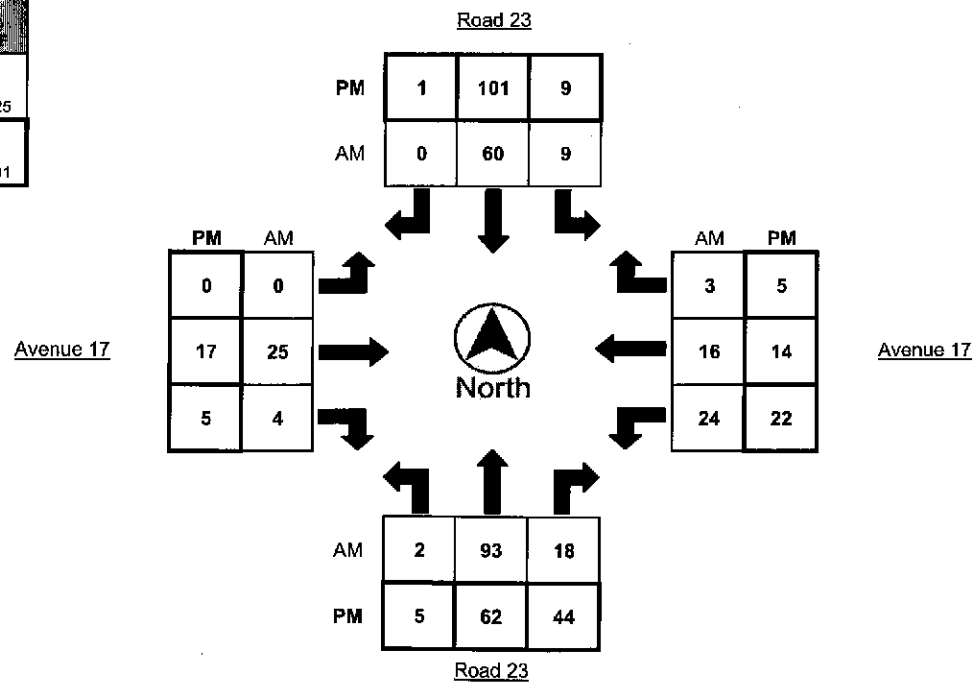
LATITUDE 36°59'46.84"N
LONGITUDE 120°7'42.99"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	1	14	4	X	1	11	0	X	0	1	0	X	3	3	2	X
7:15 AM - 7:30 AM	0	18	5	X	0	7	0	X	0	7	0	X	6	3	0	X
7:30 AM - 7:45 AM	0	27	1	X	3	19	0	X	0	3	2	X	2	2	1	X
7:45 AM - 8:00 AM	1	30	6	X	3	15	0	X	0	4	1	X	13	3	1	X
8:00 AM - 8:15 AM	1	18	6	X	3	19	0	X	0	11	1	X	3	8	1	X
8:15 AM - 8:30 AM	2	11	3	X	0	13	0	X	1	3	1	X	2	1	1	X
8:30 AM - 8:45 AM	1	19	7	X	4	11	0	X	0	2	2	X	1	2	0	X
8:45 AM - 9:00 AM	0	6	4	X	1	16	0	X	0	2	1	X	6	2	4	X
TOTAL	6	143	36	X	15	111	0	X	1	33	8	X	36	24	10	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 PM	2	24	6	X	2	24	0	X	0	5	1	X	2	4	0	X
9:15 AM - 9:30 PM	1	10	21	X	1	31	0	X	0	6	3	X	3	2	2	X
9:30 AM - 9:45 PM	1	17	8	X	3	19	0	X	0	6	0	X	4	1	1	X
9:45 AM - 10:00 PM	1	11	7	X	4	29	1	X	0	3	0	X	9	2	0	X
10:00 AM - 10:15 PM	2	24	8	X	1	22	0	X	0	2	2	X	6	9	2	X
10:15 AM - 10:30 PM	1	22	11	X	2	13	0	X	1	0	2	X	3	3	0	X
10:30 AM - 10:45 PM	1	16	4	X	1	19	0	X	0	5	0	X	2	3	3	X
10:45 AM - 11:00 PM	2	9	6	X	4	15	0	X	0	3	0	X	8	2	0	X
TOTAL	11	133	71	X	18	172	1	X	1	30	8	X	37	26	8	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:45 AM - 8:15 AM	2	93	18	X	9	60	0	X	0	25	4	X	24	16	3	X
3:15 PM - 5:15 PM	5	62	44	X	9	101	1	X	0	17	5	X	22	14	5	X

PHF
0.825
0.891





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 17 @ Airport Road / Golden State
COUNTY Madera
COLLECTION DATE 6/24/2008

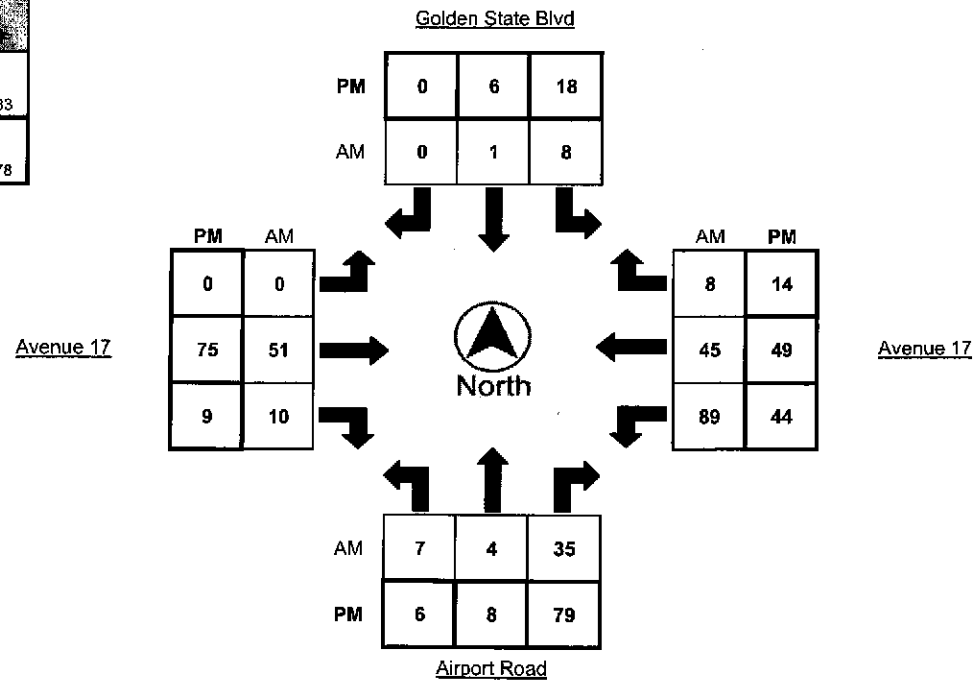
LATITUDE 36°59'47.02"N
LONGITUDE 120° 6'22.48"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	1	2	5	X	3	1	0	X	0	5	3	X	19	12	2	X
7:15 AM - 7:30 AM	1	1	1	X	2	0	0	X	0	11	3	X	19	17	4	X
7:30 AM - 7:45 AM	1	0	9	X	9	1	0	X	0	2	1	X	7	9	1	X
7:45 AM - 8:00 AM	1	1	11	X	3	0	0	X	0	11	4	X	34	20	3	X
8:00 AM - 8:15 AM	1	0	6	X	1	0	0	X	0	19	2	X	21	14	3	X
8:15 AM - 8:30 AM	3	0	11	X	2	0	0	X	0	9	1	X	20	5	1	X
8:30 AM - 8:45 AM	2	3	7	X	2	1	0	X	0	12	3	X	14	6	1	X
8:45 AM - 9:00 AM	1	1	17	X	4	1	0	X	1	10	2	X	22	14	2	X
TOTAL	11	8	67	X	26	4	0	X	1	79	19	X	156	97	17	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 AM	0	0	35	X	2	3	0	X	0	12	2	X	4	12	1	X
9:15 AM - 9:30 PM	0	1	24	X	6	2	0	X	0	25	3	X	8	8	0	X
9:30 PM - 9:45 PM	1	3	13	X	9	0	0	X	0	18	2	X	10	10	0	X
9:45 PM - 10:00 PM	3	0	12	X	3	2	0	X	0	14	3	X	13	12	4	X
10:00 PM - 10:15 PM	2	4	30	X	0	2	0	X	0	18	1	X	13	19	10	X
10:15 PM - 10:30 PM	1	2	10	X	3	1	0	X	0	14	1	X	5	7	3	X
10:30 PM - 10:45 PM	1	0	9	X	1	0	0	X	1	8	1	X	8	12	4	X
10:45 PM - 11:00 PM	1	2	6	X	1	0	0	X	0	16	0	X	7	9	3	X
TOTAL	9	12	139	X	25	10	0	X	1	125	13	X	68	89	25	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:45 AM - 8:15 AM	7	4	35	X	8	1	0	X	0	51	10	X	89	45	8	X
1:15 PM - 1:45 PM	6	8	79	X	18	6	0	X	0	75	9	X	44	49	14	X

	PHE
	0.733
	0.778





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-586-3150

LOCATION Ellis Street @ Road 26
COUNTY Madera
COLLECTION DATE 6/26/2008

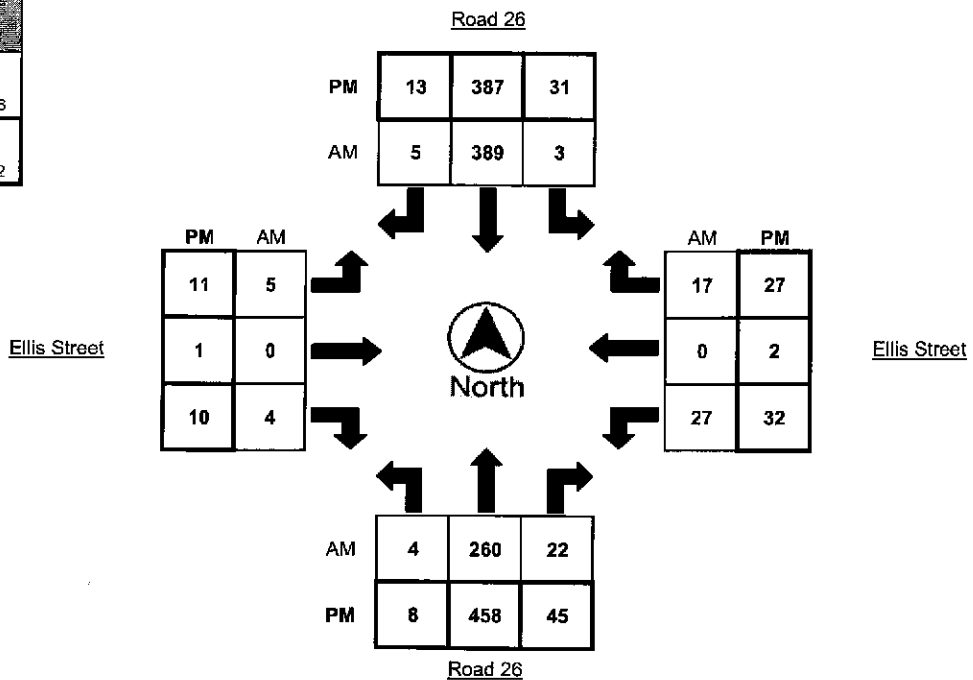
LATITUDE 36°59'12.66"N
LONGITUDE 120° 4'27.27"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	1	36	6	X	1	57	1	X	0	1	1	X	8	0	2	X
7:15 AM - 7:30 AM	0	39	7	X	1	83	1	X	0	1	0	X	7	0	1	X
7:30 AM - 7:45 AM	0	46	2	X	0	104	1	X	0	0	1	X	7	0	1	X
7:45 AM - 8:00 AM	1	77	7	X	2	128	0	X	1	0	1	X	7	0	10	X
8:00 AM - 8:15 AM	2	79	7	X	0	92	3	X	2	0	1	X	10	0	3	X
8:15 AM - 8:30 AM	1	58	6	X	1	65	1	X	2	0	1	X	3	0	3	X
8:30 AM - 8:45 AM	0	46	9	X	3	81	2	X	1	0	2	X	6	0	2	X
8:45 AM - 9:00 AM	3	43	8	X	2	77	0	X	1	0	1	X	1	0	4	X
TOTAL	8	424	52	X	10	687	9	X	7	2	8	X	49	0	26	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	2	124	9	X	7	103	3	X	3	0	2	X	9	0	4	X
4:15 PM - 4:30 PM	1	107	12	X	4	107	3	X	1	0	1	X	4	1	8	X
4:30 PM - 4:45 PM	0	112	7	X	7	97	2	X	2	1	2	X	3	2	6	X
4:45 PM - 5:00 PM	0	123	13	X	16	85	0	X	2	0	1	X	8	0	5	X
5:00 PM - 5:15 PM	3	123	9	X	9	104	2	X	3	0	1	X	11	0	10	X
5:15 PM - 5:30 PM	3	129	10	X	8	78	6	X	3	1	4	X	6	0	4	X
5:30 PM - 5:45 PM	1	106	12	X	6	88	3	X	2	0	1	X	6	0	7	X
5:45 PM - 6:00 PM	1	100	14	X	8	117	2	X	3	0	4	X	9	2	6	X
TOTAL	11	924	86	X	65	779	21	X	19	2	16	X	56	5	50	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	4	260	22	X	3	389	5	X	5	0	4	X	27	0	17	X
5:00 PM - 6:00 PM	8	458	45	X	31	387	13	X	11	1	10	X	32	2	27	X

	PHF
AM	0.786
PM	0.932





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Turning Movement Report

Prepared For:

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 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 15 1/2 @ Road 23
COUNTY Madera
COLLECTION DATE 6/24/2008

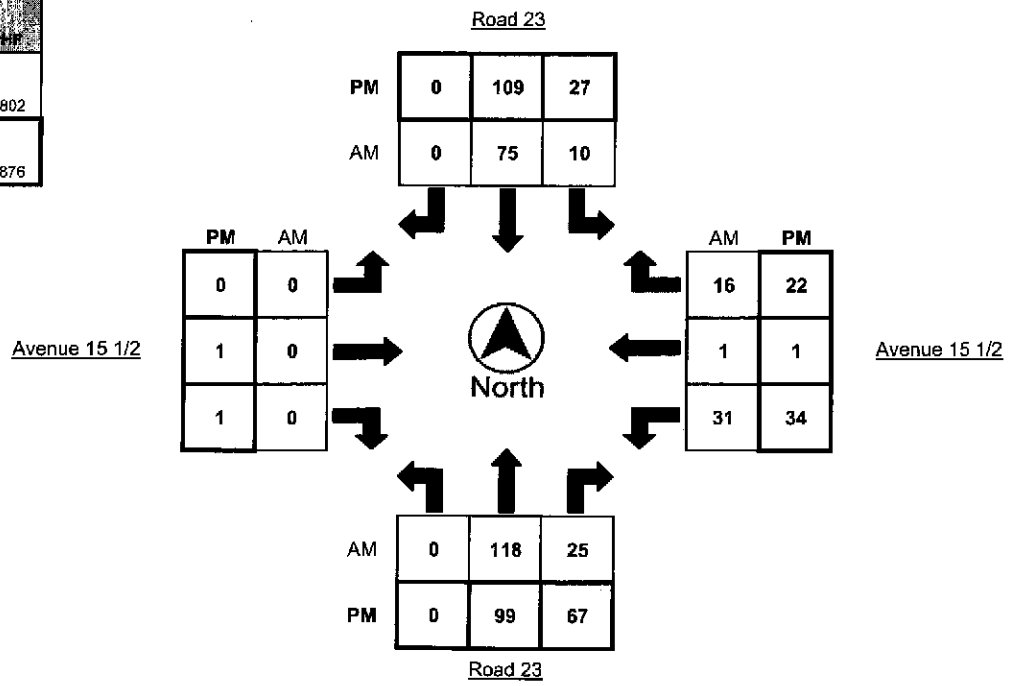
LATITUDE 36°58'28.34"N
LONGITUDE 120° 7'42.76"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	16	3	X	1	14	0	X	0	0	0	X	7	0	4	X
7:15 AM - 7:30 AM	0	23	7	X	2	11	0	X	0	0	0	X	5	1	3	X
7:30 AM - 7:45 AM	0	28	7	X	3	23	0	X	0	0	0	X	9	0	5	X
7:45 AM - 8:00 AM	0	43	5	X	1	22	0	X	0	0	0	X	10	0	5	X
8:00 AM - 8:15 AM	0	24	6	X	4	19	0	X	0	0	0	X	7	0	3	X
8:15 AM - 8:30 AM	0	12	8	X	6	16	0	X	0	0	0	X	3	0	6	X
8:30 AM - 8:45 AM	1	22	6	X	1	9	0	X	0	0	0	X	6	0	4	X
8:45 AM - 9:00 AM	0	12	3	X	5	20	0	X	0	0	0	X	2	0	2	X
TOTAL	1	180	45	X	23	134	0	X	0	0	0	X	49	1	32	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 PM	0	26	7	X	4	34	0	X	0	0	0	X	4	0	6	X
9:15 PM - 9:30 PM	0	25	29	X	7	30	0	X	0	0	0	X	8	1	3	X
9:30 PM - 9:45 PM	0	21	18	X	4	24	0	X	0	0	1	X	10	0	7	X
9:45 PM - 10:00 PM	0	24	6	X	9	27	0	X	0	1	0	X	12	0	5	X
10:00 PM - 10:15 PM	0	29	14	X	7	28	0	X	0	0	0	X	4	0	7	X
10:15 PM - 10:30 PM	0	32	10	X	8	18	0	X	0	0	0	X	10	0	5	X
10:30 PM - 10:45 PM	0	16	9	X	6	18	0	X	0	0	0	X	7	0	3	X
10:45 PM - 11:00 PM	0	13	13	X	3	20	0	X	0	0	0	X	7	0	6	X
TOTAL	0	185	106	X	48	199	0	X	0	1	1	X	62	1	42	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	0	118	25	X	10	75	0	X	0	0	0	X	31	1	16	X
4:15 PM - 5:15 PM	0	99	67	X	27	109	0	X	0	1	1	X	34	1	22	X

Time	PHF
AM	0.802
PM	0.876





Metro Traffic Data Inc.
 310 N. Irwin Street - Suite 20
 Hanford, CA 93230
 800-975-6938 Phone/Fax
 www.metrotrafficedata.com

Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 14 @ Road 23
COUNTY Madera
COLLECTION DATE 6/25/2008

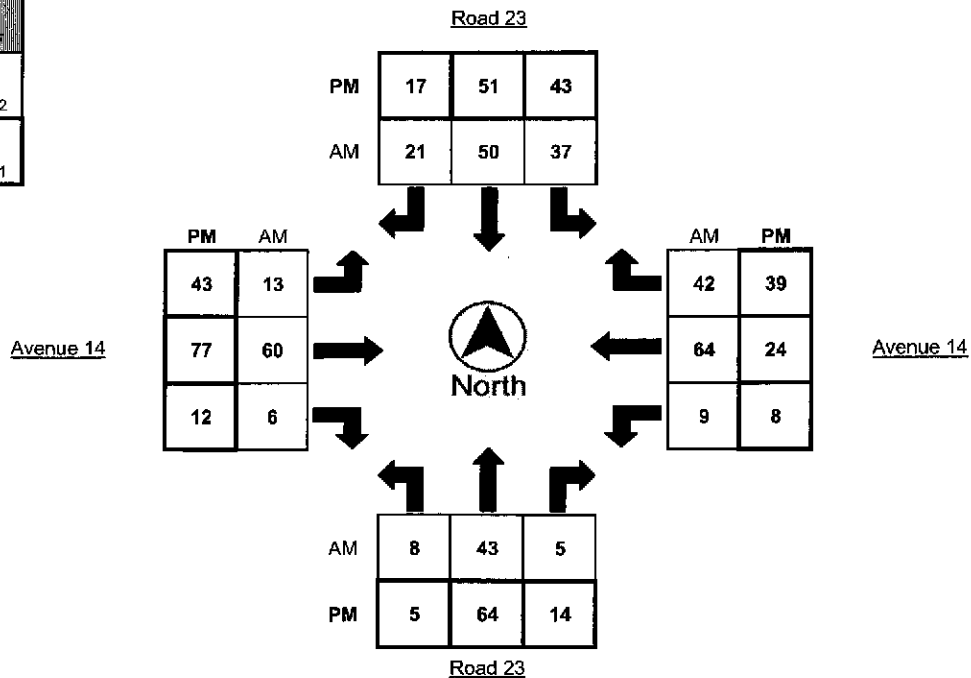
LATITUDE 36°57'10.05"N
LONGITUDE 120° 7'42.20"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	4	6	1	X	3	5	1	X	1	8	2	X	2	2	6	X
7:15 AM - 7:30 AM	1	13	3	X	3	13	5	X	1	11	1	X	4	12	8	X
7:30 AM - 7:45 AM	1	8	1	X	13	15	3	X	2	12	2	X	3	15	11	X
7:45 AM - 8:00 AM	1	12	1	X	12	12	6	X	6	22	2	X	2	24	16	X
8:00 AM - 8:15 AM	5	10	0	X	9	10	7	X	4	15	1	X	0	13	7	X
8:15 AM - 8:30 AM	1	8	6	X	8	8	1	X	5	5	2	X	2	7	14	X
8:30 AM - 8:45 AM	1	10	4	X	6	14	1	X	5	3	0	X	0	3	5	X
8:45 AM - 9:00 AM	3	11	3	X	8	8	3	X	5	1	3	X	1	6	10	X
TOTAL	17	78	19	X	62	85	27	X	29	77	13	X	14	82	77	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	18	5	X	14	10	3	X	13	17	2	X	2	12	9	X
4:15 PM - 4:30 PM	3	18	1	X	12	15	5	X	14	33	6	X	2	4	5	X
4:30 PM - 4:45 PM	1	16	3	X	9	14	4	X	8	11	1	X	1	3	17	X
4:45 PM - 5:00 PM	1	12	5	X	8	12	5	X	8	16	3	X	3	5	8	X
5:00 PM - 5:15 PM	1	10	0	X	8	12	6	X	7	19	0	X	2	6	11	X
5:15 PM - 5:30 PM	4	12	1	X	11	10	4	X	18	25	2	X	1	11	10	X
5:30 PM - 5:45 PM	1	8	3	X	7	8	2	X	12	6	2	X	6	4	5	X
5:45 PM - 6:00 PM	1	11	2	X	3	9	5	X	2	13	2	X	0	6	7	X
TOTAL	12	105	20	X	72	90	34	X	82	140	18	X	17	51	72	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	8	43	5	X	37	50	21	X	13	60	6	X	9	64	42	X
4:00 PM - 5:00 PM	5	64	14	X	43	51	17	X	43	77	12	X	8	24	39	X

	PHF
AM	0.772
PM	0.841





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

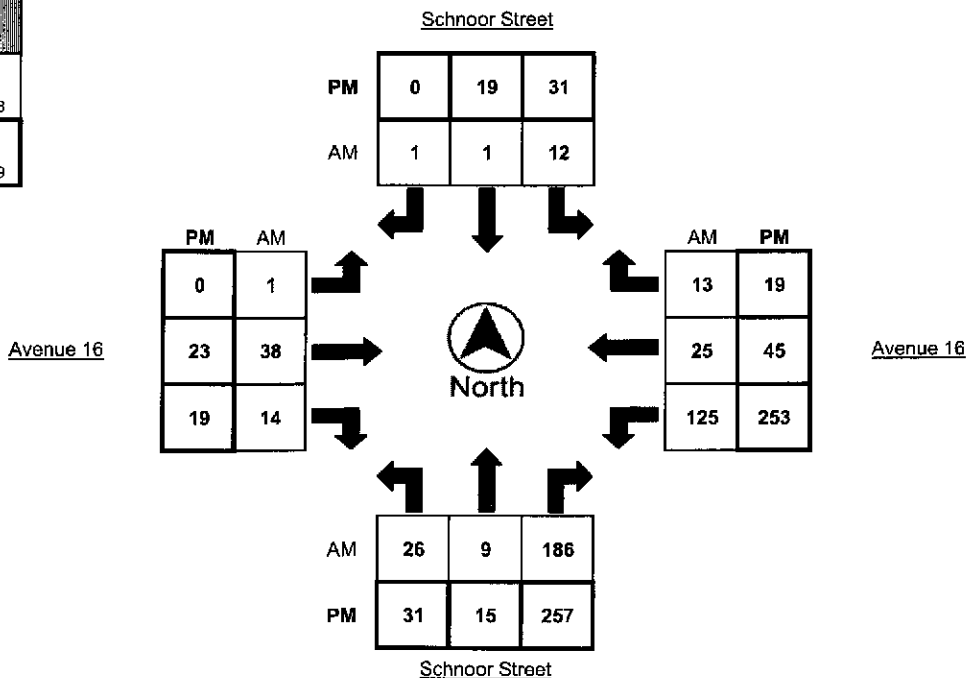
LOCATION Avenue 16 @ Schnoor Street **LATITUDE** 36°58'54.28"N
COUNTY Madera **LONGITUDE** 120° 5'15.68"W
COLLECTION DATE 6/24/2008 **WEATHER** Sunny and Clear

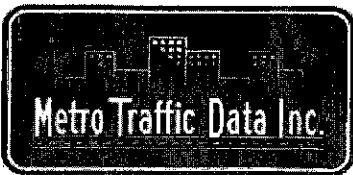
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	4	0	34	X	1	0	0	X	0	8	5	X	23	5	2	X
7:15 AM - 7:30 AM	4	0	44	X	3	0	1	X	1	9	2	X	32	3	4	X
7:30 AM - 7:45 AM	4	3	50	X	3	1	0	X	0	11	2	X	32	7	1	X
7:45 AM - 8:00 AM	11	5	51	X	4	0	0	X	0	12	7	X	37	11	6	X
8:00 AM - 8:15 AM	7	1	41	X	2	0	0	X	0	6	3	X	24	4	2	X
8:15 AM - 8:30 AM	3	2	36	X	2	2	0	X	0	18	7	X	22	6	3	X
8:30 AM - 8:45 AM	7	0	27	X	1	1	0	X	0	8	5	X	28	10	1	X
8:45 AM - 9:00 AM	4	4	32	X	3	0	0	X	0	9	3	X	32	4	3	X
TOTAL	44	15	315	X	19	4	1	X	1	81	34	X	230	50	22	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
1:00 PM - 1:15 PM	5	1	43	X	5	5	1	X	0	9	11	X	66	3	4	X
1:15 PM - 1:30 PM	6	6	66	X	8	2	0	X	0	6	8	X	64	11	6	X
1:30 PM - 1:45 PM	9	3	60	X	4	5	0	X	0	7	5	X	60	7	3	X
1:45 PM - 2:00 PM	5	4	65	X	5	4	0	X	0	4	2	X	61	13	5	X
2:00 PM - 2:15 PM	11	2	66	X	14	8	0	X	0	6	4	X	68	14	5	X
2:15 PM - 2:30 PM	3	1	78	X	4	1	0	X	0	8	2	X	59	11	3	X
2:30 PM - 2:45 PM	2	0	38	X	1	2	0	X	0	5	7	X	73	12	3	X
2:45 PM - 3:00 PM	9	3	57	X	2	2	1	X	0	5	3	X	54	3	6	X
TOTAL	50	20	473	X	43	29	2	X	0	50	42	X	505	74	35	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	26	9	186	X	12	1	1	X	1	38	14	X	125	25	13	X
4:15 PM - 5:15 PM	31	15	257	X	31	19	0	X	0	23	19	X	253	45	19	X

	PHF
AM	0.783
PM	0.899





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Ave 16 @ SR 99 NB Ramp Connector
COUNTY Madera
COLLECTION DATE 6/25/2008

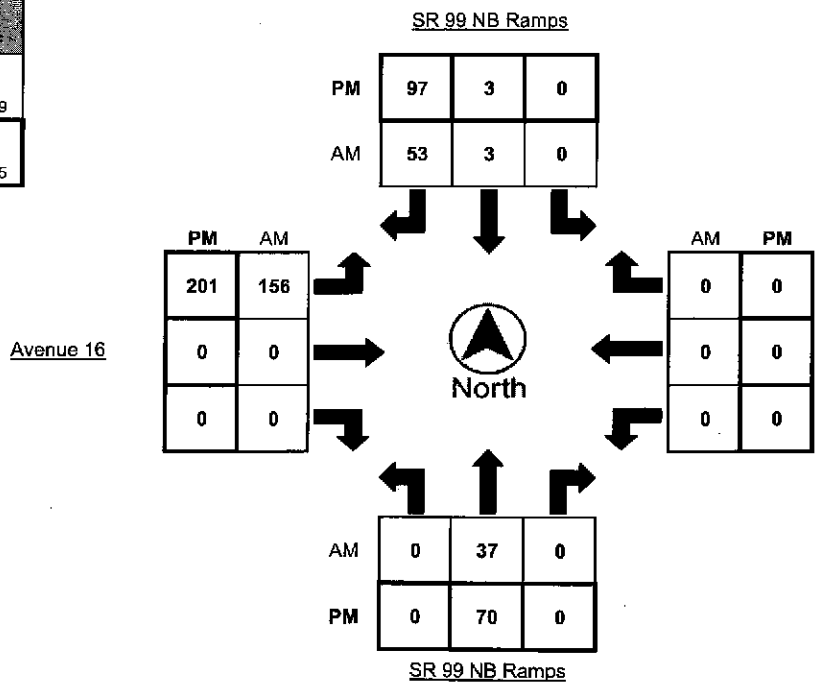
LATITUDE 36°58'52.87"N
LONGITUDE 120°4'57.94"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	3	0	X	0	0	6	X	28	0	0	X	0	0	0	X
7:15 AM - 7:30 AM	0	10	0	X	0	0	10	X	33	0	0	X	0	0	0	X
7:30 AM - 7:45 AM	0	8	0	X	0	1	18	X	43	0	0	X	0	0	0	X
7:45 AM - 8:00 AM	0	9	0	X	0	2	12	X	43	0	0	X	0	0	0	X
8:00 AM - 8:15 AM	0	10	0	X	0	0	13	X	37	0	0	X	0	0	0	X
8:15 AM - 8:30 AM	0	12	0	X	0	1	6	X	31	0	0	X	0	0	0	X
8:30 AM - 8:45 AM	0	9	0	X	0	0	12	X	33	0	0	X	0	0	0	X
8:45 AM - 9:00 AM	0	6	0	X	0	0	13	X	21	0	0	X	0	0	0	X
TOTAL	0	67	0	X	0	4	90	X	289	0	0	X	0	0	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	12	0	X	0	1	25	X	49	0	0	X	0	0	0	X
4:15 PM - 4:30 PM	0	15	0	X	0	0	22	X	46	0	0	X	0	0	0	X
4:30 PM - 4:45 PM	0	15	0	X	0	1	20	X	50	0	0	X	0	0	0	X
4:45 PM - 5:00 PM	0	16	0	X	0	0	24	X	47	0	0	X	0	0	0	X
5:00 PM - 5:15 PM	0	23	0	X	0	3	26	X	54	0	0	X	0	0	0	X
5:15 PM - 5:30 PM	0	15	0	X	0	0	18	X	57	0	0	X	0	0	0	X
5:30 PM - 5:45 PM	0	16	0	X	0	0	29	X	43	0	0	X	0	0	0	X
5:45 PM - 6:00 PM	0	14	0	X	0	0	18	X	38	0	0	X	0	0	0	X
TOTAL	0	126	0	X	0	5	182	X	384	0	0	X	0	0	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	0	37	0	X	0	3	53	X	156	0	0	X	0	0	0	X
4:15 PM - 5:45 PM	0	70	0	X	0	3	97	X	201	0	0	X	0	0	0	X

PHF	
AM	0.889
PM	0.875





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Ave 16 @ Ave 16 Connector/SR 99 NB Ramps
COUNTY Madera
COLLECTION DATE 6/25/2008

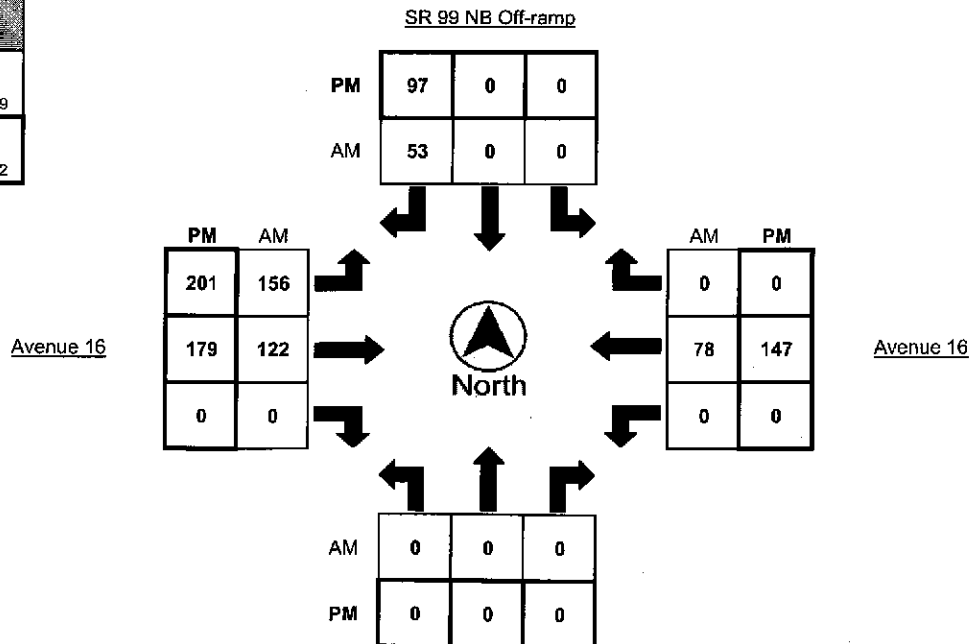
LATITUDE 36°58'51.99"N
LONGITUDE 120° 4'58.48"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	0	0	6	X	28	12	0	X	0	10	0	X
7:15 AM - 7:30 AM	0	0	0	X	0	0	10	X	33	25	0	X	0	20	0	X
7:30 AM - 7:45 AM	0	0	0	X	0	0	18	X	43	37	0	X	0	17	0	X
7:45 AM - 8:00 AM	0	0	0	X	0	0	12	X	43	35	0	X	0	19	0	X
8:00 AM - 8:15 AM	0	0	0	X	0	0	13	X	37	25	0	X	0	22	0	X
8:15 AM - 8:30 AM	0	0	0	X	0	0	6	X	31	20	0	X	0	17	0	X
8:30 AM - 8:45 AM	0	0	0	X	0	0	12	X	33	27	0	X	0	23	0	X
8:45 AM - 9:00 AM	0	0	0	X	0	0	13	X	21	37	0	X	0	19	0	X
TOTAL	0	0	0	X	0	0	90	X	269	218	0	X	0	147	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	0	0	25	X	49	32	0	X	0	38	0	X
4:15 PM - 4:30 PM	0	0	0	X	0	0	22	X	46	31	0	X	0	24	0	X
4:30 PM - 4:45 PM	0	0	0	X	0	0	20	X	50	44	0	X	0	30	0	X
4:45 PM - 5:00 PM	0	0	0	X	0	0	24	X	47	47	0	X	0	27	0	X
5:00 PM - 5:15 PM	0	0	0	X	0	0	26	X	54	43	0	X	0	48	0	X
5:15 PM - 5:30 PM	0	0	0	X	0	0	18	X	57	38	0	X	0	41	0	X
5:30 PM - 5:45 PM	0	0	0	X	0	0	29	X	43	51	0	X	0	31	0	X
5:45 PM - 6:00 PM	0	0	0	X	0	0	18	X	38	58	0	X	0	20	0	X
TOTAL	0	0	0	X	0	0	182	X	384	344	0	X	0	259	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 9:15 AM	0	0	0	X	0	0	53	X	156	122	0	X	0	78	0	X
4:45 PM - 6:45 PM	0	0	0	X	0	0	97	X	201	179	0	X	0	147	0	X

PHF	
AM	0.889
PM	0.912





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Ave 16/Gateway @ SR 99 NB Ramps
 COUNTY Madera
 COLLECTION DATE 6/25/2008

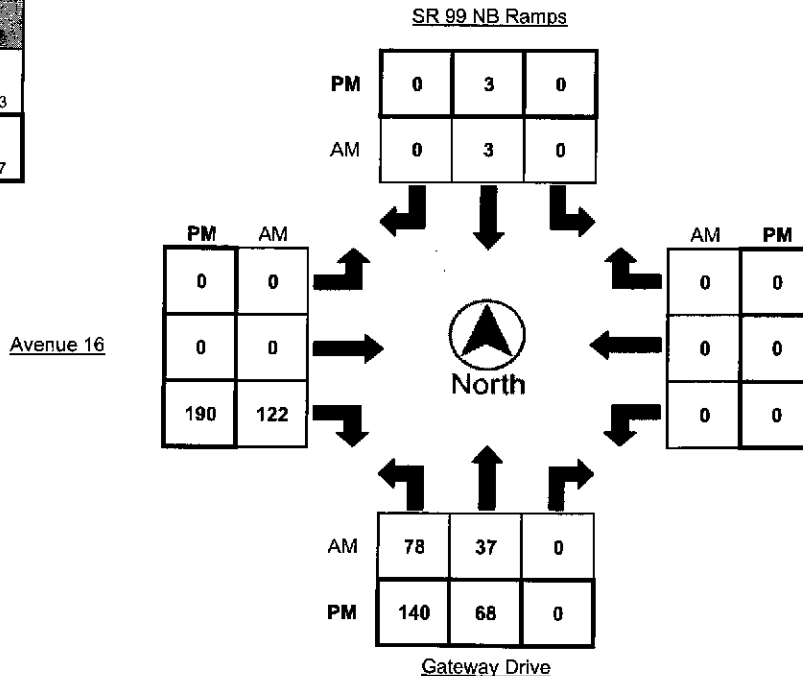
LATITUDE 36°58'51.54"N
 LONGITUDE 120° 4'56.20"W
 WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound				
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	
7:00 AM - 7:15 AM	10	3	0	X	0	0	0	X	0	0	12	X	0	0	0	0	X
7:15 AM - 7:30 AM	20	10	0	X	0	0	0	X	0	0	25	X	0	0	0	0	X
7:30 AM - 7:45 AM	17	8	0	X	0	1	0	X	0	0	37	X	0	0	0	0	X
7:45 AM - 8:00 AM	19	9	0	X	0	2	0	X	0	0	35	X	0	0	0	0	X
8:00 AM - 8:15 AM	22	10	0	X	0	0	0	X	0	0	25	X	0	0	0	0	X
8:15 AM - 8:30 AM	17	12	0	X	0	1	0	X	0	0	20	X	0	0	0	0	X
8:30 AM - 8:45 AM	23	9	0	X	0	0	0	X	0	0	27	X	0	0	0	0	X
8:45 AM - 9:00 AM	19	6	0	X	0	0	0	X	0	0	37	X	0	0	0	0	X
TOTAL	147	67	0	X	0	4	0	X	0	0	218	X	0	0	0	0	X

Time	Northbound				Southbound				Eastbound				Westbound				
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	
3:00 PM - 4:15 PM	38	12	0	X	0	1	0	X	0	0	32	X	0	0	0	0	X
4:15 PM - 4:30 PM	24	15	0	X	0	0	0	X	0	0	31	X	0	0	0	0	X
4:30 PM - 4:45 PM	30	15	0	X	0	1	0	X	0	0	44	X	0	0	0	0	X
4:45 PM - 5:00 PM	27	16	0	X	0	0	0	X	0	0	47	X	0	0	0	0	X
5:00 PM - 5:15 PM	48	23	0	X	0	3	0	X	0	0	43	X	0	0	0	0	X
5:15 PM - 5:30 PM	41	15	0	X	0	0	0	X	0	0	38	X	0	0	0	0	X
5:30 PM - 5:45 PM	31	16	0	X	0	0	0	X	0	0	51	X	0	0	0	0	X
5:45 PM - 6:00 PM	20	14	0	X	0	0	0	X	0	0	58	X	0	0	0	0	X
TOTAL	259	126	0	X	0	5	0	X	0	0	344	X	0	0	0	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound				
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	
7:00 AM - 8:15 AM	78	37	0	X	0	3	0	X	0	0	122	X	0	0	0	0	X
3:00 PM - 6:00 PM	140	68	0	X	0	3	0	X	0	0	190	X	0	0	0	0	X

	PHF
AM	0.923
PM	0.857





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903-566-3150

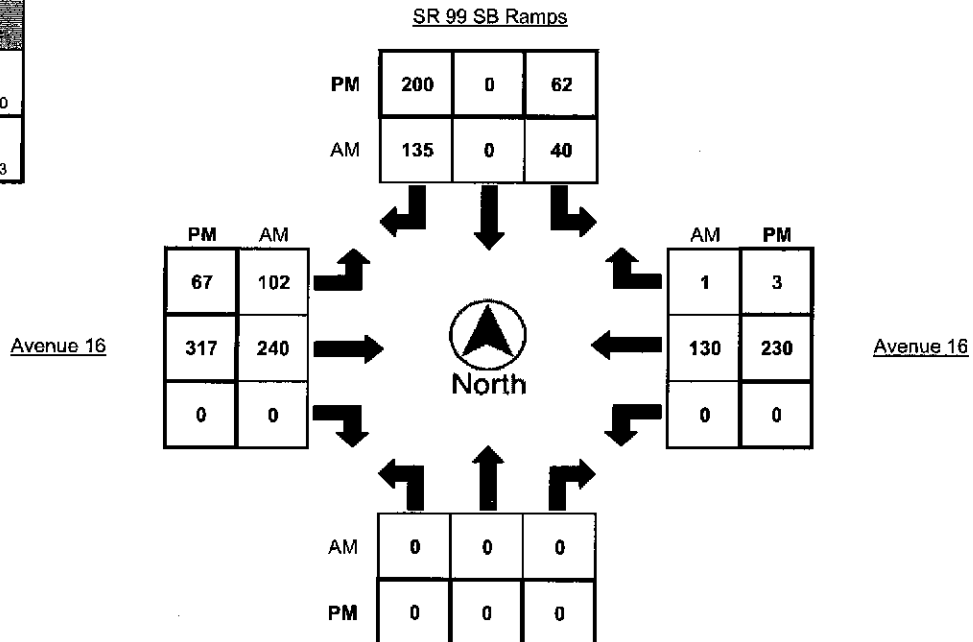
LOCATION Avenue 16 @ SR 99 SB Ramps **LATITUDE** 36°58'54.83"N
COUNTY Madera **LONGITUDE** 120° 5'8.48"W
COLLECTION DATE 6/25/2008 **WEATHER** Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Car	Thru	Right	N/A	Car	Thru	Right	N/A	Car	Thru	Right	N/A	Car	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	6	0	24	X	20	34	0	X	0	16	0	X
7:15 AM - 7:30 AM	0	0	0	X	12	0	19	X	31	46	0	X	0	29	0	X
7:30 AM - 7:45 AM	0	0	0	X	10	0	38	X	24	70	0	X	0	35	1	X
7:45 AM - 8:00 AM	0	0	0	X	12	0	38	X	27	68	0	X	0	31	0	X
8:00 AM - 8:15 AM	0	0	0	X	6	0	40	X	20	56	0	X	0	35	0	X
8:15 AM - 8:30 AM	0	0	0	X	5	0	28	X	24	48	0	X	0	22	0	X
8:30 AM - 8:45 AM	0	0	0	X	7	0	34	X	20	50	0	X	0	36	0	X
8:45 AM - 9:00 AM	0	0	0	X	3	0	34	X	10	57	0	X	0	30	0	X
TOTAL	0	0	0	X	61	0	255	X	176	429	0	X	0	234	1	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Car	Thru	Right	N/A	Car	Thru	Right	N/A	Car	Thru	Right	N/A	Car	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	14	0	47	X	14	66	0	X	0	56	3	X
4:15 PM - 4:30 PM	0	0	0	X	10	0	55	X	15	69	0	X	0	48	0	X
4:30 PM - 4:45 PM	0	0	0	X	14	0	70	X	19	82	0	X	0	47	1	X
4:45 PM - 5:00 PM	0	0	0	X	21	0	52	X	19	69	0	X	0	51	2	X
5:00 PM - 5:15 PM	0	0	0	X	13	0	39	X	13	79	0	X	0	74	0	X
5:15 PM - 5:30 PM	0	0	0	X	14	0	39	X	16	87	0	X	0	58	0	X
5:30 PM - 5:45 PM	0	0	0	X	18	0	39	X	13	75	0	X	0	61	0	X
5:45 PM - 6:00 PM	0	0	0	X	14	0	39	X	9	65	0	X	0	36	1	X
TOTAL	0	0	0	X	118	0	380	X	118	612	0	X	0	431	7	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Car	Thru	Right	N/A	Car	Thru	Right	N/A	Car	Thru	Right	N/A	Car	Thru	Right	N/A
7:15 AM - 8:15 AM	0	0	0	X	40	0	135	X	102	240	0	X	0	130	1	X
4:30 PM - 5:30 PM	0	0	0	X	62	0	200	X	67	317	0	X	0	230	3	X

PHF	
AM	0.910
PM	0.943





Metro Traffic Data Inc.
 310 N. Irwin Street - Suite 20
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 www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

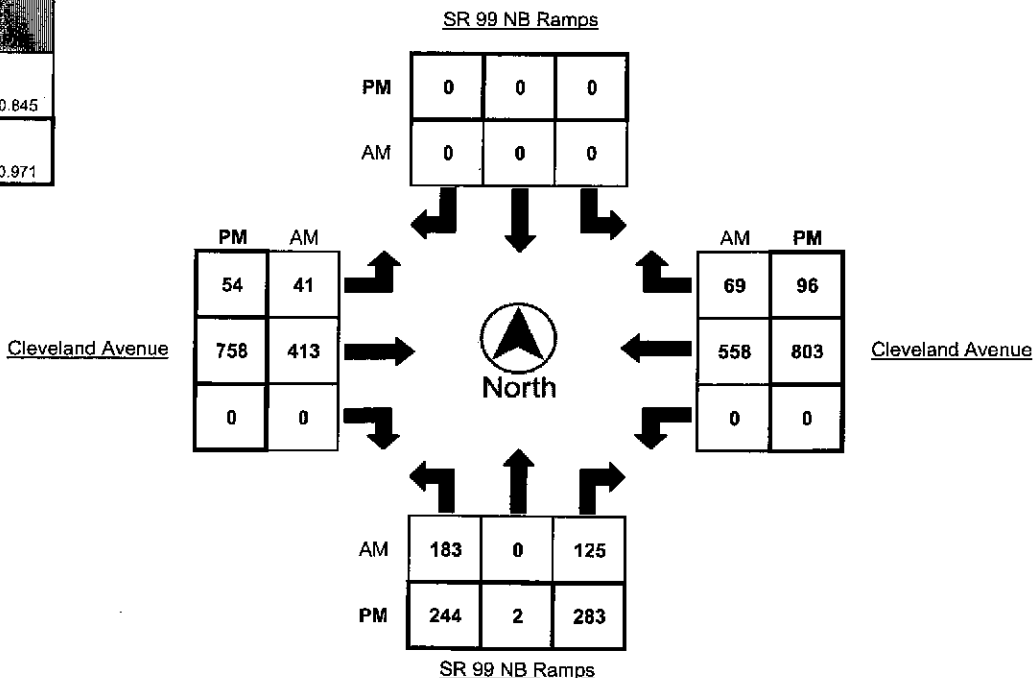
LOCATION Cleveland Avenue @ SR 99 NB Ramps **LATITUDE** 36°58'28.44"N
COUNTY Madera **LONGITUDE** 120° 4'32.32"W
COLLECTION DATE 6/25/2008 **WEATHER** Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	43	0	21	X	0	0	0	X	8	58	0	X	0	92	14	X
7:15 AM - 7:30 AM	49	0	25	X	0	0	0	X	11	79	0	X	0	121	16	X
7:30 AM - 7:45 AM	38	0	27	X	0	0	0	X	13	97	0	X	0	146	15	X
7:45 AM - 8:00 AM	44	0	36	X	0	0	0	X	16	119	0	X	0	175	21	X
8:00 AM - 8:15 AM	54	0	34	X	0	0	0	X	10	87	0	X	0	127	10	X
8:15 AM - 8:30 AM	41	0	22	X	0	0	0	X	11	88	0	X	0	139	17	X
8:30 AM - 8:45 AM	44	0	33	X	0	0	0	X	4	119	0	X	0	117	21	X
8:45 AM - 9:00 AM	60	0	32	X	0	0	0	X	4	100	0	X	0	117	20	X
TOTAL	373	0	230	X	0	0	0	X	77	747	0	X	0	1034	134	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	54	0	69	X	0	0	0	X	19	187	0	X	0	180	22	X
4:15 PM - 4:30 PM	58	1	53	X	0	0	0	X	15	197	0	X	0	181	26	X
4:30 PM - 4:45 PM	59	0	80	X	0	0	0	X	14	197	0	X	0	187	20	X
4:45 PM - 5:00 PM	73	0	75	X	0	0	0	X	11	191	0	X	0	195	32	X
5:00 PM - 5:15 PM	54	1	75	X	0	0	0	X	14	173	0	X	0	230	18	X
5:15 PM - 5:30 PM	58	0	60	X	0	0	0	X	7	160	0	X	0	203	26	X
5:30 PM - 5:45 PM	66	1	64	X	0	0	0	X	12	185	0	X	0	189	9	X
5:45 PM - 6:00 PM	58	1	53	X	0	0	0	X	13	140	0	X	0	190	28	X
TOTAL	480	4	529	X	0	0	0	X	105	1430	0	X	0	1585	181	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:45 AM - 8:45 AM	183	0	125	X	0	0	0	X	41	413	0	X	0	558	69	X
4:15 PM - 5:15 PM	244	2	283	X	0	0	0	X	54	758	0	X	0	803	96	X

AM	0.845
PM	0.971





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Cleveland Avenue @ SR 99 SB Ramps
COUNTY Madera
COLLECTION DATE 6/24/2008

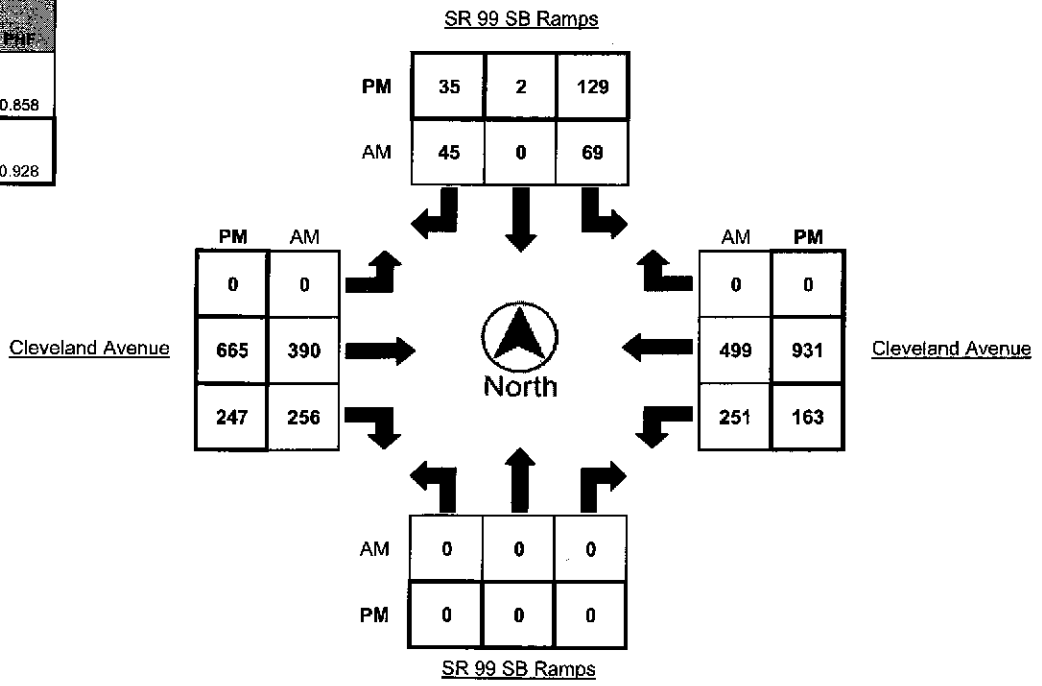
LATITUDE 36°58'28.20"N
LONGITUDE 120° 4'37.89"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	11	0	6	X	0	56	49	X	46	91	0	X
7:15 AM - 7:30 AM	0	0	0	X	16	0	9	X	0	82	60	X	59	98	0	X
7:30 AM - 7:45 AM	0	0	0	X	14	0	13	X	0	105	69	X	79	106	0	X
7:45 AM - 8:00 AM	0	0	0	X	18	0	13	X	0	115	58	X	73	163	0	X
8:00 AM - 8:15 AM	0	0	0	X	21	0	10	X	0	88	49	X	40	132	0	X
8:15 AM - 8:30 AM	0	0	0	X	12	0	7	X	0	74	47	X	40	126	0	X
8:30 AM - 8:45 AM	0	0	0	X	10	1	19	X	0	108	40	X	40	140	0	X
8:45 AM - 9:00 AM	0	0	0	X	9	0	14	X	0	85	36	X	26	110	0	X
TOTAL	0	0	0	X	111	1	91	X	0	713	428	X	403	966	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	39	0	13	X	0	153	60	X	35	200	0	X
4:15 PM - 4:30 PM	0	0	0	X	40	0	16	X	0	161	63	X	45	196	0	X
4:30 PM - 4:45 PM	0	0	0	X	36	0	9	X	0	161	48	X	42	198	0	X
4:45 PM - 5:00 PM	0	0	0	X	31	0	9	X	0	171	68	X	44	207	0	X
5:00 PM - 5:15 PM	0	0	0	X	38	0	6	X	0	165	56	X	44	194	0	X
5:15 PM - 5:30 PM	0	0	0	X	32	2	9	X	0	152	87	X	38	265	0	X
5:30 PM - 5:45 PM	0	0	0	X	33	0	12	X	0	178	59	X	33	225	0	X
5:45 PM - 6:00 PM	0	0	0	X	26	0	8	X	0	170	45	X	48	247	0	X
TOTAL	0	0	0	X	275	2	82	X	0	1311	486	X	329	1732	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	0	0	0	X	69	0	45	X	0	390	256	X	251	499	0	X
5:00 PM - 6:00 PM	0	0	0	X	129	2	35	X	0	665	247	X	163	931	0	X

	PHF
AM	0.858
PM	0.928





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION SR 145 @ SR 99 NB Ramps
COUNTY Madera
COLLECTION DATE 6/25/2008

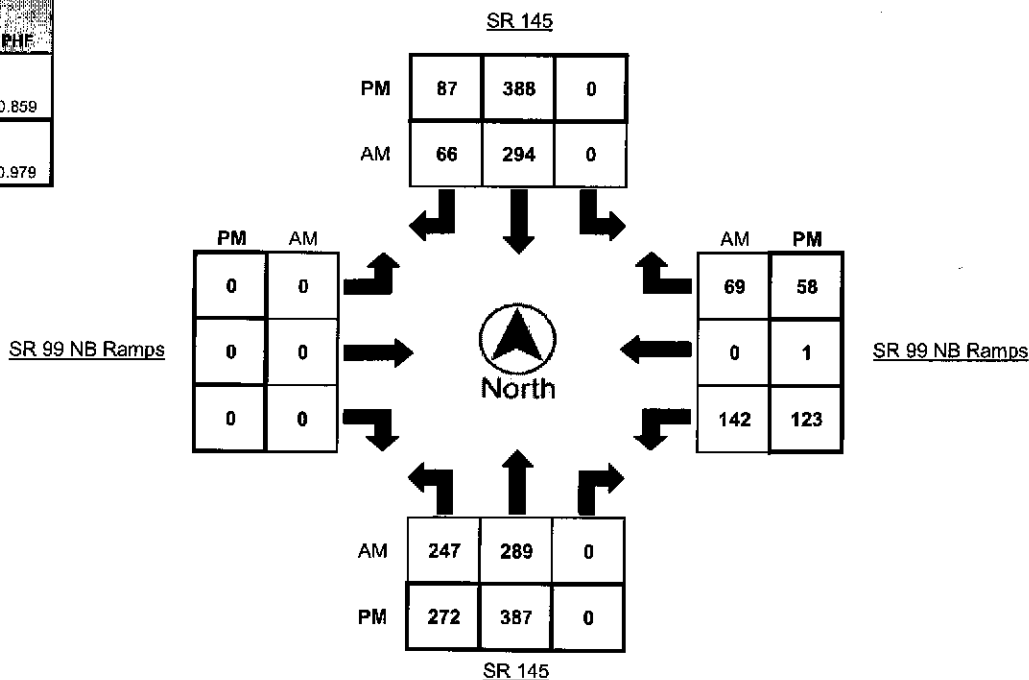
LATITUDE 36°57'14.34"N
LONGITUDE 120° 3'21.89"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	57	38	0	X	0	35	11	X	0	0	0	X	7	0	3	X
7:15 AM - 7:30 AM	37	30	0	X	0	44	14	X	0	0	0	X	25	0	9	X
7:30 AM - 7:45 AM	60	66	0	X	0	100	21	X	0	0	0	X	37	0	10	X
7:45 AM - 8:00 AM	75	79	0	X	0	74	18	X	0	0	0	X	55	0	21	X
8:00 AM - 8:15 AM	55	89	0	X	0	65	16	X	0	0	0	X	33	0	25	X
8:15 AM - 8:30 AM	57	55	0	X	0	55	11	X	0	0	0	X	17	0	13	X
8:30 AM - 8:45 AM	43	41	0	X	0	59	7	X	0	0	0	X	22	0	16	X
8:45 AM - 9:00 AM	59	57	0	X	0	60	11	X	0	0	0	X	19	1	7	X
TOTAL	443	455	0	X	0	492	109	X	0	0	0	X	215	1	104	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 AM	72	88	0	X	0	103	20	X	0	0	0	X	31	0	13	X
9:15 AM - 9:30 PM	64	101	0	X	0	99	16	X	0	0	0	X	30	0	26	X
9:30 AM - 9:45 PM	69	97	0	X	0	96	16	X	0	0	0	X	34	0	5	X
9:45 AM - 10:00 PM	63	101	0	X	0	99	22	X	0	0	0	X	28	1	14	X
10:00 AM - 10:15 PM	76	88	0	X	0	94	33	X	0	0	0	X	31	0	13	X
10:15 PM - 10:30 PM	74	81	0	X	0	81	23	X	0	0	0	X	38	0	12	X
10:30 PM - 10:45 PM	38	97	0	X	0	88	19	X	0	0	0	X	30	0	9	X
10:45 PM - 6:00 PM	62	83	0	X	0	91	27	X	0	0	0	X	25	0	8	X
TOTAL	518	736	0	X	0	751	176	X	0	0	0	X	247	1	100	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 8:30 AM	247	289	0	X	0	294	66	X	0	0	0	X	142	0	69	X
4:15 PM - 5:15 PM	272	387	0	X	0	388	87	X	0	0	0	X	123	1	58	X

	PHF
AM	0.859
PM	0.979





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION SR 99 SB Off-ramp @ Olive Ave
 COUNTY Madera
 COLLECTION DATE 6/25/2008

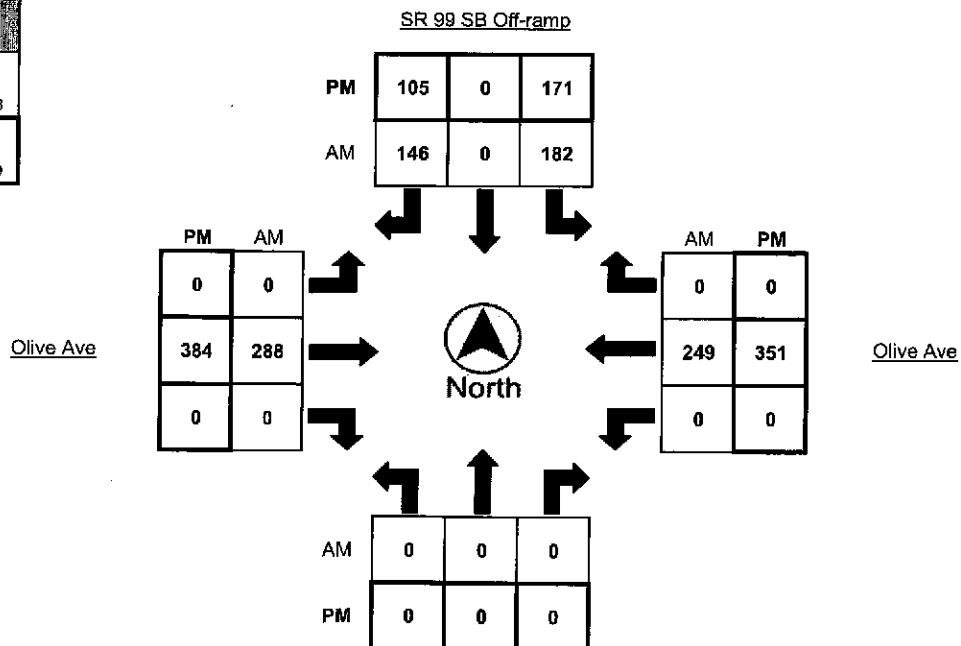
LATITUDE 36°57'10.17"N
 LONGITUDE 120° 3'24.69"W
 WEATHER Sunny and Clear

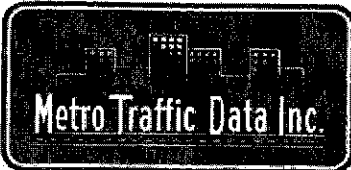
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	28	0	10	X	0	35	0	X	0	25	0	X
7:15 AM - 7:30 AM	0	0	0	X	37	0	24	X	0	57	0	X	0	34	0	X
7:30 AM - 7:45 AM	0	0	0	X	52	0	46	X	0	68	0	X	0	57	0	X
7:45 AM - 8:00 AM	0	0	0	X	58	0	53	X	0	97	0	X	0	91	0	X
8:00 AM - 8:15 AM	0	0	0	X	35	0	23	X	0	66	0	X	0	87	0	X
8:15 AM - 8:30 AM	0	0	0	X	28	0	10	X	0	62	0	X	0	40	0	X
8:30 AM - 8:45 AM	0	0	0	X	38	0	15	X	0	42	0	X	0	45	0	X
8:45 AM - 9:00 AM	0	0	0	X	31	0	15	X	0	73	0	X	0	55	0	X
TOTAL	0	0	0	X	307	0	196	X	0	500	0	X	0	414	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
2:00 PM - 2:15 PM	0	0	0	X	42	0	22	X	0	88	0	X	0	99	0	X
2:15 PM - 2:30 PM	0	0	0	X	39	0	22	X	0	103	0	X	0	90	0	X
2:30 PM - 2:45 PM	0	0	0	X	49	0	29	X	0	100	0	X	0	94	0	X
2:45 PM - 3:00 PM	0	0	0	X	41	0	32	X	0	93	0	X	0	68	0	X
3:00 PM - 3:15 PM	0	0	0	X	44	0	27	X	0	110	0	X	0	66	0	X
3:15 PM - 3:30 PM	0	0	0	X	40	0	20	X	0	96	0	X	0	95	0	X
3:30 PM - 3:45 PM	0	0	0	X	45	0	31	X	0	99	0	X	0	76	0	X
3:45 PM - 4:00 PM	0	0	0	X	43	0	24	X	0	94	0	X	0	76	0	X
TOTAL	0	0	0	X	343	0	207	X	0	783	0	X	0	664	0	X

Peak Hour	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:15 AM	0	0	0	X	182	0	146	X	0	288	0	X	0	249	0	X
4:00 PM - 5:00 PM	0	0	0	X	171	0	105	X	0	384	0	X	0	351	0	X

	PHF
AM	0.723
PM	0.929





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION SR 145 @ Ave 14 / SR 99 SB On-ramp
COUNTY Madera
COLLECTION DATE 7/9/2008

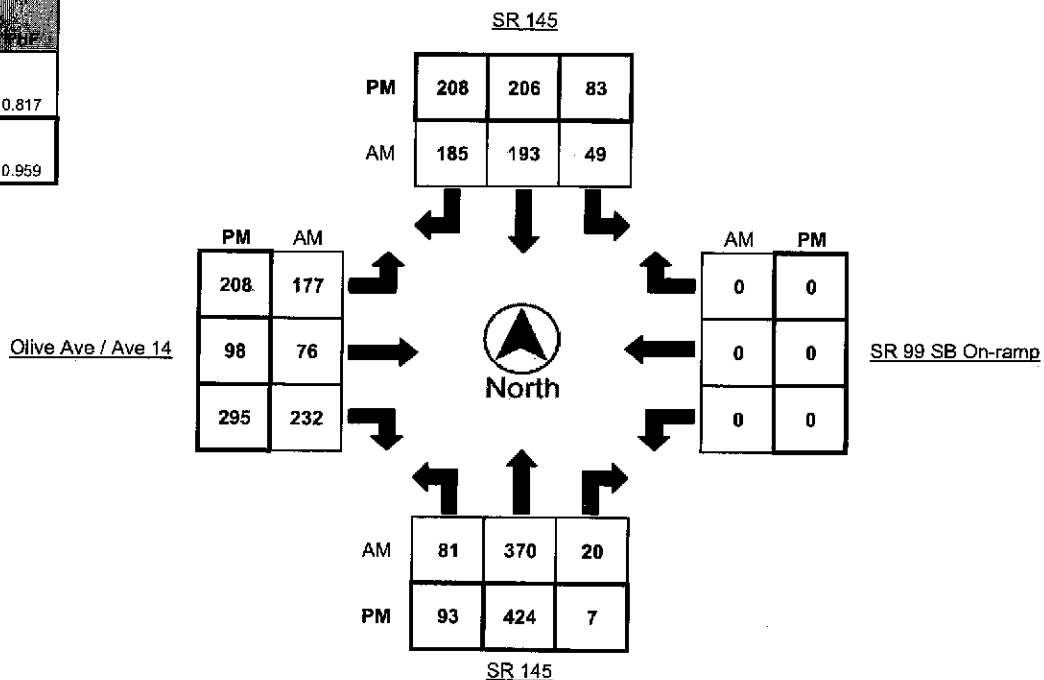
LATITUDE 36°57'9.29"N
LONGITUDE 120° 3'21.96"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	13	72	6	X	13	12	13	X	23	18	29	X	0	0	0	X
7:15 AM - 7:30 AM	11	51	4	X	9	31	23	X	20	29	43	X	0	0	0	X
7:30 AM - 7:45 AM	13	87	11	X	14	70	50	X	41	22	63	X	0	0	0	X
7:45 AM - 8:00 AM	27	107	5	X	9	49	68	X	60	22	76	X	0	0	0	X
8:00 AM - 8:15 AM	23	97	0	X	8	43	45	X	45	14	49	X	0	0	0	X
8:15 AM - 8:30 AM	18	79	4	X	18	31	22	X	31	18	44	X	0	0	0	X
8:30 AM - 8:45 AM	12	65	5	X	11	33	35	X	20	19	40	X	0	0	0	X
8:45 AM - 9:00 AM	24	90	7	X	9	36	30	X	37	15	53	X	0	0	0	X
TOTAL	141	648	42	X	91	305	266	X	277	157	397	X	0	0	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:30 PM - 4:45 PM	24	122	1	X	12	58	56	X	48	31	71	X	0	0	0	X
4:45 PM - 5:00 PM	25	100	4	X	21	58	59	X	50	18	80	X	0	0	0	X
5:00 PM - 5:15 PM	21	99	2	X	24	41	51	X	62	18	73	X	0	0	0	X
5:15 PM - 5:30 PM	23	103	0	X	26	49	42	X	48	31	71	X	0	0	0	X
5:30 PM - 5:45 PM	20	79	0	X	17	38	55	X	56	19	74	X	0	0	0	X
5:45 PM - 6:00 PM	23	82	1	X	15	36	49	X	36	14	50	X	0	0	0	X
6:00 PM - 6:15 PM	14	94	4	X	12	54	53	X	38	24	55	X	0	0	0	X
6:15 PM - 6:30 PM	24	91	4	X	14	44	51	X	53	24	73	X	0	0	0	X
TOTAL	174	770	16	X	141	378	416	X	391	179	547	X	0	0	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	81	370	20	X	49	193	185	X	177	76	232	X	0	0	0	X
4:30 PM - 5:00 PM	93	424	7	X	83	206	208	X	208	98	295	X	0	0	0	X

Time	PM
AM	0.817
PM	0.959





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Turning Movement Report

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 Dallas, TX 75248

903-566-3150

LOCATION Ave 18 1/2 @ SR 99 SB On-ramps
COUNTY Madera
COLLECTION DATE 6/24/2008

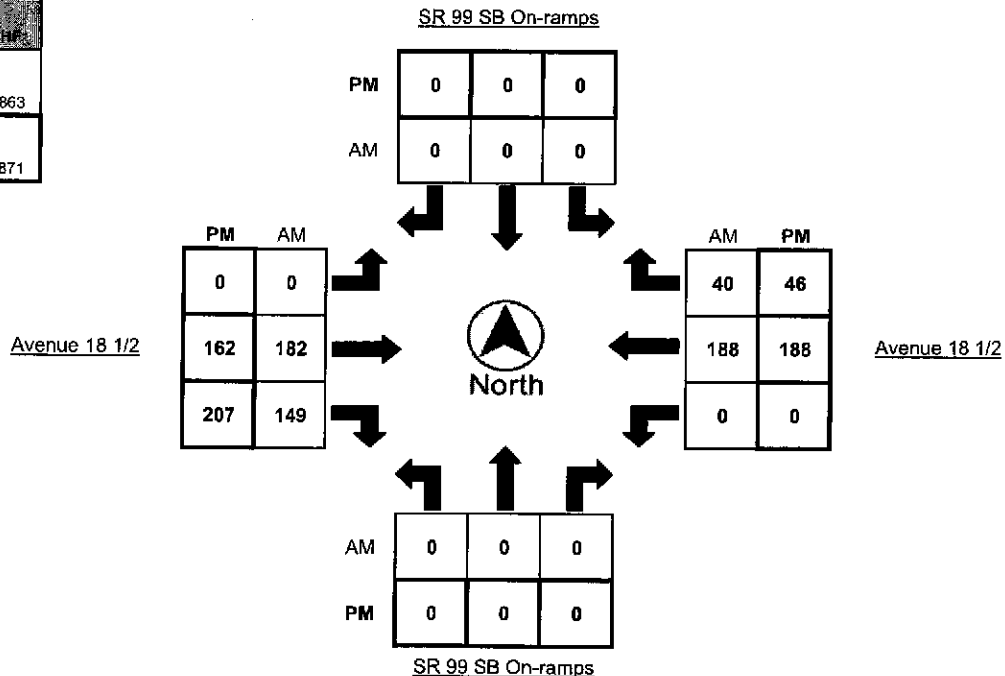
LATITUDE 37° 1'5.52"N
LONGITUDE 120° 7'49.94"W
WEATHER Sunny and Clear

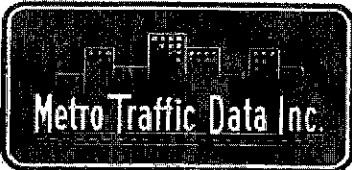
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	0	0	0	X	0	35	33	X	0	41	11	X
7:15 AM - 7:30 AM	0	0	0	X	0	0	0	X	0	26	32	X	0	45	4	X
7:30 AM - 7:45 AM	0	0	0	X	0	0	0	X	0	41	41	X	0	47	7	X
7:45 AM - 8:00 AM	0	0	0	X	0	0	0	X	0	42	47	X	0	63	10	X
8:00 AM - 8:15 AM	0	0	0	X	0	0	0	X	0	51	31	X	0	49	15	X
8:15 AM - 8:30 AM	0	0	0	X	0	0	0	X	0	48	30	X	0	29	8	X
8:30 AM - 8:45 AM	0	0	0	X	0	0	0	X	0	27	41	X	0	44	4	X
8:45 AM - 9:00 AM	0	0	0	X	0	0	0	X	0	26	21	X	0	39	11	X
TOTAL	0	0	0	X	0	0	0	X	0	296	276	X	0	357	70	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	0	0	0	X	0	43	43	X	0	51	7	X
4:15 PM - 4:30 PM	0	0	0	X	0	0	0	X	0	36	39	X	0	46	9	X
4:30 PM - 4:45 PM	0	0	0	X	0	0	0	X	0	39	63	X	0	48	23	X
4:45 PM - 5:00 PM	0	0	0	X	0	0	0	X	0	44	62	X	0	43	7	X
5:00 PM - 5:15 PM	0	0	0	X	0	0	0	X	0	43	37	X	0	35	11	X
5:15 PM - 5:30 PM	0	0	0	X	0	0	0	X	0	55	26	X	0	48	13	X
5:30 PM - 5:45 PM	0	0	0	X	0	0	0	X	0	42	51	X	0	44	7	X
5:45 PM - 6:00 PM	0	0	0	X	0	0	0	X	0	35	36	X	0	41	4	X
TOTAL PM	0	0	0	X	0	0	0	X	0	337	357	X	0	356	81	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
8:00 AM - 8:30 AM	0	0	0	X	0	0	0	X	0	182	149	X	0	188	40	X
4:00 PM - 5:00 PM	0	0	0	X	0	0	0	X	0	182	207	X	0	188	46	X

	PHF
AM	0.863
PM	0.871





Metro Traffic Data Inc.
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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Avenue 17 @ SR 99 SB On-Ramps
COUNTY Madera
COLLECTION DATE 6/24/2008

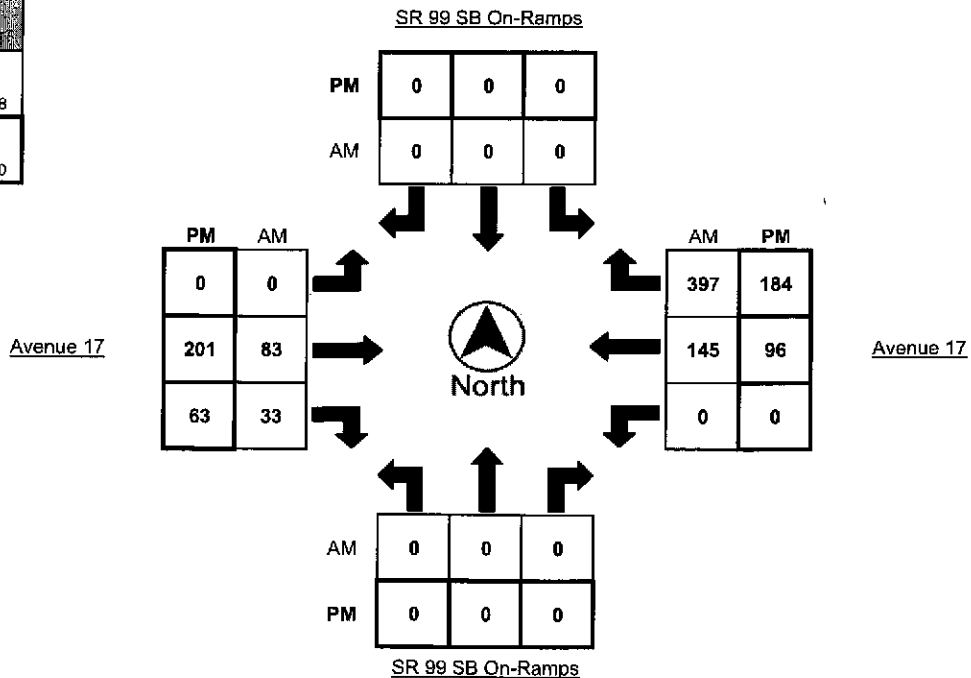
LATITUDE 36°59'47.19"N
LONGITUDE 120° 8'13.66"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	0	0	0	X	0	15	7	X	0	30	58	X
7:15 AM - 7:30 AM	0	0	0	X	0	0	0	X	0	10	10	X	0	37	107	X
7:30 AM - 7:45 AM	0	0	0	X	0	0	0	X	0	14	10	X	0	19	129	X
7:45 AM - 8:00 AM	0	0	0	X	0	0	0	X	0	31	6	X	0	55	109	X
8:00 AM - 8:15 AM	0	0	0	X	0	0	0	X	0	28	7	X	0	34	52	X
8:15 AM - 8:30 AM	0	0	0	X	0	0	0	X	0	12	14	X	0	18	55	X
8:30 AM - 8:45 AM	0	0	0	X	0	0	0	X	0	23	4	X	0	22	42	X
8:45 AM - 9:00 AM	0	0	0	X	0	0	0	X	0	22	14	X	0	40	41	X
TOTAL	0	0	0	X	0	0	0	X	0	155	72	X	0	255	593	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	0	0	X	0	0	0	X	0	57	20	X	0	15	35	X
4:15 PM - 4:30 PM	0	0	0	X	0	0	0	X	0	58	19	X	0	14	44	X
4:30 PM - 4:45 PM	0	0	0	X	0	0	0	X	0	51	16	X	0	16	46	X
4:45 PM - 5:00 PM	0	0	0	X	0	0	0	X	0	41	12	X	0	27	40	X
5:00 PM - 5:15 PM	0	0	0	X	0	0	0	X	0	51	16	X	0	39	54	X
5:15 PM - 5:30 PM	0	0	0	X	0	0	0	X	0	40	9	X	0	12	40	X
5:30 PM - 5:45 PM	0	0	0	X	0	0	0	X	0	33	10	X	0	26	65	X
5:45 PM - 6:00 PM	0	0	0	X	0	0	0	X	0	33	5	X	0	18	39	X
TOTAL	0	0	0	X	0	0	0	X	0	364	107	X	0	167	363	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	0	0	0	X	0	0	0	X	0	83	33	X	0	145	397	X
4:15 PM - 5:15 PM	0	0	0	X	0	0	0	X	0	201	63	X	0	96	184	X

Time	Count
AM	0.818
PM	0.850





Metro Traffic Data Inc.
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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION S.R. 41 @ S.R. 145
COUNTY Madera
COLLECTION DATE 7/9/2008

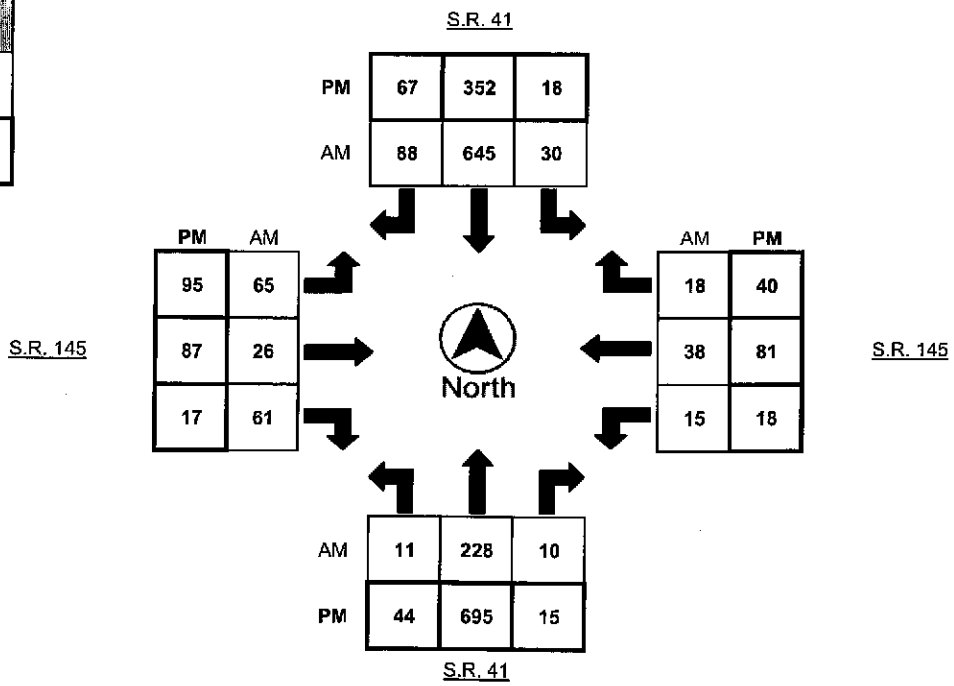
LATITUDE 37° 0'37.61"N
LONGITUDE 119°47'37.88"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
5:00 AM - 7:15 AM	2	54	2	X	4	143	17	X	11	10	15	X	7	11	3	X
7:15 AM - 7:38 AM	2	47	3	X	8	174	22	X	24	3	15	X	1	3	4	X
7:45 AM - 7:45 AM	2	72	2	X	12	181	28	X	17	12	14	X	3	14	9	X
7:45 AM - 8:00 AM	5	55	3	X	6	147	21	X	13	1	17	X	4	10	2	X
8:00 AM - 8:17 AM	4	58	2	X	6	138	19	X	12	7	9	X	3	11	4	X
8:15 AM - 8:30 AM	3	75	2	X	4	130	19	X	12	17	10	X	1	10	2	X
8:30 AM - 8:45 AM	2	76	2	X	10	138	11	X	20	13	18	X	1	8	8	X
8:45 AM - 9:00 AM	9	77	2	X	8	128	11	X	14	9	9	X	7	7	4	X
TOTAL	29	514	18	X	58	1179	148	X	123	72	107	X	27	74	36	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	15	144	8	X	3	99	17	X	14	12	12	X	1	12	4	X
4:15 PM - 4:30 PM	6	148	2	X	5	82	17	X	29	17	2	X	2	16	11	X
4:30 PM - 4:45 PM	11	165	1	X	12	94	16	X	21	17	12	X	2	15	11	X
4:45 PM - 5:00 PM	8	129	4	X	6	90	20	X	15	14	3	X	3	12	7	X
5:00 PM - 5:15 PM	9	177	1	X	5	85	7	X	20	23	3	X	5	19	8	X
5:15 PM - 5:30 PM	13	135	3	X	1	85	18	X	26	28	6	X	2	21	11	X
5:30 PM - 5:45 PM	9	188	6	X	8	106	25	X	20	16	6	X	8	18	12	X
5:45 PM - 6:00 PM	13	195	5	X	4	76	17	X	29	20	2	X	3	23	9	X
TOTAL	84	1281	30	X	44	717	137	X	174	147	46	X	26	136	73	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 8:00 AM	11	228	10	X	30	645	88	X	65	26	61	X	15	38	18	X
5:00 PM - 6:00 PM	44	695	15	X	18	352	67	X	95	87	17	X	18	81	40	X

	PHF
AM	0.844
PM	0.906





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION S.R. 41 @ Road 200
 COUNTY Madera
 COLLECTION DATE 7/9/2008

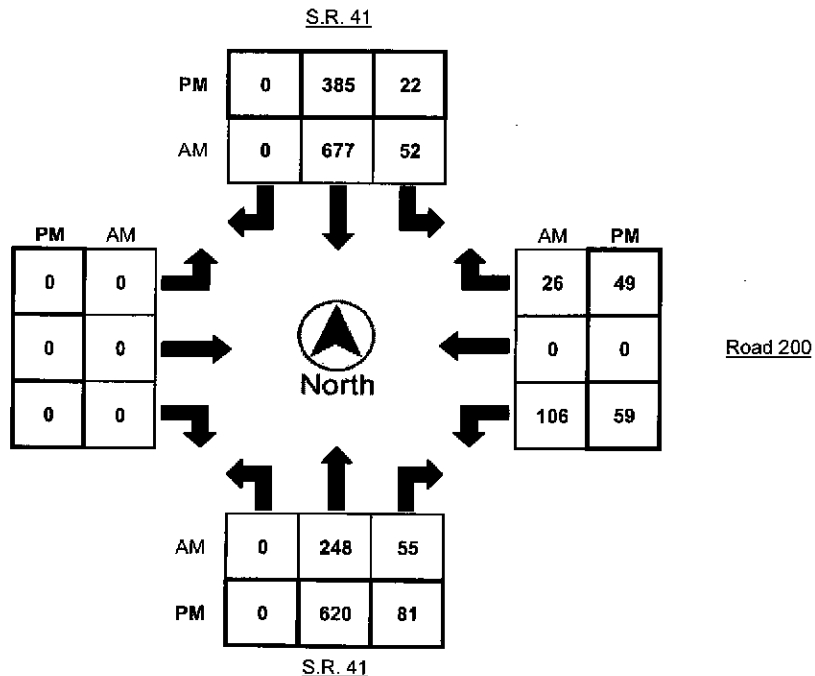
LATITUDE 37° 7'27.19"N
 LONGITUDE 119° 44'13.25"W
 WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	36	8	X	6	144	0	X	0	0	0	X	23	0	4	X
7:15 AM - 7:30 AM	0	64	16	X	19	189	0	X	0	0	0	X	26	0	3	X
7:30 AM - 7:45 AM	0	33	11	X	9	178	0	X	0	0	0	X	32	0	10	X
7:45 AM - 8:00 AM	0	97	16	X	11	162	0	X	0	0	0	X	20	0	6	X
8:00 AM - 8:15 AM	0	54	12	X	13	148	0	X	0	0	0	X	28	0	7	X
8:15 AM - 8:30 AM	0	56	18	X	7	134	0	X	0	0	0	X	23	0	4	X
8:30 AM - 8:45 AM	0	73	17	X	6	144	0	X	0	0	0	X	16	0	2	X
8:45 AM - 9:00 AM	0	88	18	X	5	115	0	X	0	0	0	X	18	0	3	X
TOTAL	0	503	116	X	76	1214	0	X	0	0	0	X	186	0	39	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 AM - 9:15 PM	0	114	8	X	5	99	0	X	0	0	0	X	11	0	5	X
9:15 PM - 9:30 PM	0	162	17	X	2	104	0	X	0	0	0	X	9	0	7	X
9:30 PM - 9:45 PM	0	155	19	X	4	101	0	X	0	0	0	X	15	0	6	X
9:45 PM - 10:00 PM	0	155	20	X	7	79	0	X	0	0	0	X	20	0	18	X
10:00 PM - 10:15 PM	0	131	19	X	6	92	0	X	0	0	0	X	14	0	10	X
10:15 PM - 10:30 PM	0	157	25	X	2	113	0	X	0	0	0	X	15	0	12	X
10:30 PM - 10:45 PM	0	177	17	X	7	101	0	X	0	0	0	X	10	0	9	X
10:45 PM - 11:00 PM	0	179	23	X	6	55	0	X	0	0	0	X	12	0	7	X
TOTAL	0	1230	148	X	39	744	0	X	0	0	0	X	106	0	74	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	0	248	55	X	52	677	0	X	0	0	0	X	106	0	26	X
4:45 PM - 5:45 PM	0	620	81	X	22	385	0	X	0	0	0	X	59	0	49	X

	PHF
AM	0.918
PM	0.938





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION S.R. 41 @ Thornberry Road
 COUNTY Madera
 COLLECTION DATE 7/8/2008

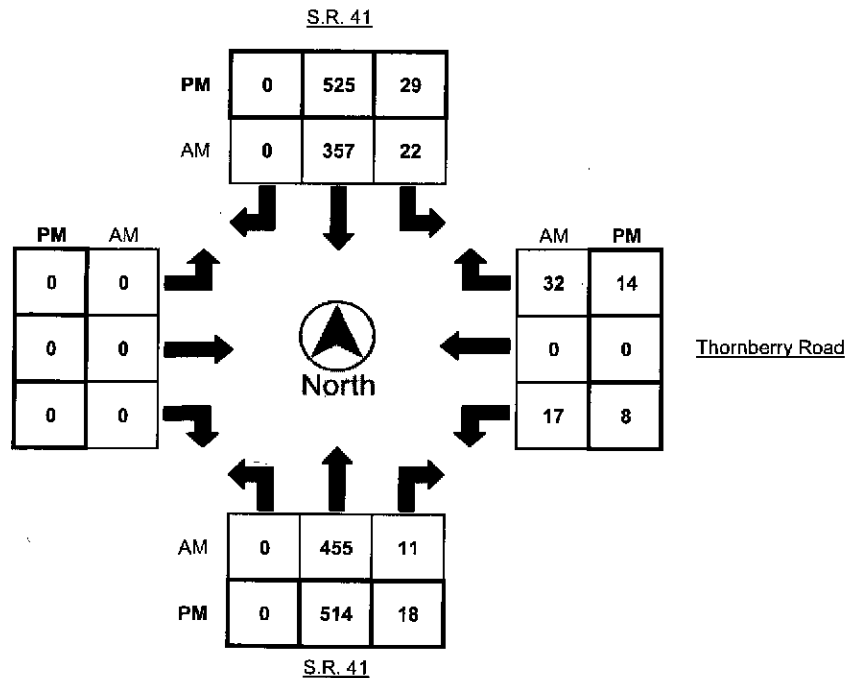
LATITUDE 37°17'36.31"N
 LONGITUDE 119°38'53.21"W
 WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	75	0	X	1	92	0	X	0	0	0	X	3	0	5	X
7:15 AM - 7:30 AM	0	90	5	X	3	81	0	X	0	0	0	X	4	0	8	X
7:30 AM - 7:45 AM	0	102	3	X	3	52	0	X	0	0	0	X	6	0	5	X
7:45 AM - 8:00 AM	0	121	1	X	1	73	0	X	0	0	0	X	10	0	3	X
8:00 AM - 8:15 AM	0	113	1	X	8	85	0	X	0	0	0	X	2	0	8	X
8:15 AM - 8:30 AM	0	125	4	X	2	92	0	X	0	0	0	X	2	0	6	X
8:30 AM - 8:45 AM	0	98	4	X	3	90	0	X	0	0	0	X	8	0	5	X
8:45 AM - 9:00 AM	0	119	2	X	9	90	0	X	0	0	0	X	5	0	13	X
TOTAL	0	843	20	X	30	655	0	X	0	0	0	X	40	0	53	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	0	117	8	X	9	121	0	X	0	0	0	X	3	0	7	X
4:15 PM - 4:30 PM	0	121	7	X	7	122	0	X	0	0	0	X	5	0	6	X
4:30 PM - 4:45 PM	0	148	7	X	6	114	0	X	0	0	0	X	1	0	2	X
4:45 PM - 5:00 PM	0	140	2	X	8	106	0	X	0	0	0	X	2	0	6	X
5:00 PM - 5:15 PM	0	108	2	X	7	145	0	X	0	0	0	X	4	0	2	X
5:15 PM - 5:30 PM	0	118	7	X	8	160	0	X	0	0	0	X	1	0	4	X
5:30 PM - 5:45 PM	0	101	6	X	11	133	0	X	0	0	0	X	3	0	1	X
5:45 PM - 6:00 PM	0	125	10	X	5	116	0	X	0	0	0	X	2	0	8	X
TOTAL	0	978	49	X	61	1017	0	X	0	0	0	X	21	0	36	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
8:00 AM - 9:00 AM	0	455	11	X	22	357	0	X	0	0	0	X	17	0	32	X
4:30 PM - 5:30 PM	0	514	18	X	29	525	0	X	0	0	0	X	8	0	14	X

	PHP
	0.939
PM	0.930





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

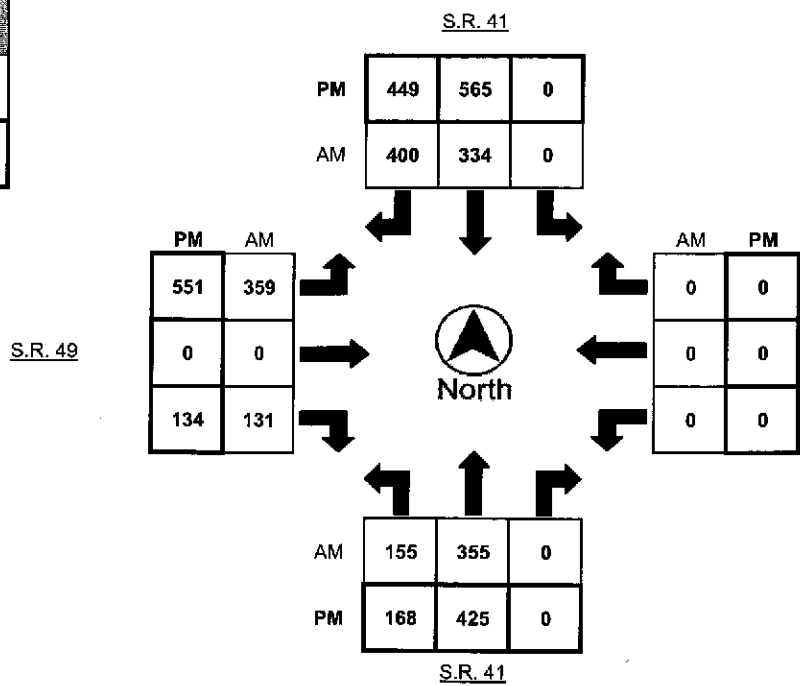
LOCATION S.R. 41 @ S.R. 49 LATITUDE 37°18'51.74"N
 COUNTY Madera LONGITUDE 119°39'20.08"W
 COLLECTION DATE 7/8/2008 WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound				
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	
7:00 AM - 7:15 AM	13	57	0	X	0	71	50	X	61	0	29	X	0	0	0	0	X
7:15 AM - 7:30 AM	19	82	0	X	0	63	48	X	83	0	29	X	0	0	0	0	X
7:30 AM - 7:45 AM	24	95	0	X	0	62	71	X	59	0	24	X	0	0	0	0	X
7:45 AM - 8:00 AM	27	108	0	X	0	63	111	X	132	0	30	X	0	0	0	0	X
8:00 AM - 8:15 AM	44	80	0	X	0	101	109	X	83	0	31	X	0	0	0	0	X
8:15 AM - 8:30 AM	37	77	0	X	0	67	99	X	99	0	24	X	0	0	0	0	X
8:30 AM - 8:45 AM	35	94	0	X	0	75	84	X	69	0	35	X	0	0	0	0	X
8:45 AM - 9:00 AM	39	104	0	X	0	91	108	X	108	0	41	X	0	0	0	0	X
TOTAL	238	697	0	X	0	593	680	X	694	0	243	X	0	0	0	0	X

Time	Northbound				Southbound				Eastbound				Westbound				
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	
4:00 PM - 4:15 PM	66	101	0	X	0	101	107	X	149	0	57	X	0	0	0	0	X
4:15 PM - 4:30 PM	43	93	0	X	0	121	86	X	123	0	27	X	0	0	0	0	X
4:30 PM - 4:45 PM	40	96	0	X	0	119	131	X	114	0	25	X	0	0	0	0	X
4:45 PM - 5:00 PM	43	119	0	X	0	120	100	X	127	0	25	X	0	0	0	0	X
5:00 PM - 5:15 PM	47	88	0	X	0	145	115	X	150	0	42	X	0	0	0	0	X
5:15 PM - 5:30 PM	38	122	0	X	0	181	103	X	160	0	42	X	0	0	0	0	X
5:30 PM - 5:45 PM	42	78	0	X	0	132	89	X	131	0	31	X	0	0	0	0	X
5:45 PM - 6:00 PM	30	88	0	X	0	123	96	X	119	0	16	X	0	0	0	0	X
TOTAL	349	785	0	X	0	1042	827	X	1073	0	265	X	0	0	0	0	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound				
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	
8:00 AM - 9:00 AM	155	355	0	X	0	334	400	X	359	0	131	X	0	0	0	0	X
4:30 PM - 5:30 PM	168	425	0	X	0	565	449	X	551	0	134	X	0	0	0	0	X

	PMP
AM	0.883
PM	0.887





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Turning Movement Report

Prepared For: **Ruth Davis**
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 6807 Leameadow
 Dallas, TX 75248
 903-566-3150

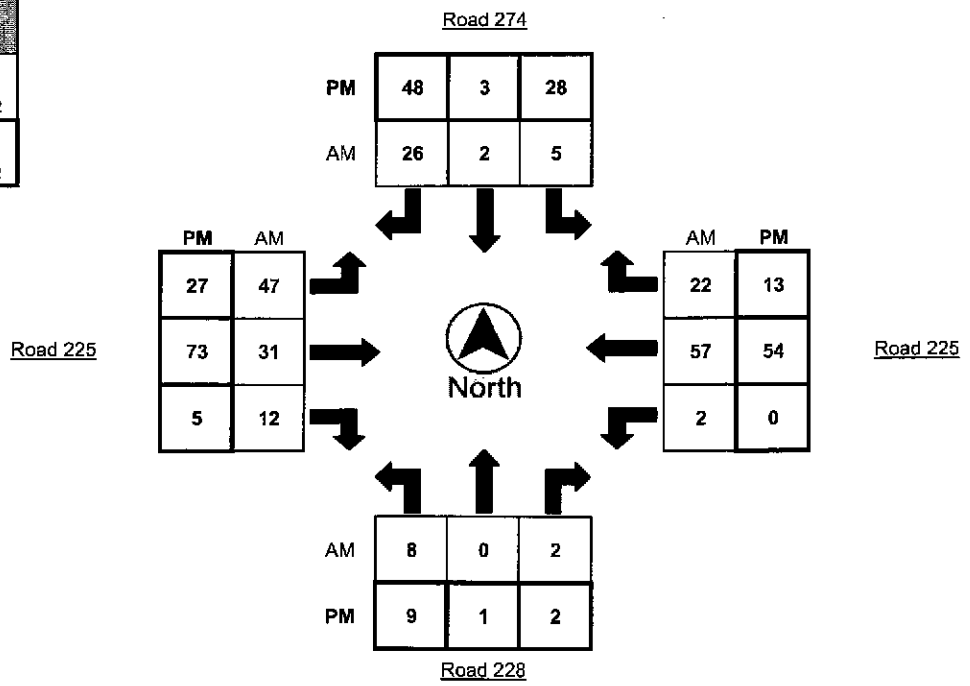
LOCATION Road 274 @ Road 225 **LATITUDE** 37°13'44.98"N
COUNTY Madera **LONGITUDE** 119°30'14.74"W
COLLECTION DATE 7/8/2008 **WEATHER** Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	2	0	0	X	1	0	5	X	1	3	0	X	0	10	5	X
7:15 AM - 7:30 AM	1	0	0	X	0	0	2	X	16	8	2	X	0	8	8	X
7:30 AM - 7:45 AM	2	0	0	X	0	1	9	X	12	3	3	X	1	18	6	X
7:45 AM - 8:00 AM	0	0	0	X	2	0	6	X	13	8	3	X	0	11	5	X
8:00 AM - 8:15 AM	3	0	1	X	2	1	6	X	11	11	0	X	0	17	8	X
8:15 AM - 8:30 AM	3	0	1	X	1	0	5	X	11	9	6	X	1	11	3	X
8:30 AM - 8:45 AM	1	0	0	X	2	1	4	X	10	7	5	X	0	18	5	X
8:45 AM - 9:00 AM	3	0	3	X	1	0	8	X	7	6	4	X	0	10	6	X
TOTAL	15	0	5	X	9	3	45	X	81	55	23	X	2	103	46	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
8:00 AM - 8:15 PM	0	0	1	X	3	1	8	X	9	9	2	X	0	8	1	X
8:15 PM - 8:30 PM	6	1	1	X	9	2	10	X	4	22	4	X	0	20	3	X
8:30 PM - 8:45 PM	2	0	1	X	8	0	14	X	5	16	0	X	0	9	1	X
8:45 PM - 9:00 PM	1	0	0	X	7	0	11	X	4	19	0	X	0	15	6	X
9:00 PM - 9:15 PM	0	0	0	X	4	1	13	X	14	16	1	X	0	10	3	X
9:15 PM - 9:30 PM	1	1	2	X	8	0	15	X	7	16	0	X	0	11	1	X
9:30 PM - 9:45 PM	1	2	0	X	5	0	8	X	9	13	0	X	0	12	2	X
9:45 PM - 10:00 PM	0	0	1	X	5	0	5	X	7	23	1	X	0	8	1	X
TOTAL	11	4	6	X	49	4	84	X	59	134	8	X	0	93	18	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	8	0	2	X	5	2	26	X	47	31	12	X	2	57	22	X
4:15 PM - 5:15 PM	9	1	2	X	28	3	48	X	27	73	5	X	0	54	13	X

PM	0.892
AM	0.802





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248
 903-566-3150

LOCATION Road 225 @ Cascadel Road
COUNTY Madera
COLLECTION DATE 7/8/2008

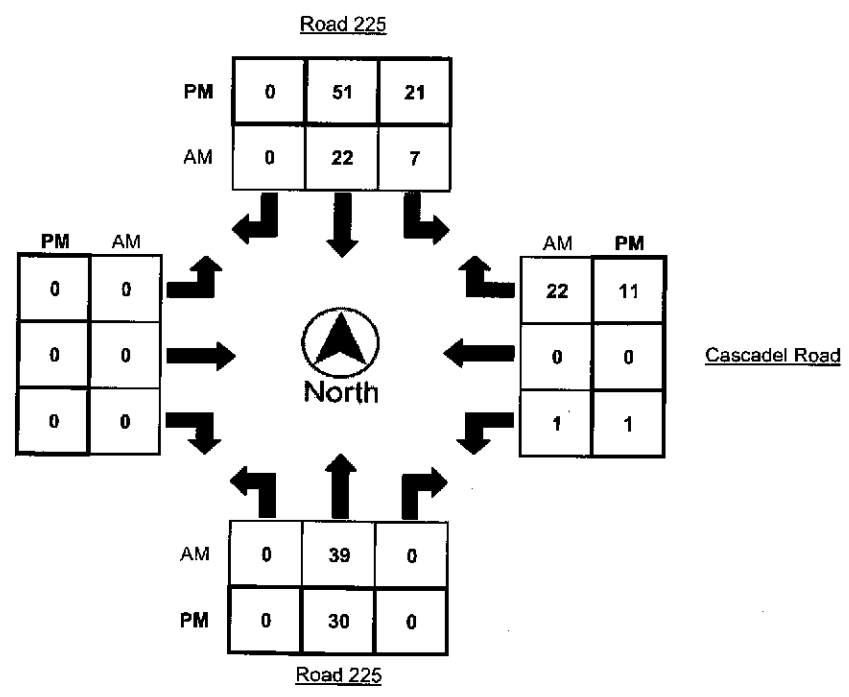
LATITUDE 37°13'42.56"N
LONGITUDE 119°29'19.05"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	3	0	X	0	2	0	X	0	0	0	X	0	0	2	X
7:15 AM - 7:30 AM	0	6	0	X	2	5	0	X	0	0	0	X	0	0	7	X
7:30 AM - 7:45 AM	0	12	1	X	1	0	0	X	0	0	0	X	0	0	5	X
7:45 AM - 8:00 AM	0	9	0	X	1	8	0	X	0	0	0	X	0	0	4	X
8:00 AM - 8:15 AM	0	14	0	X	3	4	0	X	0	0	0	X	1	0	7	X
8:15 AM - 8:30 AM	0	8	0	X	2	3	0	X	0	0	0	X	0	0	4	X
8:30 AM - 8:45 AM	0	8	0	X	1	7	0	X	0	0	0	X	0	0	7	X
8:45 AM - 9:00 AM	0	7	0	X	2	5	0	X	0	0	0	X	0	0	7	X
TOTAL	0	67	1	X	12	34	0	X	0	0	0	X	1	0	43	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 PM - 9:15 PM	0	8	0	X	1	8	0	X	0	0	0	X	0	0	3	X
9:15 PM - 9:30 PM	0	10	0	X	2	18	0	X	0	0	0	X	1	0	4	X
9:30 PM - 9:45 PM	0	4	0	X	9	11	0	X	0	0	0	X	0	0	3	X
9:45 PM - 10:00 PM	0	10	0	X	8	11	0	X	0	0	0	X	0	0	1	X
10:00 PM - 10:15 PM	0	6	0	X	2	11	0	X	0	0	0	X	0	0	3	X
10:15 PM - 10:30 PM	0	2	0	X	10	11	0	X	0	0	0	X	0	0	3	X
10:30 PM - 10:45 PM	0	2	0	X	6	6	0	X	0	0	0	X	0	0	2	X
10:45 PM - 11:00 PM	0	1	3	X	2	7	0	X	0	0	0	X	0	0	0	X
TOTAL	0	43	3	X	40	83	0	X	0	0	0	X	1	0	19	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:45 AM - 8:30 AM	0	39	0	X	7	22	0	X	0	0	0	X	1	0	22	X
4:15 PM - 5:15 PM	0	30	0	X	21	51	0	X	0	0	0	X	1	0	11	X

	PHF
AM	0.784
PM	0.814





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Turning Movement Report

Prepared For:

Ruth Davis
 TPG Consulting
 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION Cascadel Road @ Mission Drive
COUNTY Madera
COLLECTION DATE 7/8/2008

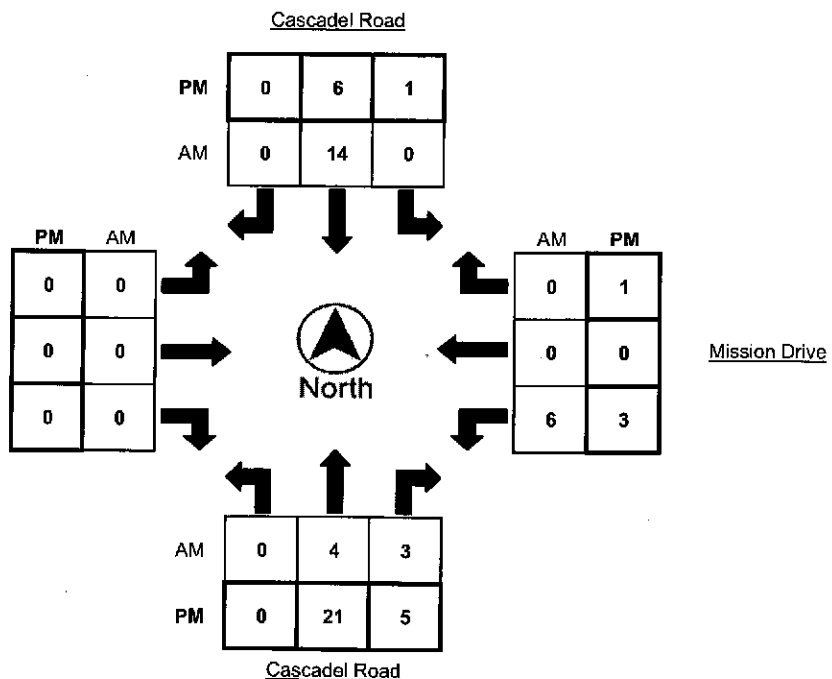
LATITUDE 37°13'47.72"N
LONGITUDE 119°28'57.53"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	0	0	0	X	0	0	0	X	0	0	0	X
7:15 AM - 7:30 AM	0	0	1	X	0	2	0	X	0	0	0	X	0	0	0	X
7:30 AM - 7:45 AM	0	2	0	X	0	3	0	X	0	0	0	X	2	0	0	X
7:45 AM - 8:00 AM	0	0	0	X	0	5	0	X	0	0	0	X	0	0	0	X
8:00 AM - 8:15 AM	0	1	1	X	0	3	0	X	0	0	0	X	3	0	0	X
8:15 AM - 8:30 AM	0	1	2	X	0	3	0	X	0	0	0	X	1	0	0	X
8:30 AM - 8:45 AM	0	0	0	X	0	3	0	X	0	0	0	X	2	0	0	X
8:45 AM - 9:00 AM	0	1	1	X	0	3	0	X	0	0	0	X	2	0	0	X
TOTAL	0	5	5	X	0	22	0	X	0	0	0	X	10	0	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 PM - 9:15 PM	0	1	0	X	0	3	0	X	0	0	0	X	2	0	0	X
9:15 PM - 9:30 PM	0	0	0	X	0	0	0	X	0	0	0	X	0	0	0	X
9:30 PM - 9:45 PM	0	7	1	X	0	1	0	X	0	0	0	X	1	0	0	X
9:45 PM - 10:00 PM	0	3	1	X	0	1	0	X	0	0	0	X	0	0	1	X
10:00 PM - 10:15 PM	0	6	0	X	1	3	0	X	0	0	0	X	1	0	0	X
10:15 PM - 10:30 PM	0	5	3	X	0	1	0	X	0	0	0	X	1	0	0	X
10:30 PM - 10:45 PM	0	4	1	X	0	1	0	X	0	0	0	X	0	0	0	X
10:45 PM - 11:00 PM	0	2	1	X	1	0	0	X	0	0	0	X	1	0	0	X
TOTAL	0	28	7	X	2	10	0	X	0	0	0	X	6	0	1	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:30 AM - 8:30 AM	0	4	3	X	0	14	0	X	0	0	0	X	6	0	0	X
4:30 PM - 5:30 PM	0	21	5	X	1	6	0	X	0	0	0	X	3	0	1	X

AM	0.844
PM	0.841





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Turning Movement Report

Prepared For:

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 6807 Leameadow
 Dallas, TX 75248

903-566-3150

LOCATION North Fork Road @ Auberry Road
COUNTY Madera
COLLECTION DATE 7/8/2008

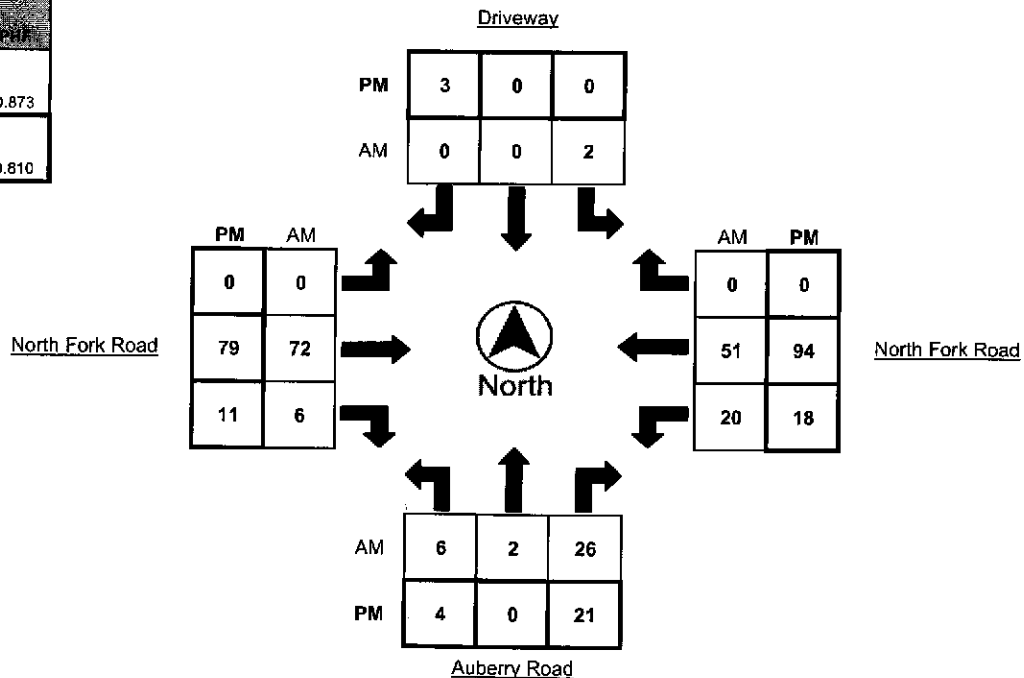
LATITUDE 37°13'9.18"N
LONGITUDE 119°30'31.07"W
WEATHER Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	2	0	0	X	0	0	0	X	0	11	2	X	0	12	0	X
7:15 AM - 7:30 AM	0	0	11	X	1	0	0	X	0	16	0	X	4	10	0	X
7:30 AM - 7:45 AM	3	2	4	X	1	0	0	X	0	15	4	X	6	12	0	X
7:45 AM - 8:00 AM	2	0	8	X	0	0	0	X	0	24	1	X	4	14	0	X
8:00 AM - 8:15 AM	1	0	3	X	0	0	0	X	0	17	1	X	6	15	0	X
8:15 AM - 8:30 AM	3	0	6	X	0	0	0	X	1	11	4	X	2	14	0	X
8:30 AM - 8:45 AM	1	1	5	X	1	0	1	X	2	12	1	X	4	8	0	X
8:45 AM - 9:00 AM	0	0	3	X	1	0	0	X	1	13	2	X	3	7	0	X
TOTAL	12	3	40	X	4	0	1	X	4	119	15	X	29	92	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
4:00 PM - 4:15 PM	2	0	4	X	1	0	0	X	0	6	0	X	2	17	0	X
4:15 PM - 4:30 PM	0	0	0	X	1	0	1	X	0	19	0	X	1	14	0	X
4:30 PM - 4:45 PM	0	0	1	X	0	0	1	X	0	18	7	X	5	21	0	X
4:45 PM - 5:00 PM	1	0	4	X	0	0	0	X	0	22	3	X	5	20	0	X
5:00 PM - 5:15 PM	3	0	10	X	0	0	1	X	0	22	0	X	6	29	0	X
5:15 PM - 5:30 PM	0	0	6	X	0	0	1	X	0	17	1	X	2	24	0	X
5:30 PM - 5:45 PM	2	0	2	X	0	0	0	X	1	11	2	X	4	16	0	X
5:45 PM - 6:00 PM	1	0	3	X	1	0	1	X	0	17	1	X	6	14	0	X
TOTAL	9	0	30	X	3	0	5	X	1	132	14	X	31	155	0	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:15 AM - 8:15 AM	6	2	26	X	2	0	0	X	0	72	6	X	20	51	0	X
4:45 PM - 5:30 PM	4	0	21	X	0	0	3	X	0	79	11	X	18	94	0	X

Time	PM
AM	0.873
PM	0.810





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Turning Movement Report

Prepared For:

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 Dallas, TX 75248

903-566-3150

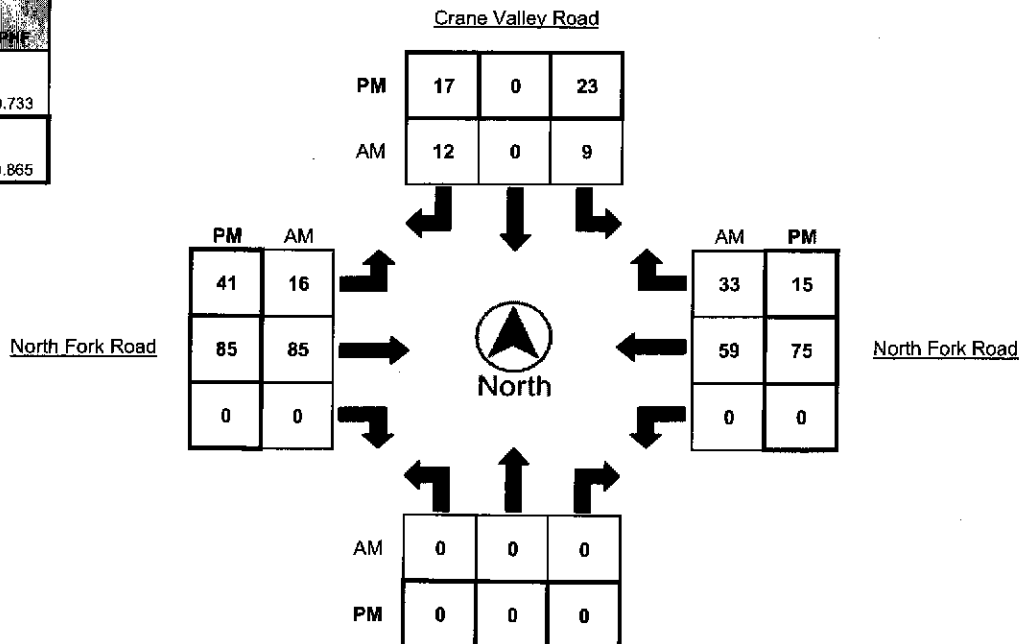
LOCATION North Fork Road @ Crane Valley Road **LATITUDE** 37°12'45.37"N
COUNTY Madera **LONGITUDE** 119°33'10.14"W
COLLECTION DATE 7/8/2008 **WEATHER** Sunny and Clear

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
7:00 AM - 7:15 AM	0	0	0	X	0	0	2	X	6	9	0	X	0	15	5	X
7:15 AM - 7:30 AM	0	0	0	X	1	0	3	X	5	5	0	X	0	19	8	X
7:30 AM - 7:45 AM	0	0	0	X	3	0	2	X	5	7	0	X	0	22	6	X
7:45 AM - 8:00 AM	0	0	0	X	1	0	1	X	3	2	0	X	0	16	2	X
8:00 AM - 8:15 AM	0	0	0	X	4	0	1	X	7	15	0	X	0	9	7	X
8:15 AM - 8:30 AM	0	0	0	X	1	0	2	X	6	23	0	X	0	12	8	X
8:30 AM - 8:45 AM	0	0	0	X	2	0	4	X	2	31	0	X	0	21	13	X
8:45 AM - 9:00 AM	0	0	0	X	2	0	5	X	1	16	0	X	0	17	5	X
TOTAL	0	0	0	X	14	0	20	X	35	108	0	X	0	131	54	X

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
9:00 PM - 9:15 PM	0	0	0	X	2	0	3	X	12	12	0	X	0	11	3	X
9:15 PM - 9:30 PM	0	0	0	X	7	0	6	X	10	12	0	X	0	13	8	X
9:30 PM - 9:45 PM	0	0	0	X	3	0	5	X	10	29	0	X	0	16	2	X
9:45 PM - 10:00 PM	0	0	0	X	2	0	4	X	15	24	0	X	0	14	4	X
10:00 PM - 10:15 PM	0	0	0	X	11	0	2	X	6	20	0	X	0	32	3	X
10:15 PM - 10:30 PM	0	0	0	X	2	0	3	X	5	12	0	X	0	7	2	X
10:30 PM - 10:45 PM	0	0	0	X	2	0	5	X	7	19	0	X	0	14	5	X
10:45 PM - 11:00 PM	0	0	0	X	4	0	1	X	13	13	0	X	0	15	1	X
TOTAL	0	0	0	X	33	0	29	X	78	141	0	X	0	122	26	X

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A	Left	Thru	Right	N/A
8:00 AM - 9:00 AM	0	0	0	X	9	0	12	X	16	85	0	X	0	59	33	X
4:15 PM - 5:15 PM	0	0	0	X	23	0	17	X	41	85	0	X	0	75	15	X

Time	PMF
AM	0.733
PM	0.865



ATTACHMENT VI – C - 53

MADERA COUNTY CAPACITY TABLE

**Table 9
Capacity Class and Capacity per Hour per Lane**

Facility Type	Madera County		Fresno County		Merced County	
	CAPCLA SS	Capacity	CAPCLA SS	Capacity	CAPCLA SS	Capacity
Freeway	1	2,000	19,59	2,000	1	2,000
Highway	2	1,145 ¹ /1,800 ²			2	1,145 ¹ /1,800 ²
County Road	3	900 ¹ /1,400 ²			3	900 ¹ /1,400 ²
Expressway	8	1,200	18,58	1,000/1,200		
Arterial	4	750			4	750
Undivided Arterial with Parking			13,53	700/800		
Undivided Arterial without Parking			14,54	800/900		
Divided Arterial with Parking			15,55	800/900		
Divided Arterial without Parking			16,56	900		
Collector	5	500	12,52	600,700	5	500
Local	6	350			6	350
Freeway Ramp	7	1,500			7	1,500
Centroid Collector	10	10,000	10,50	0	10	10,000

Notes: 1: Capacity per hour per lane for two-lane rural highways

2: Capacity per hour per lane for multi-lane rural highways

• $Adjusted\ Volume = Unadjusted\ Volume + Observed\ 1990\ Volume - Calibrated\ Model\ 1990\ Volume$

If there is no observed volume for a segment, the adjusted volume is set equal to the unadjusted volume. The volume/capacity ratio produced by the highway assignment is also adjusted to reflect the adjusted volume.

The service level computation is based on relationships derived from the 1985 Highway Capacity manual. Chapters 3, 7 and 8 of the Manual, which are largely oriented towards design, include a large number of factors that are more complex than can be used for planning purposes. However, average design defaults have been developed and used as the per/lane capacity basis in the capacity constrained assignment process. These capacities are shown as the Level E capacities in Table 13 below as well as in Table 9. The HCM also contains cut-off levels for Service Levels A through D. These capacities are also shown in Table 13. Table 14 indicates the resultant volume/capacity ratios for Service Levels A through D for the basic types of roadways in Madera County using Level E as the basic roadway capacity; in this table, the V/C ratios for urban streets are derived from the planning portion of the intersection LOS process. The postprocessor that follows the assignment module uses these V/C ratios to determine the Level of Service on each link.

Table 13
Capacities per Hour per Lane for Various Highway Facilities

LOS	Freeways	Two-Lane Rural Highways	Multi-lane Rural Highways
A	700	120	471
B	1100	240	943
C	1550	395	1286
D	1850	675	1586
E	2000	1145	1800

Table 14
Volume/Capacity Ratios Various Highway Facilities

LOS	Freeways	Two-Lane Rural Highways	Multi-lane Rural Highways	Urban Streets
A	0.35	0.10	0.26	0.60
B	0.55	0.21	0.52	0.70
C	0.78	0.34	0.71	0.80
D	0.93	0.59	0.88	0.90
E	1.00	1.00	1.00	1.00

The file produced by the postprocessor module thus contains all of the original network characteristics together with the unadjusted and adjusted volume, the adjusted volume/capacity ratio and the computed level of service.

Avenue 17 / State Route 99 Intersection Improvements Memo
02/11/2009



PETERS ENGINEERING GROUP

A CALIFORNIA CORPORATION

952 POLLASKY AVENUE
CLOVIS, CALIFORNIA 93612

PHONE (559) 299-1544
FAX (559) 299-1722

MEMORANDUM

TO: MR. CHAD BROUSSARD
FROM: DAVID PETERS, PE, TE
SUBJECT: AVENUE 17 / STATE ROUTE 99 INTERCHANGE IMPROVEMENTS
DATE: FEBRUARY 11, 2009

Introduction

Several projects have been proposed in the vicinity of the Avenue 17 / State Route 99 interchange in Madera, California including a gaming casino and hotel. Interchange improvements to accommodate this additional traffic have been identified and detailed in the Circulation section of an Environmental Impact Statement (EIS) prepared by Analytical Environmental Services (AES) of Sacramento, CA.

This technical memorandum is to analyze traffic operations of the proposed interchange improvements as proposed in the EIS (and based upon the trip generation and distributions identified in the EIS), particularly the operations of the Airport (Golden State) & Avenue 17 intersection and its interaction with the State Route 99 Southbound Off-Ramp & Avenue 17 intersection.

Analysis

A diagram of the proposed interchange improvement is presented in Figure 1. Synchro 6 (Build 614) was utilized to conduct the traffic operational analysis of the focus area shown on Figure 2.

Based upon traffic volumes forecasted in the EIS, the analysis determined the following operational characteristics of the proposed improvements during the Opening Day (2010) Alternative 'A' Scenario. This scenario included traffic from the following sources:

- Existing Traffic
- Approved & Pending Projects as presented in Table 1.
- Proposed Project (Casino & Hotel)

Table 1

**Approved / Pending / Proposed Projects
included in the Northfork Casino TIS**

Project Name	Location/Access	Phasing	Fratar		Uses	Square Feet
			Years			
Madera Town Center	N of Ave 17 E of SR 99	Phase 1	2010		Shopping Center	450,000
	N of Ave 17 E of SR 99	Build Out	2030		Shopping Center	791,630
Madera Promenade (formerly Outlet Center)	N of Ave 17 between Road 23 and Golden State; Access to Rd 23, Ave 17 and Golden State (Site Plan Provided)	Build Out	2030		Shopping Center	834,800
Bratton	SW corner of Airport and Ave 17; Access to Airport and Avenue 17 (Site Plan Provided)	Build Out	2010/2030		Hotel/Commercial	170,000
CAT 17 Shopping Center	SE corner of Ave 17 and RR; Access to Ave 17, both 2008 and 2030, and the new extension of Sharon in 2030 (Site Plan Provided)	Build Out	2030		Shopping Center	452,499
Madera Fairgrounds Commercial	SE corner of W. Cleveland Ave and Schnoor Ave; Access via W. Cleveland Ave and Schnoor Avenue (Site Map provided)	Build Out	2010/2030		Shopping Center	306,500
Feland/Zinkin	S of Ave 16 bet N Schnoor & SR 99	Build Out	2030		Shopping Center	221,000
Gottschalks	S of Ave 17 W of Airport; Access to Airport	Build Out	2030		Office	159,000
	S of Ave 17 W of Airport S of Outlet Center; Access to 17	Build Out	2030		Shopping Center	323,000
Horizon Enterprises	W of Golden State N of Ave 17 E side of Golden State with no access via Ave 17	Build Out	2030		Shopping Center	100,778
Horizon Enterprises	E side of Golden State with no access via Ave 17	Build Out	2030		Shopping Center	59,042
Horizon Enterprises (Gas Station only)	E side of Golden State with no access via Ave 17	Build Out	2010/2030		Gas Station/Mini-Mart	10,180
Heritage Homes	S of Ave 17 W of SR 99 E end of Yeager Rd	Build Out	2010/2030		Shopping Center	230,000
Horizon Enterprises/Weil	SW corner of N Schnoor & Ave 16	Build Out	2010/2030		Shopping Center	27,000

This was believed to be the most conservative analysis since it included all projects which have received entitlements or are currently under construction as well as the proposed

project. The objective under this scenario is to provide adequate capacity at the Avenue 17 interchange on opening day of the last project built under this scenario.

Level of Service

The levels of service anticipated at each of the State Route 99 / Avenue 17 ramp intersections as well as Avenue 17 & Airport Drive (Golden State Blvd.) are presented in Table 2.

Table 2 – LOS Comparisons¹

Airport Dr / Avenue 17	SB Ramps / Avenue 17	NB Ramps / Avenue 17
C	A	B

¹ - Lowest level of service presented (AM, PM Peak Hours)

Peak Hour Left-Turn Queues

The 95th and 50th percentile queue distances available and required for left turns at the ramp intersections are presented in Tables 3 and 4 respectively for each analysis scenario.

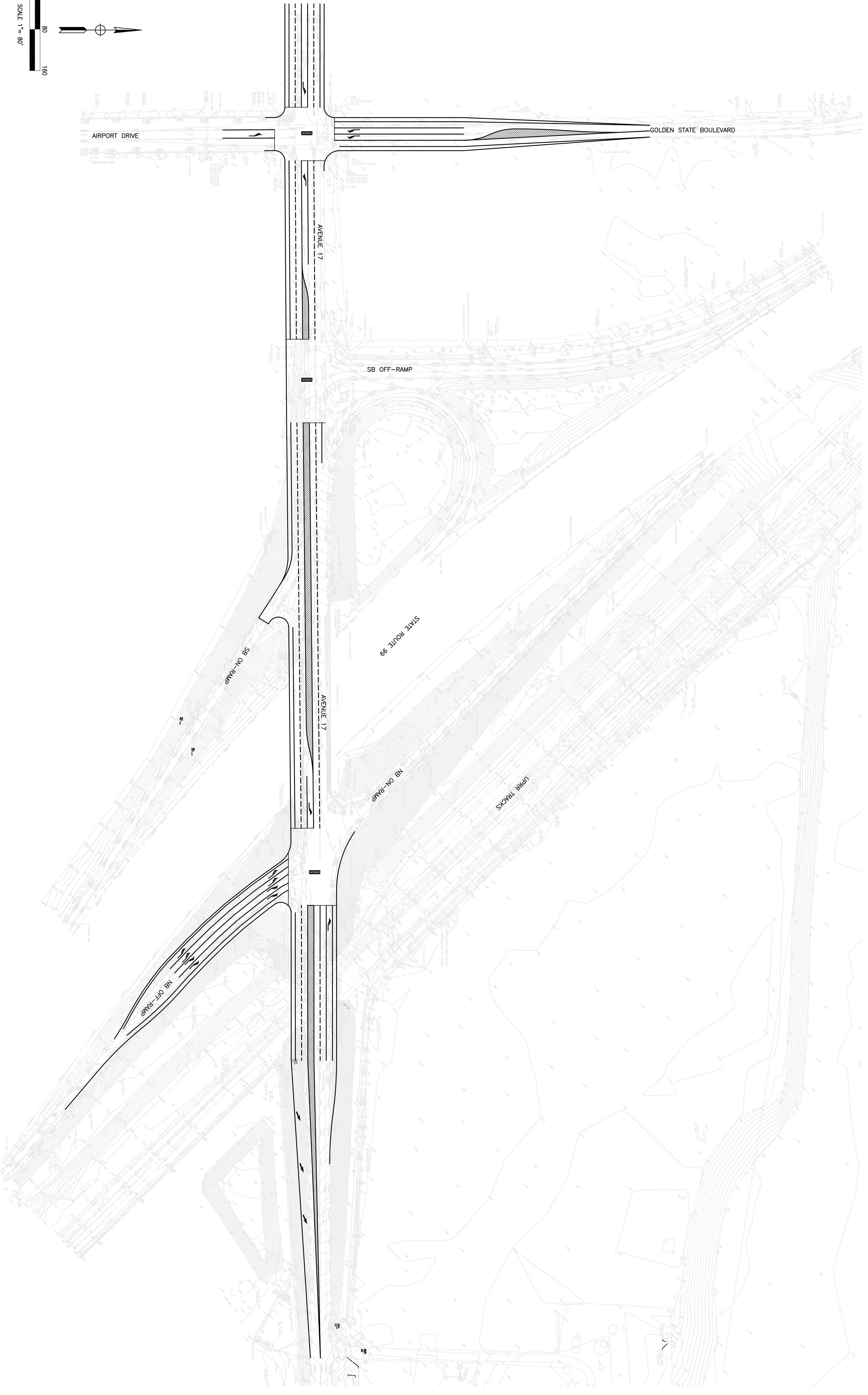
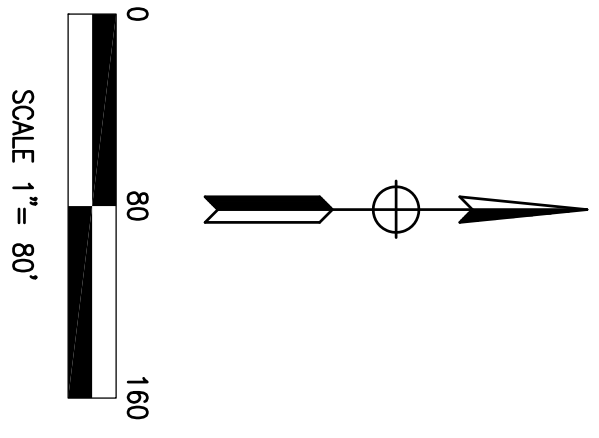
Table 3 – 95th Percentile Queue Lengths²

Westbound Left Turn on Avenue 17 at Airport Drive (G.S. Blvd)	
Available	Required
385	232

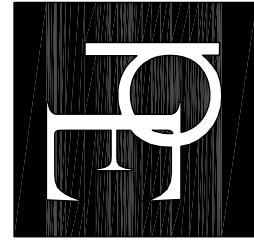
² - Longest required queue presented (AM, PM Peak Hours)

Conclusions

The main constraint at this location is accommodating the westbound left turn queues at the Avenue 17 / Airport Drive (G.S. Blvd) intersection such that vehicles do not back up and block movements at the State Route 99 Southbound Off-ramp which is adjacent and to the east of the intersection. The interchange improvements as proposed in Figure 1 will accommodate these queues, as demonstrated in Table 3, without adversely affecting the southbound ramp intersection and therefore appear to be sufficient and appropriate improvements for the scenario described above.



01-07-08	REV DATE

PREPARED BY

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




PREPARED FOR
CITY OF MADERA
 CITY HALL
 205 WEST FOURTH STREET
 MADERA, CA 93637
 (559) 861-3400

PROJECT TITLE
SR 99 & AVENUE 17 ROAD IMPROVEMENTS
2010 INTERIM IMPROVEMENTS

CY	PROJECT ENG
DP	CHECKED BY
1"=80'	SCALE
1	SHEET NUMBER
1	TOTAL SHEETS

1: Avenue 17 & Airport Drive
 HCM Signalized Intersection Capacity Analysis

2010 With Project-AM
 2/9/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	0.96		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	3490		1752	3376		1752	1656		3400	1714	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	3490		1752	3376		1752	1656		3400	1714	
Volume (vph)	32	470	14	137	460	150	108	41	89	182	25	22
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	511	15	149	500	163	117	45	97	198	27	24
RTOR Reduction (vph)	0	1	0	0	22	0	0	88	0	0	22	0
Lane Group Flow (vph)	35	525	0	149	641	0	117	54	0	198	29	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.8	45.4		11.4	52.0		7.9	8.3		7.9	8.3	
Effective Green, g (s)	4.8	45.9		11.4	52.5		7.9	8.8		7.9	8.8	
Actuated g/C Ratio	0.05	0.51		0.13	0.58		0.09	0.10		0.09	0.10	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	93	1780		222	1969		154	162		298	168	
v/s Ratio Prot	0.02	0.15		0.09	0.19		0.07	0.03		0.06	0.02	
v/s Ratio Perm												
v/c Ratio	0.38	0.29		0.67	0.33		0.76	0.34		0.66	0.17	
Uniform Delay, d1	41.2	12.7		37.5	9.6		40.1	37.9		39.8	37.3	
Progression Factor	1.00	1.00		0.90	0.45		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.4		7.6	0.4		19.2	1.2		5.5	0.5	
Delay (s)	43.7	13.1		41.2	4.7		59.3	39.1		45.3	37.8	
Level of Service	D	B		D	A		E	D		D	D	
Approach Delay (s)		15.0			11.4			48.2			43.7	
Approach LOS		B			B			D			D	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2: Avenue 17 & SR-99 SB off Ramp
 HCM Signalized Intersection Capacity Analysis

2010 With Project-AM
 2/9/2009

























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↗	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3505	3505		1752	1568
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3505	3505		1752	1568
Volume (vph)	0	741	669	0	56	78
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	805	727	0	61	85
RTOR Reduction (vph)	0	0	0	0	0	77
Lane Group Flow (vph)	0	805	727	0	61	8
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		73.0	73.0		8.0	8.0
Effective Green, g (s)		73.5	73.5		8.5	8.5
Actuated g/C Ratio		0.82	0.82		0.09	0.09
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2862	2862		165	148
v/s Ratio Prot		c0.23	0.21		c0.03	
v/s Ratio Perm						0.01
v/c Ratio		0.28	0.25		0.37	0.05
Uniform Delay, d1		2.0	1.9		38.2	37.1
Progression Factor		0.15	0.27		1.00	1.00
Incremental Delay, d2		0.2	0.2		1.4	0.2
Delay (s)		0.5	0.7		39.6	37.2
Level of Service		A	A		D	D
Approach Delay (s)		0.5	0.7		38.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

4: Avenue 17 & SR-99 NB Ramps
 HCM Signalized Intersection Capacity Analysis

2010 With Project-AM
 2/9/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 		 			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1752	3505			3505	1568	3400		2760			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1752	3505			3505	1568	3400		2760			
Volume (vph)	60	382	0	0	772	90	350	0	233	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	415	0	0	839	98	380	0	253	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	41	0	0	209	0	0	0
Lane Group Flow (vph)	65	415	0	0	839	57	380	0	44	0	0	0
Turn Type	Prot						Perm custom		custom			
Protected Phases	7	4					8					
Permitted Phases							8		2			
Actuated Green, G (s)	10.4	65.9					51.5	51.5	15.1	15.1		
Effective Green, g (s)	10.4	66.4					52.0	52.0	15.6	15.6		
Actuated g/C Ratio	0.12	0.74					0.58	0.58	0.17	0.17		
Clearance Time (s)	4.0	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	202	2586					2025	906	589	478		
v/s Ratio Prot	c0.04	0.12					c0.24					
v/s Ratio Perm							0.04		c0.11	0.02		
v/c Ratio	0.32	0.16					0.41	0.06	0.65	0.09		
Uniform Delay, d1	36.6	3.5					10.5	8.3	34.6	31.2		
Progression Factor	0.94	0.52					1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.9	0.1					0.6	0.1	2.4	0.1		
Delay (s)	35.4	1.9					11.2	8.5	37.1	31.3		
Level of Service	D	A					B	A	D	C		
Approach Delay (s)	6.5						10.9		34.8		0.0	
Approach LOS	A						B		C		A	
Intersection Summary												
HCM Average Control Delay	17.2		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.45											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	44.7%		ICU Level of Service				A					
Analysis Period (min)	15											
c Critical Lane Group												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	526	149	663	117	142	198	51
v/c Ratio	0.25	0.28	0.78	0.32	0.75	0.57	0.66	0.27
Control Delay	43.2	12.8	63.5	4.7	70.5	23.5	51.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	12.8	63.5	4.7	70.5	23.5	51.1	26.1
Queue Length 50th (ft)	19	81	87	26	66	24	57	14
Queue Length 95th (ft)	48	128	#184	90	#154	77	#95	46
Internal Link Dist (ft)		1009		379		945		888
Turn Bay Length (ft)								
Base Capacity (vph)	156	1846	195	2049	156	574	302	540
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.28	0.76	0.32	0.75	0.25	0.66	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	805	727	61	85
v/c Ratio	0.28	0.25	0.37	0.38
Control Delay	0.5	0.7	44.0	13.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.5	0.7	44.0	13.9
Queue Length 50th (ft)	2	7	33	0
Queue Length 95th (ft)	2	9	70	42
Internal Link Dist (ft)	379	248	379	
Turn Bay Length (ft)				
Base Capacity (vph)	2863	2863	788	752
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	0.25	0.08	0.11
Intersection Summary				



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	65	415	839	98	380	253
v/c Ratio	0.29	0.16	0.41	0.10	0.65	0.37
Control Delay	36.1	2.1	12.5	2.9	39.5	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	2.1	12.5	2.9	39.5	5.6
Queue Length 50th (ft)	36	15	140	0	104	0
Queue Length 95th (ft)	76	21	210	24	140	32
Internal Link Dist (ft)		527	1294			
Turn Bay Length (ft)						
Base Capacity (vph)	253	2587	2057	961	1190	1130
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.16	0.41	0.10	0.32	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.89		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	3446		1752	3336		1752	1639		3400	1735	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	3446		1752	3336		1752	1639		3400	1735	
Volume (vph)	42	673	85	162	637	302	126	84	241	339	49	32
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	732	92	176	692	328	137	91	262	368	53	35
RTOR Reduction (vph)	0	10	0	0	54	0	0	136	0	0	32	0
Lane Group Flow (vph)	46	814	0	176	966	0	137	217	0	368	56	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.7	31.0		10.5	36.8		23.4	16.0		15.5	8.1	
Effective Green, g (s)	4.7	31.5		10.5	37.3		23.4	16.5		15.5	8.6	
Actuated g/C Ratio	0.05	0.35		0.12	0.41		0.26	0.18		0.17	0.10	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	91	1206		204	1383		456	300		586	166	
v/s Ratio Prot	0.03	c0.24		0.10	c0.29		0.08	c0.13		c0.11	0.03	
v/s Ratio Perm												
v/c Ratio	0.51	0.68		0.86	0.70		0.30	0.72		0.63	0.34	
Uniform Delay, d1	41.5	24.9		39.0	21.7		26.7	34.6		34.6	38.0	
Progression Factor	1.00	1.00		0.77	0.59		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	3.0		27.5	2.7		0.4	8.4		2.1	1.2	
Delay (s)	45.9	27.9		57.5	15.5		27.1	43.0		36.7	39.3	
Level of Service	D	C		E	B		C	D		D	D	
Approach Delay (s)		28.9			21.7			38.6			37.2	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2: Avenue 17 & SR-99 SB off Ramp
 HCM Signalized Intersection Capacity Analysis























2010 With Project-PM
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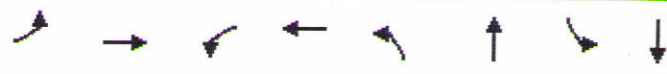


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↙	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3505	3505		1752	1568
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3505	3505		1752	1568
Volume (vph)	0	1253	1010	0	209	91
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1362	1098	0	227	99
RTOR Reduction (vph)	0	0	0	0	0	62
Lane Group Flow (vph)	0	1362	1098	0	227	37
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		65.1	65.1		15.9	15.9
Effective Green, g (s)		65.6	65.6		16.4	16.4
Actuated g/C Ratio		0.73	0.73		0.18	0.18
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2555	2555		319	286
v/s Ratio Prot		c0.39	0.31		c0.13	
v/s Ratio Perm						0.02
v/c Ratio		0.53	0.43		0.71	0.13
Uniform Delay, d1		5.4	4.8		34.6	30.8
Progression Factor		0.27	0.36		1.00	1.00
Incremental Delay, d2		0.6	0.4		7.3	0.2
Delay (s)		2.1	2.1		41.9	31.0
Level of Service		A	A		D	C
Approach Delay (s)		2.1	2.1		38.6	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay			6.4		HCM Level of Service	A
HCM Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

4: Avenue 17 & SR-99 NB Ramps
 HCM Signalized Intersection Capacity Analysis

2010 With Project-PM
 2/9/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 		 			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.97		0.88			
Fr _t	1.00	1.00			1.00	0.85	1.00		0.85			
Fl _t Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1752	3505			3505	1568	3400		2760			
Fl _t Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1752	3505			3505	1568	3400		2760			
Volume (vph)	74	854	0	0	1081	191	422	0	720	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	928	0	0	1175	208	459	0	783	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	101	0	0	173	0	0	0
Lane Group Flow (vph)	80	928	0	0	1175	107	459	0	610	0	0	0
Turn Type	Prot						Perm custom		custom			
Protected Phases	7	4					8					
Permitted Phases							8	2	2			
Actuated Green, G (s)	6.4	56.3					45.9	45.9	24.7	24.7		
Effective Green, g (s)	6.4	56.8					46.4	46.4	25.2	25.2		
Actuated g/C Ratio	0.07	0.63					0.52	0.52	0.28	0.28		
Clearance Time (s)	4.0	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	125	2212					1807	808	952	773		
v/s Ratio Prot	c0.05	0.26					c0.34					
v/s Ratio Perm							0.07	0.14	c0.22			
v/c Ratio	0.64	0.42					0.65	0.13	0.48	0.79		
Uniform Delay, d ₁	40.7	8.3					15.9	11.3	27.0	29.9		
Progression Factor	0.76	0.39					1.00	1.00	1.00	1.00		
Incremental Delay, d ₂	9.0	0.5					1.8	0.3	0.4	5.4		
Delay (s)	39.9	3.8					17.7	11.7	27.4	35.3		
Level of Service	D	A					B	B	C	D		
Approach Delay (s)	6.6						16.8			32.4	0.0	
Approach LOS	A						B			C	A	
Intersection Summary												
HCM Average Control Delay	19.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	56.0%		ICU Level of Service				B					
Analysis Period (min)	15											
c Critical Lane Group												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	824	176	1020	137	353	368	88
v/c Ratio	0.33	0.65	1.01	0.68	0.30	0.81	0.63	0.44
Control Delay	45.6	27.4	102.6	16.2	27.7	32.3	40.8	31.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	27.4	102.6	16.2	27.7	32.3	40.8	31.5
Queue Length 50th (ft)	25	204	~103	120	61	103	98	29
Queue Length 95th (ft)	59	291	#232	#343	109	180	#175	71
Internal Link Dist (ft)		1009		379		945		888
Turn Bay Length (ft)								
Base Capacity (vph)	156	1275	175	1495	454	616	584	554
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.65	1.01	0.68	0.30	0.57	0.63	0.16

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1362	1098	227	99
v/c Ratio	0.53	0.43	0.71	0.29
Control Delay	2.3	2.4	46.7	12.5
Queue Delay	0.2	0.0	0.0	0.0
Total Delay	2.5	2.4	46.7	12.5
Queue Length 50th (ft)	55	12	123	11
Queue Length 95th (ft)	75	102	184	49
Internal Link Dist (ft)	379	248	379	
Turn Bay Length (ft)				
Base Capacity (vph)	2556	2556	633	615
Starvation Cap Reductn	402	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.43	0.36	0.16

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	80	928	1175	208	459	783
v/c Ratio	0.54	0.42	0.64	0.23	0.48	0.83
Control Delay	41.9	4.1	19.2	2.8	28.1	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	4.1	19.2	2.8	28.1	28.6
Queue Length 50th (ft)	46	53	268	0	107	161
Queue Length 95th (ft)	m79	79	357	37	147	234
Internal Link Dist (ft)		527	1294			
Turn Bay Length (ft)						
Base Capacity (vph)	156	2211	1837	921	1096	1052
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.42	0.64	0.23	0.42	0.74

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Roadway Improvements Cost Estimates

Summary of Probable Construction Costs

	Total Cost
2010 Project (Alternative A)	<u>\$60,935,455</u>
2010 Project (Alternative B)	<u>\$60,935,455</u>
2010 Project (Alternative C)	<u>\$60,935,455</u>
2010 Project (Alternative D)	<u>\$305,500</u>
2030 Project (Alternative A)	<u>\$144,627,523</u>
2030 Project (Alternative B)	<u>\$144,627,523</u>
2030 Project (Alternative C)	<u>\$144,627,523</u>
2030 Project (Alternative D)	<u>\$305,500</u>

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS
NORTH FORK CASINO PROJECT, MADERA, CA
2010 Project Alternative A, B, & C

PREPARED BY: K.THOMPSON

DATE: 10/22/2008

PROJECT NO. 04-837.1

ITEM NAME (DESCRIPTION)	UNIT	QTY	UNIT COST	TOTAL COST
SR 99 North of Avenue 18 1/2 (0.5 Miles)				
• Right-of-way Acquisition	SF	31680	\$3	\$95,040
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$30,000	\$30,000
• PCC (JPCP) (13")	CF	34320	\$25	\$858,000
• CB (6")	CF	15840	\$20	\$316,800
• ASB (8.5")	Ton	1497	\$50	\$74,850
• Earthwork (Grading/Compacting/Import)	LS	1	\$121,440	\$121,440
• Utility Relocation	LS	1	\$150,000	\$150,000
COST				\$1,646,130
SR 99 between Avenue 18 1/2 and Avenue 17 (1.5 Miles)				
• Right-of-way Acquisition	SF	190080	\$3	\$570,240
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$80,000	\$80,000
• PCC (JPCP) (13")	CF	205286	\$25	\$5,132,150
• CB (6")	CF	95040	\$20	\$1,900,800
• ASB (8.5")	Ton	8982	\$50	\$449,100
• Earthwork (Grading/Compacting/Import)	LS	1	\$728,640	\$728,640
• Utility Relocation	LS	1	\$450,000	\$450,000
COST				\$9,310,930
SR 99 South of Avenue 17 (0.5 Miles)				
• Right-of-way Acquisition	SF	63360	\$3	\$190,080
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$20,000	\$20,000
• PCC (JPCP) (13")	CF	68429	\$25	\$1,710,725
• CB (6")	CF	31680	\$20	\$633,600
• ASB (8.5")	Ton	2994	\$50	\$149,700
• Earthwork (Grading/Compacting/Import)	LS	1	\$242,880	\$242,880
• Utility Relocation	LS	1	\$150,000	\$150,000
COST				\$3,096,985
Avenue 18 1/2 @ SR 99 SB Ramps/Road 23				
• Signalization of Intersection	LS	1	\$235,000	\$235,000
COST				\$235,000
Avenue 18 1/2 @ SR 99 NB Ramps				
• Signalization of Intersection	LS	1	\$235,000	\$235,000
COST				\$235,000
Avenue 17 - SR 99 to Road 27 (2.56 miles)				
• Right-of-way Acquisition	SF	324408	\$3	\$973,224
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$100,000	\$100,000
• Asphalt (4")	Ton	8029	\$150	\$1,204,350
• Aggregate Base (12")	Ton	21898	\$50	\$1,094,900
• Earthwork (Grading/Compacting/Import)	LS	1	\$811,020	\$811,020
• Bridge Structure @ SR 99 (Removal)	LS	1	\$1,003,000	\$1,003,000
• Bridge Structure @ SR 99 (Re-Construction)	LS	1	\$6,000,000	\$6,000,000
• Bridge Structure @ Railroad (Widening)	LS	1	\$816,000	\$816,000
• Utility Relocation	LS	1	\$150,000	\$150,000
COST				\$12,152,494

Avenue 17 @ Road 23

• Signalization of Intersection	LS	1	\$235,000	\$235,000
			COST	\$235,000

Avenue 17 at Golden State Boulevard

• Signalization of Intersection	LS	1	\$235,000	\$235,000
• Right-of-way Acquisition	SF	39800	\$3	\$119,400
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$60,000	\$60,000
• Asphalt (4")	Ton	985	\$150	\$147,750
• Aggregate Base (12")	Ton	2686	\$50	\$134,300
• Earthwork (Grading/Compacting/Import)	LS	1	\$99,495	\$99,495
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$810,945

Avenue 17 at SR 99 SB Ramps

• Signalization of Intersection	LS	1	\$235,000	\$235,000
			COST	\$235,000

Avenue 17 at SR 99 NB Ramps

• Signalization of Intersection	LS	1	\$235,000	\$235,000
• Right-of-way Acquisition	SF	89850	\$3	\$269,550
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$60,000	\$60,000
• HMA Asphalt (7.5")	Ton	4245	\$150	\$636,750
• Aggregate Base (15")	Ton	7581	\$50	\$379,050
• Earthwork (Grading/Compacting/Import)	LS	1	\$281,530	\$281,530
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$1,876,880

Olive Avenue/Avenue 14 at SR 99 SB off-ramp

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	11160	\$3	\$33,480
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$15,000	\$15,000
• HMA Asphalt (7.5")	CF	527	\$20	\$10,540
• Aggregate Base (15")	Ton	942	\$150	\$141,300
• Earthwork (Grading/Compacting/Import)	LS	1	\$34,968	\$34,968
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$435,288

Olive Avenue/Avenue 14/SR 99 SB on-ramp at SR 145

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	18000	\$10	\$180,000
• Building Acquisition	SF	21750	\$100	\$2,175,000
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$25,000	\$25,000
• Hardscape Removal (Curb/Gutter/Sidewalk)	LF	1000	\$20	\$20,000
• Hardscape Installation (Curb/Gutter/Sidewalk)	LF	1000	\$40	\$40,000
• Handicap Accessible Ramp Installation	EA	5	\$2,500	\$12,500
• Asphalt (4")	Ton	594	\$150	\$89,100
• Aggregate Base (12")	Ton	1620	\$50	\$81,000
• Earthwork (Grading/Compacting/Import)	LS	1	\$40,050	\$40,050
• Realignment of South Bound On- Ramp	LS	1	\$50,000	\$50,000
• Utility Relocation	LS	1	\$35,000	\$35,000
			COST	\$2,932,650

Avenue 12/Golden State Boulevard at SR 99 SB off Ramps

• Signalization of Intersection	LS	1	\$235,000	\$235,000
• Right-of-way Acquisition	SF	18120	\$3	\$54,360
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$20,000	\$20,000
• HMA Asphalt (7.5")	Ton	850	\$150	\$127,500
• Aggregate Base (15")	Ton	1529	\$50	\$76,450
• Earthwork (Grading/Compacting/Import)	LS	1	\$57,078	\$57,078
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$585,388

Avenue 12 at Golden State Boulevard

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	11160	\$3	\$33,480
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$15,000	\$15,000
• Asphalt (4")	Ton	276	\$150	\$41,400
• Aggregate Base (12")	Ton	753	\$50	\$37,650
• Earthwork (Grading/Compacting/Import)	LS	1	\$27,900	\$27,900
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$355,430

Avenue 12 at SR 99 NB Ramps

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	5580	\$3	\$16,740
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$10,000	\$10,000
• HMA Asphalt (7.5")	Ton	264	\$150	\$39,600
• Aggregate Base (15")	Ton	471	\$50	\$23,550
• Earthwork (Grading/Compacting/Import)	LS	1	\$52,380	\$52,380
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$342,270

SUBTOTAL CONSTRUCTION COST \$34,485,390

TRAFFIC CONTROL/CONSTRUCTION STAGING (15%)	\$5,172,809
MISC. (3%) - Includes Mobilization/Clearing and grubbing site, etc.	\$1,034,562
CONTINGENCIES (35%)	\$12,069,887
CONSTRUCTION ENGINEERING (5%)	\$1,724,270
PLANS, SPECIFICATIONS, & ENGINEERING (10%)	\$3,448,539

TOTAL CONSTRUCTION COST \$57,935,455

PSR	EA	6	\$250,000.00	\$1,500,000
EIR	EA	6	\$250,000.00	\$1,500,000

TOTAL PROJECT COST \$60,935,455

Notes:

1. All cost reflect current rates/estimates, future rates may differ
2. This estimate is approximate. Reference is made to TPG TIS - NorthFork Casino October, 2008
3. When freeway overpasses are required to lengthen due to SR 99 widening entire overpass structures are assumed to be replaced
4. No drainage analysis has been included in these estimates
5. Only minimal utility impacts have been included
6. It is assumed that sufficient Right of Way is available to be purchased for planned widening of SR 99 without encroaching on the Railroad Right of Way.
7. Cost estimate does not account for all structure relocation

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS
NORTH FORK CASINO PROJECT, MADERA, CA
 2010 Project Alternative D

PREPARED BY: K.THOMPSON

DATE: 10/22/2008

PROJECT NO. 04-837.1

ITEM NAME (DESCRIPTION)	UNIT	QTY	UNIT COST	TOTAL COST
SR 41 at Road 420 (Thornberry Road)				
• Signalization of Intersection	LS	1	\$235,000	\$235,000
COST				\$235,000
SUBTOTAL CONSTRUCTION COST				\$235,000
TRAFFIC CONTROL/CONSTRUCTION STAGING (15%)				\$35,250
CONSTRUCTION ENGINEERING (5%)				\$11,750
PLANS, SPECIFICATIONS, & ENGINEERING (10%)				\$23,500
TOTAL PROJECT COST				\$305,500

Notes:

All cost reflect current rates/estimates, future rates may differ
 This estimate is approximate. Reference is made to TPG TIS - NorthFork Casino October, 2008
 No drainage analysis has been included in these estimates
 Only minimal utility impacts have been included

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS
NORTH FORK CASINO PROJECT, MADERA, CA
2030 Project Alternative A, B, & C

PREPARED BY: K.THOMPSON

DATE: 10/22/2008

PROJECT NO. 04-837.1

ITEM NAME (DESCRIPTION)	UNIT	QTY	UNIT COST	TOTAL COST
SR 99 North of Avenue 18 1/2 (0.5 Miles)				
• Right-of-way Acquisition	SF	63360	\$3	\$190,080
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$40,000	\$40,000
• PCC (JPCP) (13")	CF	68429	\$25	\$1,710,725
• CB (6")	CF	31680	\$20	\$633,600
• ASB (8.5")	Ton	2994	\$50	\$149,700
• Earthwork (Grading/Compacting/Import)	LS	1	\$242,000	\$242,000
• Utility Relocation	LS	1	\$150,000	\$150,000
COST				\$3,116,105
SR 99 between Avenue 18 1/2 and Avenue 17 (1.5 Miles)				
• Right-of-way Acquisition	SF	190080	\$3	\$570,240
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$80,000	\$80,000
• PCC (JPCP) (13")	CF	205284	\$25	\$5,132,100
• CB (6")	CF	95040	\$20	\$1,900,800
• ASB (8.5")	Ton	8981	\$50	\$449,050
• Earthwork (Grading/Compacting/Import)	LS	1	\$725,472	\$725,472
• Utility Relocation	LS	1	\$450,000	\$450,000
COST				\$9,307,662
SR 99 South of Avenue 17 (0.5 Miles)				
• Right-of-way Acquisition	SF	63360	\$3	\$190,080
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$20,000	\$20,000
• PCC (JPCP) (13")	CF	68429	\$25	\$1,710,725
• CB (6")	CF	31680	\$20	\$633,600
• ASB (8.5")	Ton	2994	\$50	\$149,700
• Earthwork (Grading/Compacting/Import)	LS	1	\$241,824	\$241,824
• Utility Relocation	LS	1	\$150,000	\$150,000
COST				\$3,095,929
Avenue 18 1/2 at SR 99 SB Ramps				
• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	50760	\$3	\$152,280
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$20,000	\$20,000
• HMA Asphalt (7.5")	Ton	2379	\$150	\$356,850
• Aggregate Base (15")	Ton	4283	\$50	\$214,150
• Earthwork (Grading/Compacting/Import)	LS	1	\$158,625	\$158,625
• Utility Relocation	LS	1	\$20,000	\$20,000
COST				\$1,106,905
Avenue 18 1/2 at SR 99 NB Ramps				
• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	18000	\$3	\$54,000
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$20,000	\$20,000
• HMA Asphalt (7.5")	Ton	844	\$150	\$126,600
• Aggregate Base (15")	Ton	1519	\$50	\$75,950
• Earthwork (Grading/Compacting/Import)	LS	1	\$1,080,270	\$1,080,270
• Bridge Structure @ SR 99 (Removal)	LS	1	\$1,079,000	\$1,079,000
• Bridge Structure @ SR 99 (Re-Construction)	LS	1	\$9,262,500	\$9,262,500
• Utility Relocation	LS	1	\$20,000	\$20,000
COST				\$11,903,320
Avenue 18 1/2 at Golden State Ave./Road 23				
• Signalization of Intersection	LS	1	\$235,000	\$235,000
• Right-of-way Acquisition	SF	333840	\$3	\$1,001,520
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$100,000	\$100,000
• Asphalt (4")	Ton	5673	\$150	\$850,950
• Aggregate Base (12")	Ton	15471	\$50	\$773,550
• Earthwork (Grading/Compacting/Import)	LS	1	\$905,220	\$905,220
• Utility Relocation	LS	1	\$50,000	\$50,000
COST				\$3,916,240

Avenue 18 @ Road 23

• Signalization of Intersection	LS	1	\$235,000	\$235,000
			COST	\$235,000

Avenue 17 - Road 23 to SR 99 (1.44 miles)

• Right-of-way Acquisition	SF	364954	\$3	\$1,094,862
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$75,000	\$75,000
• Asphalt (4")	Ton	9033	\$150	\$1,354,950
• Aggregate Base (12")	Ton	24634	\$50	\$1,231,700
• Earthwork (Grading/Compacting/Import)	LS	1	\$1,859,400	\$1,859,400
• Bridge Structure @ SR 99 (Widening)	LS	1	\$2,880,000	\$2,880,000
• Bridge Structure @ Railroad (Widening)	LS	1	\$816,000	\$816,000
• Utility Relocation	LS	1	\$30,000	\$30,000
			COST	\$9,341,912

Avenue 17 at Golden State Boulevard

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	37560	\$3	\$112,680
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$25,000	\$25,000
• Asphalt (4")	Ton	930	\$150	\$139,500
• Aggregate Base (12")	Ton	2535	\$50	\$126,750
• Earthwork (Grading/Compacting/Import)	LS	1	\$93,900	\$93,900
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$697,830

Avenue 17 at SR 99 SB Ramps

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	33480	\$3	\$100,440
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$20,000	\$20,000
• HMA Asphalt (7.5")	Ton	1569	\$150	\$235,350
• Aggregate Base (15")	Ton	2825	\$50	\$141,250
• Earthwork (Grading/Compacting/Import)	LS	1	\$104,625	\$104,625
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$801,665

Avenue 17 at SR 99 NB Ramps

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	113250	\$3	\$339,750
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$50,000	\$50,000
• PCC (JPCP) (13")	CF	25350	\$25	\$633,750
• CB (6")	CF	11700	\$20	\$234,000
• ASB (8.5")	Ton	1223	\$50	\$61,150
• HMA Asphalt (7.5")	Ton	1463	\$150	\$219,450
• Aggregate Base (15")	Ton	2633	\$50	\$131,650
• Earthwork (Grading/Compacting/Import)	LS	1	\$229,275	\$229,275
• Utility Relocation	LS	1	\$15,000	\$15,000
			COST	\$2,099,025

** Avenue 16/Ellis St. at Aviation Drive

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	44640	\$3	\$133,920
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$35,000	\$35,000
• Asphalt (4")	Ton	1105	\$150	\$165,750
• Aggregate Base (12")	Ton	3013	\$50	\$150,650
• Earthwork (Grading/Compacting/Import)	LS	1	\$111,600	\$111,600
• Utility Relocation	LS	1	\$40,000	\$40,000
			COST	\$821,920

Avenue 15 1/2 at Road 23

• Signalization of Intersection	LS	1	\$235,000	\$235,000
			COST	\$235,000

Cleveland Avenue/Avenue 15 1/2 at SR 99 NB Ramps

• Signal Modification (Cleveland Ave/Ave 15 1/2 at SR 99 NB Ramps)	LS	1	\$185,000	\$185,000
• Signal Modification (Cleveland Ave/Ave 15 1/2 at Golden State Blvd)	LS	1	\$185,000	\$185,000
• Signal Modification (Cleveland Ave/Ave 15 1/2 at Country Club Dr.)	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	101010	\$3	\$303,030
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$30,000	\$30,000
• HMA Asphalt (7.5")	Ton	523	\$150	\$78,450
• Aggregate Base (15")	Ton	942	\$50	\$47,100
• Hardscape Removal (Curb/Gutter/Sidewalk)	LF	1000	\$20	\$20,000
• Hardscape Installation (Curb/Gutter/Sidewalk)	LF	1000	\$40	\$40,000
• Handicap Accessable Ramp Installation	EA	6	\$2,500	\$15,000
• Earthwork (Grading/Compacting/Import)	LS	1	\$3,383,010	\$3,383,010
• Bridge Structure @ SR 99 (Widening)	LS	1	\$1,228,800	\$1,228,800
• Utility Relocation	LS	1	\$35,000	\$35,000
			COST	\$5,735,390

Cleveland Avenue/Avenue 15 1/2 at SR 99 SB Ramps

• Signal Modification (Cleveland Ave/Ave 15 1/2 at SR 99 SB Ramps)	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	89850	\$3	\$269,550
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$30,000	\$30,000
• HMA Asphalt (7.5")	Ton	523	\$150	\$78,450
• Aggregate Base (15")	Ton	942	\$50	\$47,100
• Earthwork (Grading/Compacting/Import)	LS	1	\$2,108,025	\$2,108,025
• Utility Relocation	LS	1	\$25,000	\$25,000
			COST	\$2,743,125

SR 145/Madera Avenue at SR 99 NB Ramps

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	6000	\$10	\$60,000
• Right-of-way Acquisition	SF	11160	\$3	\$33,480
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$150,000	\$150,000
• Hardscape Removal (Curb/Gutter/Sidewalk)	LF	450	\$20	\$9,000
• Hardscape Installation (Curb/Gutter/Sidewalk)	LF	450	\$40	\$18,000
• Handicap Accessable Ramp Installation	EA	6	\$2,500	\$15,000
• HMA Asphalt (7.5")	Ton	523	\$150	\$78,450
• Aggregate Base (15")	Ton	972	\$50	\$48,600
• Asphalt (4")	Ton	149	\$150	\$22,350
• Aggregate Base (12")	Ton	405	\$50	\$20,250
• Earthwork (Grading/Compacting/Import)	LS	1	\$2,108,025	\$2,108,025
• Utility Relocation	LS	1	\$40,000	\$40,000
			COST	\$2,788,155

Olive Avenue/Avenue 14 at SR 99 SB off-ramp

• Signalization Modification	LS	1	\$185,000	\$185,000
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$15,000	\$15,000
			COST	\$200,000

Olive Avenue/Avenue 14/SR 99 SB on-ramp at SR 145

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	21000	\$10	\$210,000
• Right-of-way Acquisition	SF	45480	\$3	\$136,440
• Building Acquisition	SF	21750	\$100	\$2,175,000
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$40,000	\$40,000
• Hardscape Removal (Curb/Gutter/Sidewalk)	LF	1000	\$20	\$20,000
• Hardscape Installation (Curb/Gutter/Sidewalk)	LF	1000	\$40	\$40,000
• Handicap Accessable Ramp Installation	EA	5	\$2,500	\$12,500
• HMA Asphalt (7.5")	Ton	558	\$150	\$83,700
• Aggregate Base (15")	Ton	1013	\$50	\$50,650
• Asphalt (4")	Ton	829	\$150	\$124,350
• Aggregate Base (12")	Ton	2260	\$50	\$113,000
• Earthwork (Grading/Compacting/Import)	LS	1	\$1,649,400	\$1,649,400
• Bridge Structure @ SR 99 (Widening)	LS	1	\$1,778,400	\$1,778,400
• Utility Relocation	LS	1	\$35,000	\$35,000
			COST	\$6,653,440

Avenue 12/Golden State Boulevard at SR 99 SB off Ramps

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	47400	\$3	\$142,200
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$35,000	\$35,000
• PCC (JPCP) (13")	CF	25272	\$25	\$631,800
• CB (6")	CF	11700	\$20	\$234,000
• ASB (8.5")	Ton	1119	\$50	\$55,950
• HMA Asphalt (7.5")	Ton	1125	\$150	\$168,750
• Aggregate Base (15")	Ton	2026	\$50	\$101,300
• Earthwork (Grading/Compacting/Import)	LS	1	\$164,375	\$164,375
• Utility Relocation	LS	1	\$15,000	\$15,000
	COST			\$1,733,375

Avenue 12 at Golden State Boulevard

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	16800	\$3	\$50,400
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$30,000	\$30,000
• Asphalt (4")	Ton	416	\$150	\$62,400
• Aggregate Base (12")	Ton	1134	\$50	\$56,700
• Earthwork (Grading/Compacting/Import)	LS	1	\$42,000	\$42,000
• Utility Relocation	LS	1	\$15,000	\$15,000
	COST			\$441,500

Avenue 12 at SR 99 NB Ramps

• Signal Modification	LS	1	\$185,000	\$185,000
• Right-of-way Acquisition	SF	230400	\$3	\$691,200
• Signing, Striping and Pavement Markings (Removal and Installation)	LS	1	\$65,000	\$65,000
• HMA Asphalt (7.5")	Ton	900	\$150	\$135,000
• Aggregate Base (15")	Ton	1620	\$50	\$81,000
• Earthwork (Grading/Compacting/Import)	LS	1	\$9,792,180	\$9,792,180
• Bridge Structure @ SR 99 (Widening)	LS	1	\$1,329,600	\$1,329,600
• Bridge Structure @ Railroad (Widening)	LS	1	\$1,296,000	\$1,296,000
• Bridge Structure @ Canal (Widening)	LS	1	\$2,016,000	\$2,016,000
• Bridge Structure @ Off-Ramp (Widening)	LS	1	\$1,440,000	\$1,440,000
	COST			\$17,030,980

SUBTOTAL CONSTRUCTION COST \$84,004,478

TRAFFIC CONTROL/CONSTRUCTION STAGING (15%)	\$12,600,672
MISC. (3%) - Includes Mobilization/Clearing and grubbing site, etc.	\$2,520,134
CONTINGENCIES (35%)	\$29,401,567
CONSTRUCTION ENGINEERING (5%)	\$4,200,224
PLANS, SPECIFICATIONS, & ENGINEERING (10%)	\$8,400,448

TOTAL CONSTRUCTION COST \$141,127,523

PSR	EA	7	\$250,000.00	\$1,750,000
EIR	EA	7	\$250,000.00	\$1,750,000

TOTAL PROJECT COST \$144,627,523

Notes:

1. All cost reflect current rates/estimates, future rates may differ
2. This estimate is approximate. Reference is made to TPG TIS - NorthFork Casino October, 2008
3. When freeway overpasses are required to lengthen due to SR 99 widening entire overpass structures are assumed to be replaced
4. No drainage analysis has been included in these estimates
5. Only minimal utility impacts have been included
6. It is assumed that sufficient Right of Way is available to be purchased for planned widening of SR 99 without encroaching on the Railroad Right of Way.

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS
NORTH FORK CASINO PROJECT, MADERA, CA
 2030 Project Alternative D

PREPARED BY: K. THOMPSON

DATE: 10/22/2008

PROJECT NO. 04-837.1

ITEM NAME (DESCRIPTION)	UNIT	QTY	UNIT COST	TOTAL COST
SR 41 at Road 420				
• Signalization of Intersection	LS	1	\$235,000	\$235,000
COST				\$235,000
SUBTOTAL CONSTRUCTION COST				\$235,000
TRAFFIC CONTROL/CONSTRUCTION STAGING (15%)				\$35,250
CONSTRUCTION ENGINEERING (5%)				\$11,750
PLANS, SPECIFICATIONS, & ENGINEERING (10%)				\$23,500
TOTAL PROJECT COST				\$305,500

Notes:

All cost reflect current rates/estimates, future rates may differ
 This estimate is approximate. Reference is made to TPG TIS - NorthFork Casino October, 2008
 No drainage analysis has been included in these estimates
 Only minimal utility impacts have been included

Avenue 17 / State Route 99 Intersection Improvements Memo
02/11/2009



PETERS ENGINEERING GROUP

A CALIFORNIA CORPORATION

952 POLLASKY AVENUE
CLOVIS, CALIFORNIA 93612

PHONE (559) 299-1544
FAX (559) 299-1722

MEMORANDUM

TO: MR. CHAD BROUSSARD
FROM: DAVID PETERS, PE, TE
SUBJECT: AVENUE 17 / STATE ROUTE 99 INTERCHANGE IMPROVEMENTS
DATE: FEBRUARY 11, 2009

Introduction

Several projects have been proposed in the vicinity of the Avenue 17 / State Route 99 interchange in Madera, California including a gaming casino and hotel. Interchange improvements to accommodate this additional traffic have been identified and detailed in the Circulation section of an Environmental Impact Statement (EIS) prepared by Analytical Environmental Services (AES) of Sacramento, CA.

This technical memorandum is to analyze traffic operations of the proposed interchange improvements as proposed in the EIS (and based upon the trip generation and distributions identified in the EIS), particularly the operations of the Airport (Golden State) & Avenue 17 intersection and its interaction with the State Route 99 Southbound Off-Ramp & Avenue 17 intersection.

Analysis

A diagram of the proposed interchange improvement is presented in Figure 1. Synchro 6 (Build 614) was utilized to conduct the traffic operational analysis of the focus area shown on Figure 2.

Based upon traffic volumes forecasted in the EIS, the analysis determined the following operational characteristics of the proposed improvements during the Opening Day (2010) Alternative 'A' Scenario. This scenario included traffic from the following sources:

- Existing Traffic
- Approved & Pending Projects as presented in Table 1.
- Proposed Project (Casino & Hotel)

Table 1

**Approved / Pending / Proposed Projects
included in the Northfork Casino TIS**

Project Name	Location/Access	Phasing	Fratar		Uses	Square Feet
			Years			
Madera Town Center	N of Ave 17 E of SR 99	Phase 1	2010		Shopping Center	450,000
	N of Ave 17 E of SR 99	Build Out	2030		Shopping Center	791,630
Madera Promenade (formerly Outlet Center)	N of Ave 17 between Road 23 and Golden State; Access to Rd 23, Ave 17 and Golden State (Site Plan Provided)	Build Out	2030		Shopping Center	834,800
Bratton	SW corner of Airport and Ave 17; Access to Airport and Avenue 17 (Site Plan Provided)	Build Out	2010/2030		Hotel/Commercial	170,000
CAT 17 Shopping Center	SE corner of Ave 17 and RR; Access to Ave 17, both 2008 and 2030, and the new extension of Sharon in 2030 (Site Plan Provided)	Build Out	2030		Shopping Center	452,499
Madera Fairgrounds Commercial	SE corner of W. Cleveland Ave and Schnoor Ave; Access via W. Cleveland Ave and Schnoor Avenue (Site Map provided)	Build Out	2010/2030		Shopping Center	306,500
Feland/Zinkin	S of Ave 16 bet N Schnoor & SR 99	Build Out	2030		Shopping Center	221,000
Gottschalks	S of Ave 17 W of Airport; Access to Airport	Build Out	2030		Office	159,000
	S of Ave 17 W of Airport S of Outlet Center; Access to 17	Build Out	2030		Shopping Center	323,000
Horizon Enterprises	W of Golden State N of Ave 17 E side of Golden State with no access via Ave 17	Build Out	2030		Shopping Center	100,778
Horizon Enterprises	E side of Golden State with no access via Ave 17	Build Out	2030		Shopping Center	59,042
Horizon Enterprises (Gas Station only)	E side of Golden State with no access via Ave 17	Build Out	2010/2030		Gas Station/Mini-Mart	10,180
Heritage Homes	S of Ave 17 W of SR 99 E end of Yeager Rd	Build Out	2010/2030		Shopping Center	230,000
Horizon Enterprises/Weil	SW corner of N Schnoor & Ave 16	Build Out	2010/2030		Shopping Center	27,000

This was believed to be the most conservative analysis since it included all projects which have received entitlements or are currently under construction as well as the proposed

project. The objective under this scenario is to provide adequate capacity at the Avenue 17 interchange on opening day of the last project built under this scenario.

Level of Service

The levels of service anticipated at each of the State Route 99 / Avenue 17 ramp intersections as well as Avenue 17 & Airport Drive (Golden State Blvd.) are presented in Table 2.

Table 2 – LOS Comparisons¹

Airport Dr / Avenue 17	SB Ramps / Avenue 17	NB Ramps / Avenue 17
C	A	B

¹ - Lowest level of service presented (AM, PM Peak Hours)

Peak Hour Left-Turn Queues

The 95th and 50th percentile queue distances available and required for left turns at the ramp intersections are presented in Tables 3 and 4 respectively for each analysis scenario.

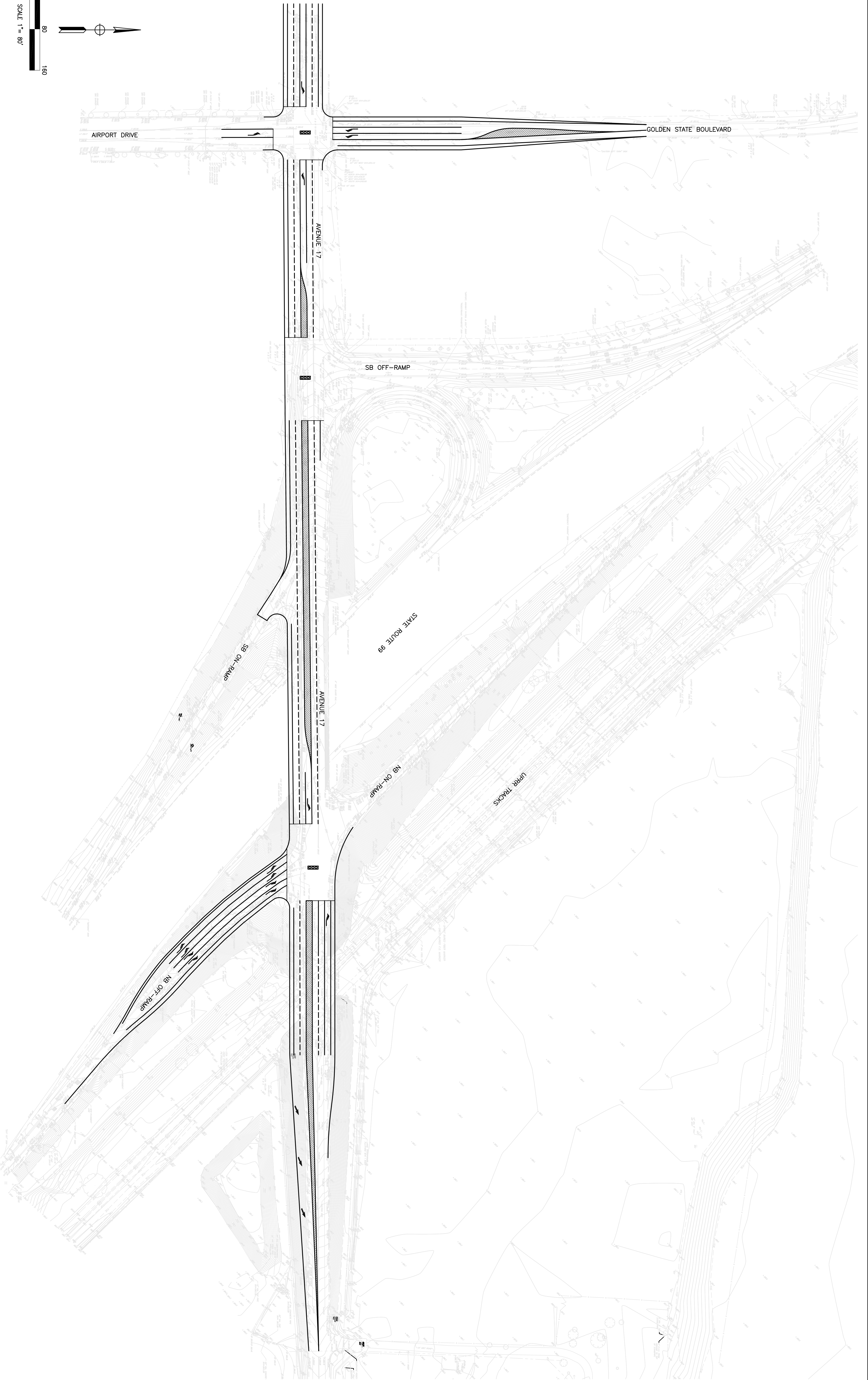
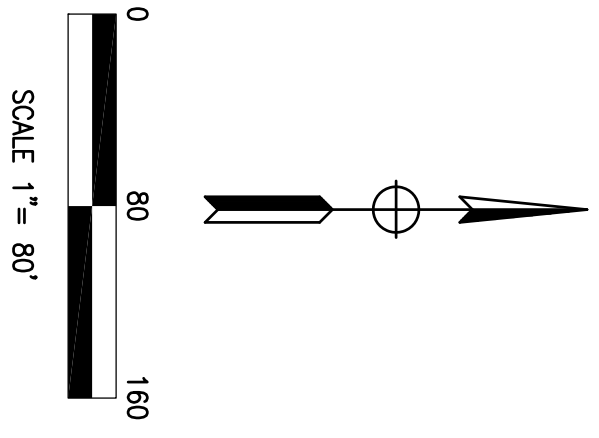
Table 3 – 95th Percentile Queue Lengths²

Westbound Left Turn on Avenue 17 at Airport Drive (G.S. Blvd)	
Available	Required
385	232

² - Longest required queue presented (AM, PM Peak Hours)

Conclusions

The main constraint at this location is accommodating the westbound left turn queues at the Avenue 17 / Airport Drive (G.S. Blvd) intersection such that vehicles do not back up and block movements at the State Route 99 Southbound Off-ramp which is adjacent and to the east of the intersection. The interchange improvements as proposed in Figure 1 will accommodate these queues, as demonstrated in Table 3, without adversely affecting the southbound ramp intersection and therefore appear to be sufficient and appropriate improvements for the scenario described above.



01-07-08	REV DATE






















PREPARED BY
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PREPARED FOR
CITY OF MADERA
 CITY HALL
 205 WEST FOURTH STREET
 MADERA, CA 93637
 (559) 861-3400

PROJECT TITLE	PROJECT ENG
SR 99 & AVENUE 17 ROAD IMPROVEMENTS	CY
SHEET TITLE	CHECKED BY
2010 INTERIM IMPROVEMENTS	DP
	SCALE
	1" = 80'
	SHEET NUMBER
	1
	TOTAL SHEETS
	1

1: Avenue 17 & Airport Drive
 HCM Signalized Intersection Capacity Analysis

2010 With Project-AM
 2/9/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	0.96		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	3490		1752	3376		1752	1656		3400	1714	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	3490		1752	3376		1752	1656		3400	1714	
Volume (vph)	32	470	14	137	460	150	108	41	89	182	25	22
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	511	15	149	500	163	117	45	97	198	27	24
RTOR Reduction (vph)	0	1	0	0	22	0	0	88	0	0	22	0
Lane Group Flow (vph)	35	525	0	149	641	0	117	54	0	198	29	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.8	45.4		11.4	52.0		7.9	8.3		7.9	8.3	
Effective Green, g (s)	4.8	45.9		11.4	52.5		7.9	8.8		7.9	8.8	
Actuated g/C Ratio	0.05	0.51		0.13	0.58		0.09	0.10		0.09	0.10	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	93	1780		222	1969		154	162		298	168	
v/s Ratio Prot	0.02	0.15		0.09	0.19		0.07	0.03		0.06	0.02	
v/s Ratio Perm												
v/c Ratio	0.38	0.29		0.67	0.33		0.76	0.34		0.66	0.17	
Uniform Delay, d1	41.2	12.7		37.5	9.6		40.1	37.9		39.8	37.3	
Progression Factor	1.00	1.00		0.90	0.45		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.4		7.6	0.4		19.2	1.2		5.5	0.5	
Delay (s)	43.7	13.1		41.2	4.7		59.3	39.1		45.3	37.8	
Level of Service	D	B		D	A		E	D		D	D	
Approach Delay (s)		15.0			11.4			48.2			43.7	
Approach LOS		B			B			D			D	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2: Avenue 17 & SR-99 SB off Ramp
 HCM Signalized Intersection Capacity Analysis

2010 With Project-AM
 2/9/2009

























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3505	3505		1752	1568
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3505	3505		1752	1568
Volume (vph)	0	741	669	0	56	78
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	805	727	0	61	85
RTOR Reduction (vph)	0	0	0	0	0	77
Lane Group Flow (vph)	0	805	727	0	61	8
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		73.0	73.0		8.0	8.0
Effective Green, g (s)		73.5	73.5		8.5	8.5
Actuated g/C Ratio		0.82	0.82		0.09	0.09
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2862	2862		165	148
v/s Ratio Prot		c0.23	0.21		c0.03	
v/s Ratio Perm						0.01
v/c Ratio		0.28	0.25		0.37	0.05
Uniform Delay, d1		2.0	1.9		38.2	37.1
Progression Factor		0.15	0.27		1.00	1.00
Incremental Delay, d2		0.2	0.2		1.4	0.2
Delay (s)		0.5	0.7		39.6	37.2
Level of Service		A	A		D	D
Approach Delay (s)		0.5	0.7		38.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

4: Avenue 17 & SR-99 NB Ramps
 HCM Signalized Intersection Capacity Analysis

2010 With Project-AM
 2/9/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 		 			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1752	3505			3505	1568	3400		2760			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1752	3505			3505	1568	3400		2760			
Volume (vph)	60	382	0	0	772	90	350	0	233	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	415	0	0	839	98	380	0	253	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	41	0	0	209	0	0	0
Lane Group Flow (vph)	65	415	0	0	839	57	380	0	44	0	0	0
Turn Type	Prot					Perm custom		custom				
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	10.4	65.9			51.5	51.5	15.1		15.1			
Effective Green, g (s)	10.4	66.4			52.0	52.0	15.6		15.6			
Actuated g/C Ratio	0.12	0.74			0.58	0.58	0.17		0.17			
Clearance Time (s)	4.0	4.5			4.5	4.5	4.5		4.5			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	202	2586			2025	906	589		478			
v/s Ratio Prot	c0.04	0.12			c0.24							
v/s Ratio Perm						0.04	c0.11		0.02			
v/c Ratio	0.32	0.16			0.41	0.06	0.65		0.09			
Uniform Delay, d1	36.6	3.5			10.5	8.3	34.6		31.2			
Progression Factor	0.94	0.52			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.9	0.1			0.6	0.1	2.4		0.1			
Delay (s)	35.4	1.9			11.2	8.5	37.1		31.3			
Level of Service	D	A			B	A	D		C			
Approach Delay (s)		6.5			10.9			34.8			0.0	
Approach LOS		A			B			C			A	
Intersection Summary												
HCM Average Control Delay		17.2				HCM Level of Service			B			
HCM Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)		12.0				
Intersection Capacity Utilization		44.7%				ICU Level of Service		A				
Analysis Period (min)		15										
c Critical Lane Group												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	526	149	663	117	142	198	51
v/c Ratio	0.25	0.28	0.78	0.32	0.75	0.57	0.66	0.27
Control Delay	43.2	12.8	63.5	4.7	70.5	23.5	51.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	12.8	63.5	4.7	70.5	23.5	51.1	26.1
Queue Length 50th (ft)	19	81	87	26	66	24	57	14
Queue Length 95th (ft)	48	128	#184	90	#154	77	#95	46
Internal Link Dist (ft)		1009		379		945		888
Turn Bay Length (ft)								
Base Capacity (vph)	156	1846	195	2049	156	574	302	540
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.28	0.76	0.32	0.75	0.25	0.66	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	805	727	61	85
v/c Ratio	0.28	0.25	0.37	0.38
Control Delay	0.5	0.7	44.0	13.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.5	0.7	44.0	13.9
Queue Length 50th (ft)	2	7	33	0
Queue Length 95th (ft)	2	9	70	42
Internal Link Dist (ft)	379	248	379	
Turn Bay Length (ft)				
Base Capacity (vph)	2863	2863	788	752
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	0.25	0.08	0.11
Intersection Summary				



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	65	415	839	98	380	253
v/c Ratio	0.29	0.16	0.41	0.10	0.65	0.37
Control Delay	36.1	2.1	12.5	2.9	39.5	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	2.1	12.5	2.9	39.5	5.6
Queue Length 50th (ft)	36	15	140	0	104	0
Queue Length 95th (ft)	76	21	210	24	140	32
Internal Link Dist (ft)		527	1294			
Turn Bay Length (ft)						
Base Capacity (vph)	253	2587	2057	961	1190	1130
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.16	0.41	0.10	0.32	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.89		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	3446		1752	3336		1752	1639		3400	1735	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	3446		1752	3336		1752	1639		3400	1735	
Volume (vph)	42	673	85	162	637	302	126	84	241	339	49	32
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	732	92	176	692	328	137	91	262	368	53	35
RTOR Reduction (vph)	0	10	0	0	54	0	0	136	0	0	32	0
Lane Group Flow (vph)	46	814	0	176	966	0	137	217	0	368	56	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.7	31.0		10.5	36.8		23.4	16.0		15.5	8.1	
Effective Green, g (s)	4.7	31.5		10.5	37.3		23.4	16.5		15.5	8.6	
Actuated g/C Ratio	0.05	0.35		0.12	0.41		0.26	0.18		0.17	0.10	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	91	1206		204	1383		456	300		586	166	
v/s Ratio Prot	0.03	c0.24		0.10	c0.29		0.08	c0.13		c0.11	0.03	
v/s Ratio Perm												
v/c Ratio	0.51	0.68		0.86	0.70		0.30	0.72		0.63	0.34	
Uniform Delay, d1	41.5	24.9		39.0	21.7		26.7	34.6		34.6	38.0	
Progression Factor	1.00	1.00		0.77	0.59		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	3.0		27.5	2.7		0.4	8.4		2.1	1.2	
Delay (s)	45.9	27.9		57.5	15.5		27.1	43.0		36.7	39.3	
Level of Service	D	C		E	B		C	D		D	D	
Approach Delay (s)		28.9			21.7			38.6			37.2	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2: Avenue 17 & SR-99 SB off Ramp
 HCM Signalized Intersection Capacity Analysis























2010 With Project-PM
 2/9/2009



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↙	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3505	3505		1752	1568
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3505	3505		1752	1568
Volume (vph)	0	1253	1010	0	209	91
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1362	1098	0	227	99
RTOR Reduction (vph)	0	0	0	0	0	62
Lane Group Flow (vph)	0	1362	1098	0	227	37
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		65.1	65.1		15.9	15.9
Effective Green, g (s)		65.6	65.6		16.4	16.4
Actuated g/C Ratio		0.73	0.73		0.18	0.18
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2555	2555		319	286
v/s Ratio Prot		c0.39	0.31		c0.13	
v/s Ratio Perm						0.02
v/c Ratio		0.53	0.43		0.71	0.13
Uniform Delay, d1		5.4	4.8		34.6	30.8
Progression Factor		0.27	0.36		1.00	1.00
Incremental Delay, d2		0.6	0.4		7.3	0.2
Delay (s)		2.1	2.1		41.9	31.0
Level of Service		A	A		D	C
Approach Delay (s)		2.1	2.1		38.6	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay			6.4		HCM Level of Service	A
HCM Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

4: Avenue 17 & SR-99 NB Ramps
 HCM Signalized Intersection Capacity Analysis

2010 With Project-PM
 2/9/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 		 			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.97		0.88			
Fr _t	1.00	1.00			1.00	0.85	1.00		0.85			
Fl _t Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1752	3505			3505	1568	3400		2760			
Fl _t Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1752	3505			3505	1568	3400		2760			
Volume (vph)	74	854	0	0	1081	191	422	0	720	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	928	0	0	1175	208	459	0	783	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	101	0	0	173	0	0	0
Lane Group Flow (vph)	80	928	0	0	1175	107	459	0	610	0	0	0
Turn Type	Prot						Perm custom		custom			
Protected Phases	7	4					8					
Permitted Phases							8		2		2	
Actuated Green, G (s)	6.4	56.3					45.9	45.9	24.7	24.7		
Effective Green, g (s)	6.4	56.8					46.4	46.4	25.2	25.2		
Actuated g/C Ratio	0.07	0.63					0.52	0.52	0.28	0.28		
Clearance Time (s)	4.0	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	125	2212					1807	808	952	773		
v/s Ratio Prot	c0.05	0.26					c0.34					
v/s Ratio Perm							0.07		0.14	c0.22		
v/c Ratio	0.64	0.42					0.65	0.13	0.48	0.79		
Uniform Delay, d ₁	40.7	8.3					15.9	11.3	27.0	29.9		
Progression Factor	0.76	0.39					1.00	1.00	1.00	1.00		
Incremental Delay, d ₂	9.0	0.5					1.8	0.3	0.4	5.4		
Delay (s)	39.9	3.8					17.7	11.7	27.4	35.3		
Level of Service	D	A					B	B	C	D		
Approach Delay (s)	6.6						16.8		32.4		0.0	
Approach LOS	A						B		C		A	
Intersection Summary												
HCM Average Control Delay	19.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	56.0%		ICU Level of Service				B					
Analysis Period (min)	15											
c Critical Lane Group												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	824	176	1020	137	353	368	88
v/c Ratio	0.33	0.65	1.01	0.68	0.30	0.81	0.63	0.44
Control Delay	45.6	27.4	102.6	16.2	27.7	32.3	40.8	31.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	27.4	102.6	16.2	27.7	32.3	40.8	31.5
Queue Length 50th (ft)	25	204	~103	120	61	103	98	29
Queue Length 95th (ft)	59	291	#232	#343	109	180	#175	71
Internal Link Dist (ft)		1009		379		945		888
Turn Bay Length (ft)								
Base Capacity (vph)	156	1275	175	1495	454	616	584	554
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.65	1.01	0.68	0.30	0.57	0.63	0.16

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1362	1098	227	99
v/c Ratio	0.53	0.43	0.71	0.29
Control Delay	2.3	2.4	46.7	12.5
Queue Delay	0.2	0.0	0.0	0.0
Total Delay	2.5	2.4	46.7	12.5
Queue Length 50th (ft)	55	12	123	11
Queue Length 95th (ft)	75	102	184	49
Internal Link Dist (ft)	379	248	379	
Turn Bay Length (ft)				
Base Capacity (vph)	2556	2556	633	615
Starvation Cap Reductn	402	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.43	0.36	0.16

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	80	928	1175	208	459	783
v/c Ratio	0.54	0.42	0.64	0.23	0.48	0.83
Control Delay	41.9	4.1	19.2	2.8	28.1	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	4.1	19.2	2.8	28.1	28.6
Queue Length 50th (ft)	46	53	268	0	107	161
Queue Length 95th (ft)	m79	79	357	37	147	234
Internal Link Dist (ft)		527	1294			
Turn Bay Length (ft)						
Base Capacity (vph)	156	2211	1837	921	1096	1052
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.42	0.64	0.23	0.42	0.74

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.