B. TRAFFIC ANALYSIS

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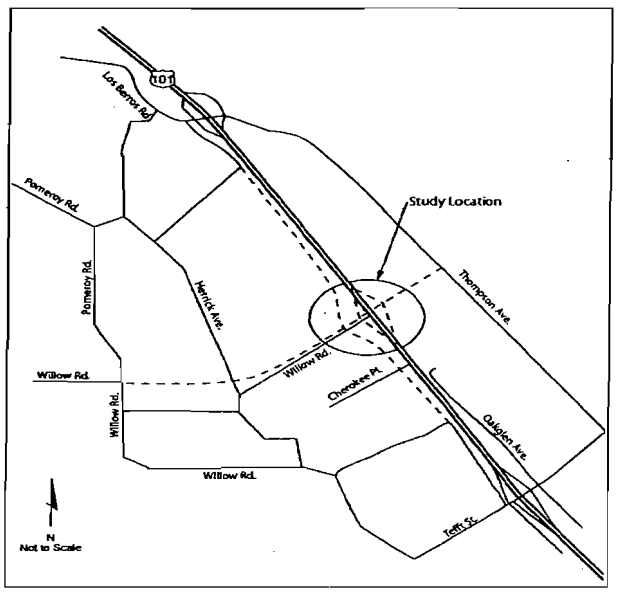
FINAL
TRAFFIC OPERATIONS REPORT



US 101/WILLOW ROAD INTERCHANGE PROJECT

Prepared for
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Executive Summary

This report summarizes the traffic operations analysis of three build alternatives at the U.S. 101/Willow Road interchange located in Nipomo, an unincorporated community in central San Luis Obispo County, California. The four study alternatives include the following:

- No Project – No improvements to any of the interchanges in the study area and no Willow Road extension
- CEQA Baseline Alternative – Willow Road extension from Pomeroy Road across Hetrick Avenue to Frontage Road; includes extension of Frontage Road from Sandydale Drive to Willow Road
- Alternative 1 (Preferred Alternative) – Willow Road extension from Pomeroy Road across US 101 to Thompson Avenue; includes new interchange at US 101 / Willow Road and extension of Frontage Road from Sandydale Drive to Willow Road
- Alternative 2 – Willow Road extension from Pomeroy Road across Hetrick Avenue to Frontage Road; includes extension of Frontage Road from Sandydale Drive to Summit Station Road near Los Berros Road
- Alternative 3 – Lane improvements at the US 101 / Tefft Street interchange only

This study evaluated the intersection and freeway operations of each alternative at the Los Berros Road, Tefft Street and Willow Road interchanges. The major issues, assumptions and findings associated with the traffic operations analysis are presented below.

Existing Conditions:

- New counts were conducted in July 2003 to analyze existing traffic operations. Supplemental AM peak hour counts conducted in October 2003 at two intersections indicate no substantial difference in peak hour volumes.
- With one exception, all of the study intersections currently operate acceptably during the AM and PM peak hours. Only the signalized Tefft Street/US 101 Southbound Ramp-S. Frontage Road intersection operates at LOS E during the AM and PM peak hours. The relatively high traffic volumes and the existing intersection configuration with the offset on-ramp contribute to poor operations at this location. Currently, queues do not back onto the US 101 mainline section at the Tefft Street interchange. All of the other intersections operate at LOS C or better during both peak hours.
- The freeway generally operates at an acceptable level through the Nipomo area. Existing ramp merge/diverge operations are calculated to be LOS C during both peak hours at all locations.
- Accident data provided by Caltrans indicates no substantial accident problems on the mainline or at any of the interchange ramps with one exception. Of note, the northbound off-ramp to Los Berros Road has a fatal+injury rate of approximately three times the reported average, but a specific cause based on available accident information and observations could not be determined.

Future Conditions with Project Alternatives:

- Future traffic volumes were estimated based on 2030 forecasts from the model used to update the South County Circulation Study.
- With no improvements at both the Los Berros Road and Tefft Street interchanges and no new Willow Road interchange, future operations will degrade to unacceptable levels at all study locations. This scenario represents the "No Build" condition.

- Construction of the CEQA Baseline Alternative, which extends Willow Road from Pomeroy Avenue to the North Frontage Road, will not change operations at any of the study ramp intersections since roadway connections from future growth areas currently exist. The Willow Road extension will change the travel path of vehicles destined for the freeway but will not add significant capacity or improve access.
- The new Willow Road interchange and the extension of Willow Road to Thompson Avenue (Alternative 1) will provide the best operations at all of the study intersections except at the US 101/Tefft Street ramp intersections where Alternative 3 includes additional capacity and results in better operations. Although capacity would still be required to provide acceptable operations at the southbound ramp intersections at Los Berros Road and Tefft Street, Alternative 1 requires the fewest additional improvements of any of the build alternatives. This is the only alternative under which traffic signals are not warranted at the Los Berros Road interchanges during the PM peak hour.
- Ramp operations at the new Willow Road interchange are projected to operate at LOS D in 2030.
- Construction of a continuous frontage road along the west side of the freeway without the interchange (Alternative 2) would not alleviate the projected excessive congestion and delay at the existing interchanges. The new frontage roadway would provide more direct access to the existing interchanges (even though local roads currently provide this access), but without a new freeway access point, substantial reconstruction of both the Los Berros and Tefft Street interchanges would be required to provide acceptable operations in the future. Many of these improvements at the Tefft Street interchange are not considered feasible due to right-of-way impacts and the immediate proximity of existing buildings.
- Construction of additional turn lanes at both of the US 101/Tefft Street ramp intersections with Alternative 3 would provide the greatest improvement in LOS at these locations. All other intersection and freeway operations would mirror the "No Build" condition. However, the feasibility of these improvements is limited given the proximity of adjacent land uses and structures.

I. INTRODUCTION

The purpose of this document is to describe the traffic operations analysis conducted for the new US 101 / Willow Road Interchange, in Nipomo, California. This report is being prepared to evaluate potential improvement alternatives for the Willow Road Corridor and US 101 / Willow Road interchange. Currently, the US 101 interchanges with Los Berros Road to the north and Tefft Street to the south provide access to US 101 for traffic in the area. The southern interchange, US 101 / Tefft Street, currently experiences congestion during the peak periods. Operations of this interchange and the Los Berros Road interchange to the north are expected to worsen as traffic volumes increase throughout the area due to increases in local and regional activity associated with population and employment growth. The Willow Road corridor improvements and new interchange with US 101 are being proposed to alleviate some of the existing and future expected traffic congestion at the existing interchanges, and to accommodate growth outside the current developed area.

The traffic operations analysis includes components of the freeway system and local arterial system that are expected to be affected by the US 101 / Willow Road interchange and Willow Road corridor improvements. The study area is shown in Figure 1. A list of analysis facilities is provided with each analysis scenario in subsequent chapters.

The remainder of this report contains the following five chapters:

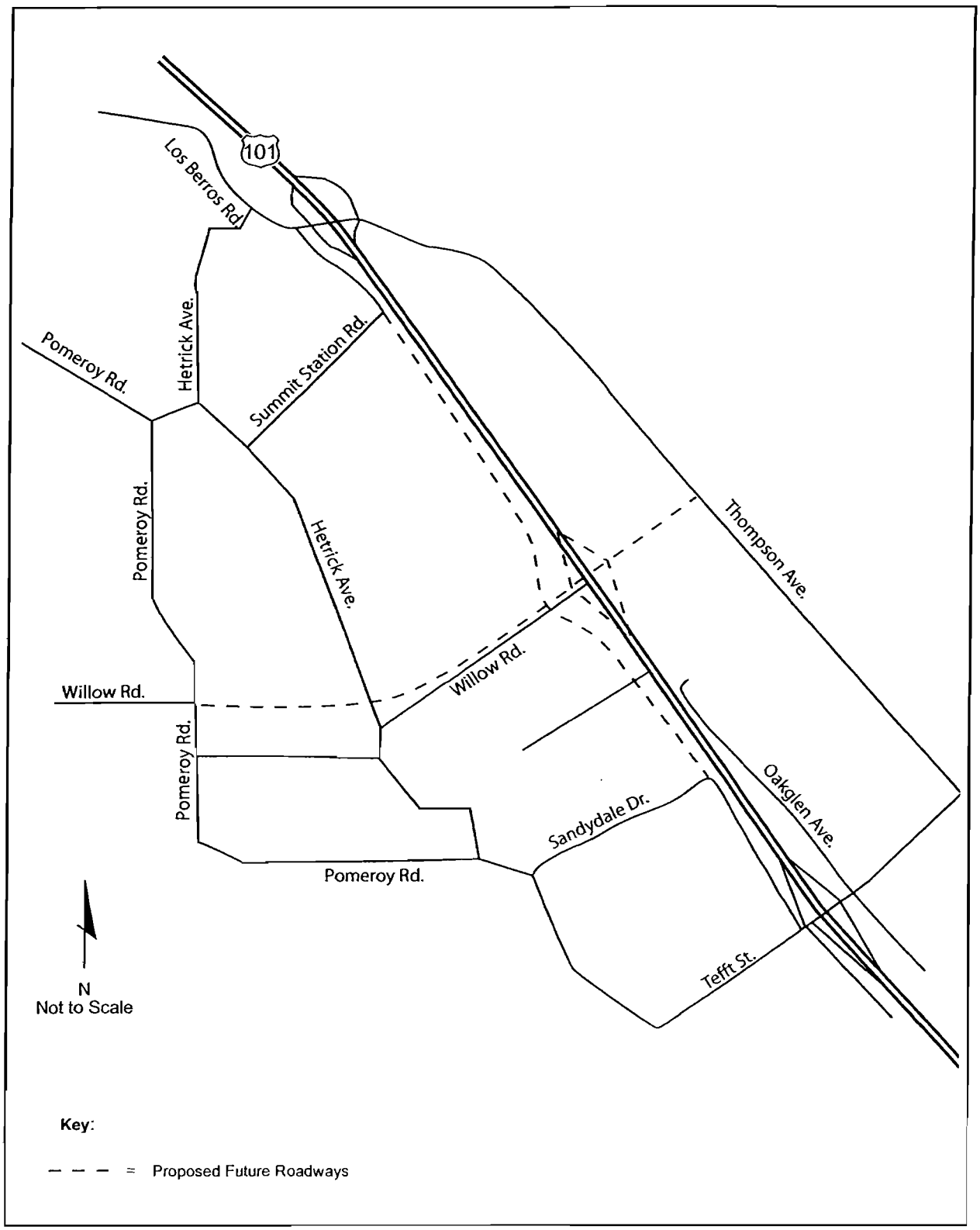
Chapter II – Traffic Operations Analysis Methodology;

Chapter III – Existing Traffic Operations Analysis;

Chapter IV – Description of Project Alternatives; and

Chapter V – Design Year Traffic Operations Analysis; and

Chapter II describes the methodology used to analyze freeway and local arterial traffic operations. Chapter III describes the existing traffic operations of the existing interchanges to the north and south of the proposed Willow Road interchange, as well as the operations of the local arterial system. Chapter IV presents the project alternatives, and Chapter V contains design year traffic operations results for the no project scenario and the five project alternatives.



Willow Road - US 101 Interchange

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STUDY AREA
Figure 1

II. ANALYSIS METHODOLOGY

The operating conditions experienced by motorists are described in terms of "level of service." Level of service (LOS) is a qualitative measure of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, and driving comfort and convenience. Levels of service are designated on a scale from LOS A to LOS F, with LOS A representing the best performance and LOS F the worst.

Ramp Junction Analysis

The operations of freeway facilities are often dictated by ramp junctions (both merge points and diverge points). These locations often prove to be critical in determining the operations of freeway segments. Therefore, the analysis examined ramp junctions under the assumption that the identification of ramp junction operations would also predict the freeway mainline analysis near the study area.

Operations at ramp junctions were evaluated using the methodology documented in the Highway Capacity Manual.[1] Table 1 summarizes the level of service criteria that apply to ramp junctions.

Table 1
Level of Service Criteria for Ramp-Freeway Junction Areas[1]

Level of Service	Maximum Density[2] (Passenger Cars/Mile/Lane)	Minimum Speed[3] (Miles/Hour)
A	10	58
B	20	56
C	28	52
D	35	46
E	>35	42
F	--[4]	--[4]

Notes:
1 Source: Transportation Research Board, *Highway Capacity Manual*, Special Report 209, 2000
2 Primary measure of level of service
3 Secondary measure of level of service
4 Demand flows exceed defined limits

Signalized Intersection Analysis

The analysis of signalized intersections focused on the two intersections at the US 101 / Tefft Street interchange. These are the only two signalized intersections in the project study area. The operations of signalized intersections were evaluated using the Synchro 5.0 software package. Synchro implements the analysis procedures presented in the Highway Capacity Manual, and is the

analysis package preferred by Caltrans for evaluation of ramp intersections at freeway interchanges. In particular, Synchro reflects the interaction between the two intersections and allows them to be treated as a single system, with coordination between the two locations. The HCM methodology determines signalized intersection level of service based on the average control delay per vehicle at the intersection. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration, but does not account for delays caused by on-street parking, driveways, and other friction factors. The ranges of control delay and the corresponding LOS for signalized intersections are presented in Table 2.

Table 2
Signalized Intersection Level of Service Definitions

Level of Service	Signalized Intersection	Average Control Delay (sec / veh)
A	Insignificant Delays: No approach phase is fully utilized and no vehicle waits longer than one red indications.	≤ 10
B	Minimal Delays: An occasional approach phase is fully utilized. Drivers begin to feel restricted.	> 10 – 20
C	Acceptable Delays: Major approach phase may become fully utilized. Most drivers feel somewhat restricted.	> 20 – 35
D	Tolerable Delays: Drivers may wait through no more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.	> 35 – 55
E	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long vehicle queues from upstream.	> 55 – 80
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	> 80

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

Unsignalized Intersection Analysis

For unsignalized intersections (including both all-way stop-controlled and side street stop-controlled), the Transportation Research Board's *2000 Highway Capacity Manual* methodology for unsignalized intersections was utilized. With this methodology, operations are defined by the average control delay per vehicle (measured in seconds) for each stop-controlled movement. The method incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side street stop-controlled intersections, delay is typically represented for each movement from the minor (stop-controlled) approaches only. Table 3 summarizes the relationship between control delay and LOS for unsignalized intersections.

1 Transportation Research Board, 2000

Table 3
Unsignalized Intersection Level of Service Definitions

Level of Service	Unsignalized Intersection	Average Control Delay (sec / veh)
A	No delay for stop-controlled approaches.	0 - 10
B	Operations with minor delay.	> 10 – 15
C	Operations with moderate delays.	> 15 – 25
D	Operations with some delays.	>25 - 35
E	Operations with high delays, and long queues.	> 35 – 50
F	Operation with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

Evaluation Criteria

Traffic operations were evaluated under existing (Year 2003) conditions and Year 2030 traffic conditions with and without the project alternatives in place. San Luis Obispo County has identified LOS D as the criterion for acceptable operations. The California Department of Transportation (Caltrans) strives to achieve LOS C operations for state-maintained facilities, but accepts LOS D as a goal in more developed and congested areas, which will include Nipomo by 2030. Therefore, LOS D will serve as the evaluation standard for the freeway ramp junction and intersection (signalized and unsignalized) operations.

III. EXISTING TRAFFIC OPERATIONS ANALYSIS

To provide reviewers with a context for how AM and PM peak hour traffic operations are projected to change over time, an analysis of existing traffic operations in the study area was conducted.

Existing Roadway Network

Regional access to the unincorporated Nipomo area of San Luis Obispo County is provided by US 101. Key local facilities that would be affected by a new interchange at Willow Road include Los Berros Road, Tefft Street, Pomeroy Road, Hetrick Avenue, and Thompson Avenue. The North Frontage Road on the east side of the freeway is also addressed due to its proposed extension as part of all of the build alternatives. Each of these facilities is briefly described below.

US Highway 101 (US 101) is a regional freeway extending through San Luis Obispo County north through the Bay Area and south to the Los Angeles basin. Through the Nipomo area, US 101 includes two travel lanes in each direction.

Willow Road is a two-lane roadway and includes several different segments within the study area. The first segment is located between State Route (SR) 1 (Cabrillo Highway)-Guadalupe Road and Pomeroy Road. The second segment includes the south leg of the Pomeroy Road/Willow Road intersection to Camino Caballo. South of Camino Caballo to Tefft street, this segment is designated Pomeroy Road. The third segment of Willow Road extends between Hetrick Avenue and terminates just west of US 101. This segment is currently gated east of Hetrick Avenue.

Los Berros Road is a two-lane roadway connecting Valley Road in Arroyo Grande with the Nipomo area and US 101. Both US 101 interchange intersections are controlled by stop signs on the ramp approaches. East of US 101, Los Berros Road is designated as Thompson Avenue, which curves to the south and parallels the freeway, eventually intersecting with Tefft Street.

Tefft Street is a two- to four-lane roadway extending from N. Los Flores Drive at its west end to Dana Foothills Road at its eastern terminus. Tefft Street includes an interchange with US 101 and intersects Thompson Avenue east of the freeway. The majority of urban development in Nipomo is located in the vicinity of the Tefft Street corridor, and both US 101 ramp intersections are signalized. The southbound on-ramp from Tefft Street is offset from the corresponding off-ramp due to the alignment of the South Frontage Road, and essentially forms the "fifth leg" of this intersection. In this area, Tefft Street includes two lanes in each direction. Between

Pomeroy Road is a two-lane roadway with two distinct segments. The first segment links Los Berros Road to Willow Road just north of Live Oak Ridge Road. As noted above, the second segment extends between Camino Caballo and Tefft Street.

Hetrick Avenue is two-lane local roadway that connects Willow Road near Sandydale Drive to Dale Avenue near the Los Berros Road interchange. Hetrick intersects the west end of Willow Road approximately 9/10 of a mile west of US 101.

Thompson Avenue is a two-lane roadway through the community of Nipomo that is parallel to the freeway and intersects US 101 at two locations. Thompson Avenue is the extension of Los Berros Road north of Nipomo, while this street intersects SR 166 (Cuyama Highway) immediately east of US 101 at its southern terminus.

North Frontage Road is a two-lane roadway extending from south of Juniper Street to Sandydale Drive immediately west of and paralleling US 101. Access to the Tefft Street interchange is provided via Juniper Street and Mary Avenue.

Study Locations

This analysis included the freeway merge and diverge points and arterial facilities (intersections) listed below.

Freeway Ramp Junctions

- Southbound US 101 Off-ramp at Los Berros Road
- Southbound US 101 On-ramp from Los Berros Road
- Southbound US 101 Off-ramp at Tefft Street
- Southbound US 101 On-ramp from Tefft Street
- Northbound US 101 Off-ramp at Tefft Street
- Northbound US 101 On-ramp from Tefft Street
- Northbound US 101 Off-ramp at Los Berros Road
- Northbound US 101 On-ramp from Los Berros Road

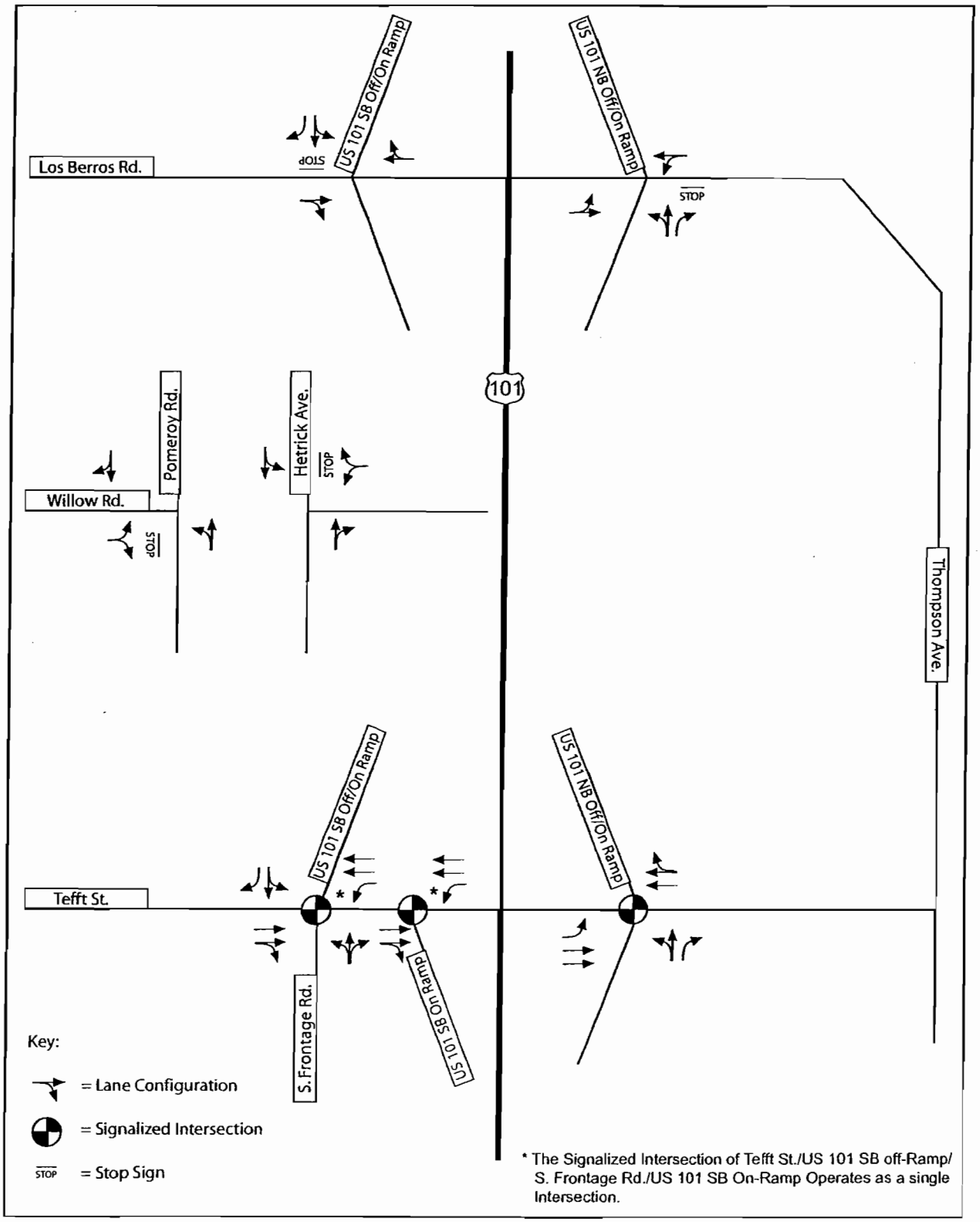
Arterial Intersections

- Southbound US 101 Ramps / Los Berros Road (Unsignalized, Side Street Stop-Controlled)
- Northbound US 101 Ramps / Los Berros Road (Unsignalized, Side Street Stop-Controlled)
- Willow Road / Pomeroy Road (Unsignalized, Side Street Stop-Controlled)
- Willow Road / Hetrick Avenue (Unsignalized, Side Street Stop-Controlled)
- Southbound US 101 Ramps / Tefft Street (Signalized)
- Northbound US 101 Ramps / Tefft Street (Signalized)

The Pomeroy and Hetrick intersections were included since the extension of Willow Road to the freeway will include modifications or construction of new roadway segments at both of these streets. One of the project alternatives described in Chapter IV includes the extension of Willow Road to Thompson Avenue located east of and parallel to the freeway. The Willow Road/Thompson Avenue intersection is only analyzed under future conditions.

Existing Volumes and Lane Configurations

Figure 2 displays the existing geometrics and traffic control for the selected analysis locations. As shown in the figures, both existing study interchanges (US 101 / Los Berros Road and US 101 / Tefft Street) are configured as diamond interchanges. US 101 includes two mixed flow lanes in each direction throughout the study area.



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EXISTING LANE CONFIGURATION AND CONTROL

Figure 2

The peak hour traffic volumes are depicted in Figure 3. Intersection turning movement volumes and daily roadway segment counts were obtained from all new traffic counts conducted in July 2003 and are included in Appendix A. Subsequent counts were conducted at two intersections in October 2003 to assess the potential impact of school traffic. The October counts were very similar to the summer data and indicated that school traffic does not vary significantly in the vicinity of the Tefft Street and Los Berros Road interchanges.

A review of the daily volumes on each segment showed that AM peak hour volume generally represented approximately seven (7) percent of the daily volume, while the PM peak hour volume was approximately nine (9) percent of the daily volume. This information was used to estimate future daily volumes as described in Chapter V.

The ramp intersection volumes were used to calculate the ramp merge/diverge volumes, while freeway mainline volumes were obtained from an average of hourly count data from January, April and August 2003 provided by Caltrans from the station located south of the Tefft Street interchange.

Freeway Operations

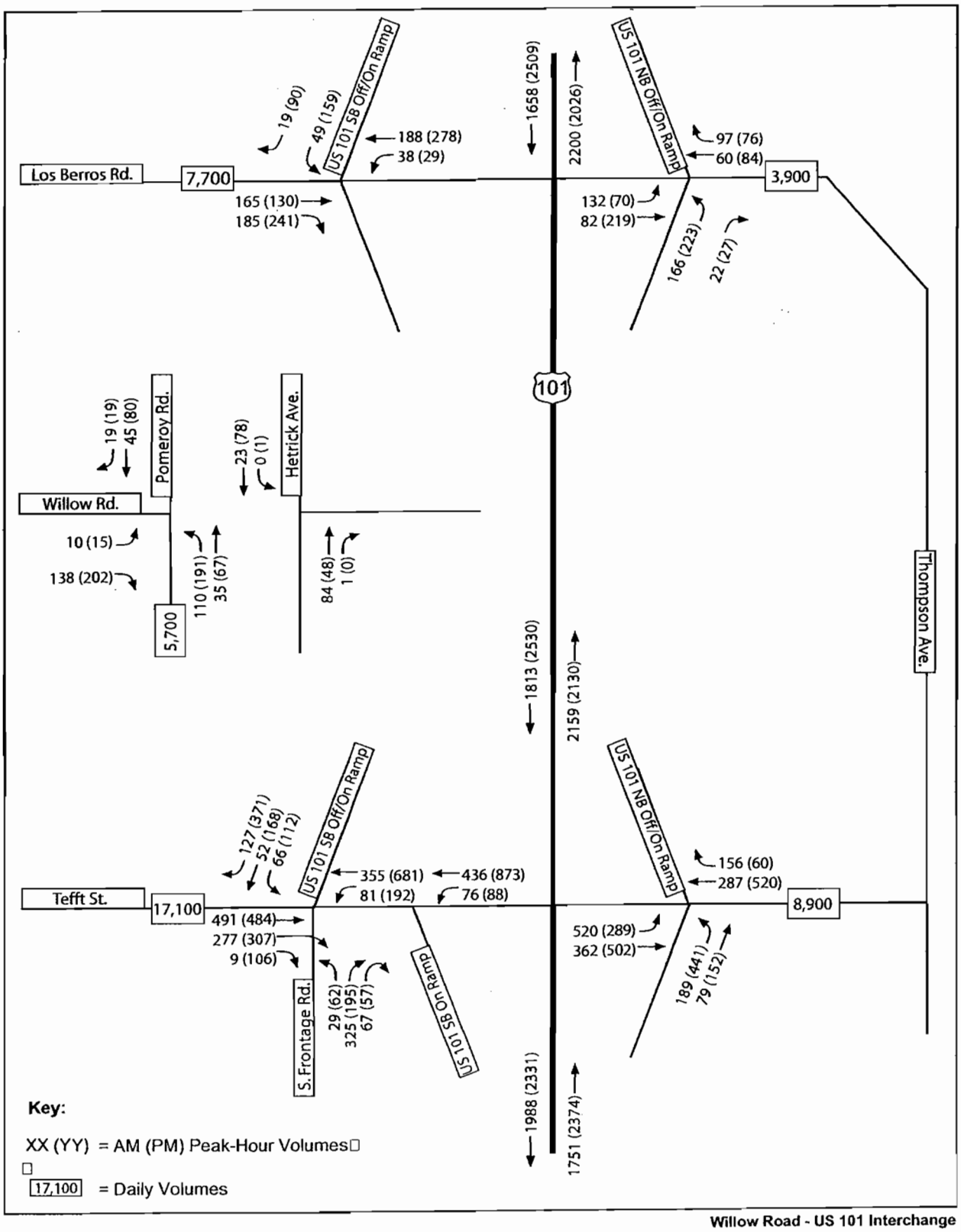
Traffic operations results for the ramp junctions are contained in Table 4, and calculation worksheets are included in Appendix C. As stated above, the operations of the ramp junctions govern the operation of the freeway mainline through the study area. Therefore, the mainline LOS is expected to be the same as that reported for the ramp junctions.

Table 4
Ramp Junction LOS Summary – Existing Conditions

Ramp Junction	AM Peak Hour LOS/Density	PM Peak Hour LOS/Density
Southbound US 101 Off-ramp at Los Berros Road	21 / C	31 / D
Southbound US 101 On-ramp from Los Berros Road	22 / C	31 / D
Southbound US 101 Off-ramp at Tefft Street	22 / C	32 / D
Southbound US 101 On-ramp from Tefft Street	24 / C	30 / D
Northbound US 101 Off-ramp at Tefft Street	24 / C	25 / C
Northbound US 101 On-ramp from Tefft Street	27 / C	23 / C
Northbound US 101 Off-ramp at Los Berros Road	28 / C	23 / C
Northbound US 101 On-ramp from Los Berros Road	28 / C	22 / C

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

The ramp junction LOS results indicate that ramp merge and diverge points typically operate at LOS C in the AM peak hour. In the PM peak hour, the southbound ramps operate at LOS D while the northbound ramps operate at LOS C.



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EXISTING TRAFFIC VOLUMES

Figure 3

Arterial Intersection Operations

Traffic operations results for the arterial intersections are presented in Table 5, and calculation worksheets are included in Appendix B. The existing conditions LOS results reveal that the Southbound US 101 Ramp intersection with Tefft Street operates at LOS E during the AM and PM peak hours. The poor operation of this intersection is a result of the atypical approach configuration with the southbound on-ramp that essentially forms the "fifth leg." of this intersection, as well as the overall traffic demand. This fifth leg requires complex signal timings that result in reduced efficiency.

Table 5
Intersection LOS Summary – Existing Conditions

Intersection	Traffic Control	LOS / Delay (Sec. / Veh.)	
		AM Peak Hour	PM Peak Hour
Southbound US 101 Ramps / Los Berros Road	Side Street Stop	B / 13.5	C / 18.1
Northbound US 101 Ramps / Los Berros Road	Side Street Stop	C / 17.7	C / 21.4
Willow Road / Pomeroy Road	Side Street Stop	A / 9.5	B / 10.6
Willow Road / Hetrick Avenue	Side Street Stop	A / 9.1	A / 0.1
Southbound US 101 Ramps / Tefft Street	Signal	**E / 65.9**	**E / 62.3**
Northbound US 101 Ramps / Tefft Street	Signal	C / 25.0	C / 34.5

Notes:
[1] Signalized intersection LOS based on average intersection delay, based on the methodology in the *Highway Capacity Manual*, 2000 Edition.
[2] All-way stop-controlled intersection LOS based on average intersection delay, based on the methodology in the *Highway Capacity Manual*, 2000 Edition.

Source: Fehr & Peers, October 2003.

Improvements

In order to improve traffic operations at this intersection, various improvements were analyzed to determine what could be done. Based on this analysis, it was determined that if a northbound right-turn lane were added to the South Frontage Road, this intersection's operations could improve to LOS C in the AM peak hour and LOS D in the PM peak hour.

Accident Data

Accident data was provided by Caltrans for the 3-year period from January 2000 to December 2002 for the freeway mainline between Los Berros Road and Tefft Street and at or near the ramp junctions of these two existing interchanges. This information indicated that a total of 66 accidents occurred on the US Highway 101 mainline, and 32 accidents occurred in the vicinity of a ramp junction. For both sets of data, nearly 60 percent of the accidents occurred in the northbound direction. The data for each facility type is presented below. It should be noted that a fatal collision occurred in January 2004 on the southbound off-ramp to Tefft Street. This accident, which involved an intoxicated driver, was not included in the data set from Caltrans but is acknowledged here.

Freeway Mainline Accidents

These incidents occurred throughout the day with the highest one hour total of seven (7) accidents occurring at 3:00 pm. In terms of the day of the week, approximately 20 percent of the accidents each occurred on a Thursday, Friday and Saturday. April, June and August represented the months with the highest proportion of accidents, while all of the remaining months included fewer than 10 percent each of the accident total. Over the 36-month period, a total of 3 fatalities and 34 injured persons were reported from mainline accidents.

The primary collision factors of speeding and improper turn represented the highest proportion of mainline accidents at roughly 35 percent and 30 percent, respectively. Of the total, approximately 35 percent of vehicles hitting an object other than a vehicle, and 29 percent of the total resulting in a rear-end collision. Other factors including weather, roadway conditions or lighting did not appear to contribute significantly to the reported accidents based on the summary data provided.

Ramp Junction Accidents

Accidents at the ramp junctions occurred throughout most of the day, however, no incidents were reported between 12:00 am and 5:00 pm during the 3-year period. Fifty-three (53) percent of the accidents occurred in March, July, August and November with March representing the highest proportion. Contrary to the mainline totals, the highest percentage of accidents occurred on Friday and Saturday at approximately 25 percent each, with Thursday only representing 6 percent of the total.

Speeding and "other" violations constituted the most prevalent primary collision factors (75 percent of the total), and rear-end collisions were the most frequent type of collision at nearly 44 percent of the 32 total accidents. Most of the accidents (i.e., at least 66 percent) occurred on clear days with daylight and dry pavement conditions. Of note is the number of accidents (13 or nearly 41 percent) that occurred at the ramp exit, and those (17 or 53 percent) that occurred on the ramp near, but not in, the adjacent street intersection. Similar to the freeway accidents, none of the other factors including weather, roadway conditions or lighting appeared to contribute significantly to the reported ramp junction accidents.

Comparison of Actual to Average Rates

The accident rates for the freeway mainline and ramp junctions within the study area are presented in Table 6 on the following page. This data shows no fatalities at the ramps during the study period, and the mainline rate of fatal accidents is lower than the statewide average. With the exception of the northbound off-ramp to Los Berros Road, all of the fatal+injury accident rates are lower than the statewide average. The NB Los Berros Road off-ramp fatal+injury rate is approximately three times the statewide average.

At five ramp locations (three of which are at the Tefft Street interchange), the total rate of accidents is higher than the statewide average. As noted above, no specific problems can be identified from the data provided as to a consistent cause of accidents at these or other locations.

Table 6
Accident Rate Summary

Location	Statewide Average (Accidents/Million Vehicles)			Actual Occurrence Rate (Accidents/Million Vehicles)		
	Fatal	Fatal+Injury	Total	Fatal	Fatal+Injury	Total
Mainline (Tefft to Los Berros)	0.013	0.26	0.65	0.011	0.12	0.35
SB On from Tefft	0.002	0.32	0.80	0.00	0.00	0.65
NB Off to Tefft	0.005	0.61	1.50	0.00	0.00	**2.11**
NB On from Tefft	0.002	0.32	0.80	0.00	0.25	**1.27**
SB Off to Tefft	0.005	0.61	1.50	0.00	0.46	**2.28**
NB Off to Los Berros	0.014	0.43	1.15	0.00	1.30	**1.74**
SB On from Los Berros	0.007	0.21	0.55	0.00	0.00	0.00
NB On from Los Berros	0.007	0.21	0.55	0.00	0.00	**0.61**

Note: Total accidents includes fatal plus injury plus property damage only (PDO) accidents. Thus, the total rate may not equal the sum of the Fatal and Fatal + Injury rate.
Bold indicates where actual rate exceeds statewide average.
Source: Caltrans – District 5, TASAS Table B, November 6, 2003.

Further Analysis

As traffic volumes increase over time with regional and local growth, especially on Tefft Street, the operations of these existing interchanges are expected to deteriorate unless additional access capacity to the freeway is provided. With the more complex timing, intersection configuration, and the increased traffic volumes, queues may begin to extend on the off-ramps back into the mainline. Not only does this create unacceptable traffic operations, but it increases the potential for accidents. To address this problem and other operational issues in the local arterial system, four improvement alternatives were developed as part of the traffic operations analysis effort. These alternatives are presented in the next chapter.

IV. DESCRIPTION OF PROJECT ALTERNATIVES

Figure 1 presented a map of the study area. It also included a schematic representation of the proposed roadway improvements and the location of the proposed new interchange. A general description of which improvements are contained within each study alternative is provided below.

No Project Alternative

This alternative assumes that no improvements are made to the Willow Road corridor and that a new interchange is not constructed at US 101. In addition, Willow Road is not planned to be extended east of its current terminus at Pomeroy Road. No modifications to any of study area intersections at Tefft Street and Los Berros Road are assumed under this alternative.

CEQA Baseline Alternative

The CEQA Baseline Alternative includes the extension of Willow Road from Pomeroy Road east to a point just west of the US 101 freeway corridor. The second part of this alternative includes the extension of the North Frontage Road from its current terminus at Sandaydale Drive to the new Willow Road extension. This configuration would provide a more direct connection from the Tefft Street corridor to the Willow Road corridor. However, traffic using Willow Road as an alternate route would still be directed to the Tefft Street interchange via the North Frontage Road extension, Juniper Street and Mary Avenue. Since this improvement does not involve any modifications to the freeway corridor and would be a local project administered by San Luis Obispo County, it is only subject to CEQA environmental review.

Alternative 1 (Preferred Alternative)

Alternative 1 is the preferred alternative for this project. Alternative 1 would connect Willow Road from its intersection with Pomeroy Road to Thompson Avenue to the east. This would create a continuous Willow Road segment by removing the discontinuities that currently exist. The North Frontage Road would be extended from Sandydale Drive north to Willow Road where it would terminate. A new diamond interchange would be constructed at US 101. This would result in congestion relief at the existing freeway interchanges at Los Berros Road and at Tefft Street.

Alternative 2

Alternative 2 would be similar to the CEQA Baseline Alternative, except that the North Frontage Road would be extended northward, beyond Willow Road, to Los Berros Road via Summit Station Road and the existing frontage road near the Los Berros Road interchange. This would have a similar effect as the CEQA Baseline Alternative by providing an alternate route to and from US 101, but would not have the effect of channeling all traffic to the Tefft Street interchange, as is the case in the Baseline Alternative. Instead, traffic would have a choice to travel south to the Tefft Street interchange or north to the Los Berros Road interchange upon reaching the eastern end of Willow Road, at the Frontage Road. It is important to note that traffic can currently access both existing interchanges via Pomeroy Road, Aden Way and Hetrick Avenue to Los Berros Road to the north, or via Willow Road, Sandydale Drive, and Mary Avenue

Alternative 3

Alternative 3 includes the addition of capacity to the US 101 Southbound Ramps / Tefft Street and US 101 Northound Ramps / Tefft Street intersections to improve operations. The proposed improvements under this alternative include the addition of turn lanes at each intersection that would provide acceptable operations under Future Year conditions (see Chapter V). These improvements are as follows:

Tefft Street/SB Off-ramp-S. Frontage Road Intersection

- Second southbound right-turn lane
- Separate eastbound through lane
- Second westbound left-turn lane and second receiving lane on south approach (S. Frontage Road)
- Additional northbound right-turn lane

Tefft Street/NB Ramps Intersection

- Separate westbound through lane

Alternative 3 does not include any improvements at either the Los Berros Road interchange intersections or within the Willow Road corridor.

The traffic operations for each of these alternatives were analyzed under design year (2030) conditions. The results are presented in the next chapter.

V. DESIGN YEAR TRAFFIC OPERATIONS ANALYSIS

This chapter presents the design year traffic operations analysis results for the study area freeway facilities and arterial intersections under each of the following scenarios:

- No Project
- CEQA Baseline – Willow Road extension from Pomeroy Road across Hetrick Avenue to Frontage Road; includes extension of Frontage Road from Sandydale Drive to Willow Road
- Alternative 1 (Preferred Alternative) – Willow Road extension from Pomeroy Road across US 101 to Thompson Avenue; includes new interchange at US 101 / Willow Road and extension of Frontage Road from Sandydale Drive to Willow Road
- Alternative 2 – Willow Road extension from Pomeroy Road across Hetrick Avenue to Frontage Road; includes extension of Frontage Road from Sandydale Drive to Summit Station Road at Los Berros Road
- Alternative 3 – Lane improvements to the US 101 / Tefft Street ramp intersections only

Future Year Study Locations

For the freeway ramp merge and diverge operations analysis, the new interchange of US 101 and Willow Road (Alternative 1) would introduce four new ramp junctions:

- Southbound US 101Off-ramp at Willow Road
- Southbound US 101 On-ramp from Willow Road
- Northbound US 101 Off-Ramp at Willow Road
- Northbound US 101 On-ramp from Willow Road

In addition, the build alternatives would introduce new arterial intersections, evaluated in this analysis. These new intersections are listed below, along with the project alternatives in which they are included.

- Willow Road / Pomeroy Road (4th leg added) (CEQA Baseline, Alternative 1, Alternative 2)
- Willow Road / Hetrick Avenue (4th leg added) (CEQA Baseline, Alternative 1, Alternative 2)
- Willow Road / North Frontage Road (New Intersection) (Alternative 1, Alternative 2)
- Southbound US 101 Ramps / Willow Road (New Intersection) (Alternative 1)
- Northbound Us 101 Ramps / Willow Road (New Intersection) (Alternative 1)
- Willow Road / Thompson Avenue (New Intersection) (Alternative 1)

Future Traffic Volumes

The travel demand model forecasts were provided by San Luis Obispo County Department of Public Works staff from work that was completed for the *South County Circulation Study: 2000 Annual and 5th Year Update*. The study analyzed the impacts of buildout in the Nipomo area to identify the ultimate improvements required to support the planned land uses for the area around US 101 between SR 1 and SR 166. The buildout year was assumed to be 2060 in the South County study and some of this information was used to complete the environmental documentation prepared in 1998 for the Willow Road interchange.

The South County study report was most recently updated in August 2002, and included and update the of the South County Road Improvement Fee program. These fees are collected and administered by the San Luis Obispo County Public Works Department, and a portion of these fees are planned to be used to fund the Willow Road interchange improvements

Caltrans typically requires forecasts for a 20-year or longer period from the time of construction to evaluate operations of state-maintained facilities. Although previous studies analyzed operations under buildout (2060) conditions, that scenario involves volumes beyond the typical "design life" of a roadway project. Accordingly, traffic projections from within a shorter timeframe were developed.

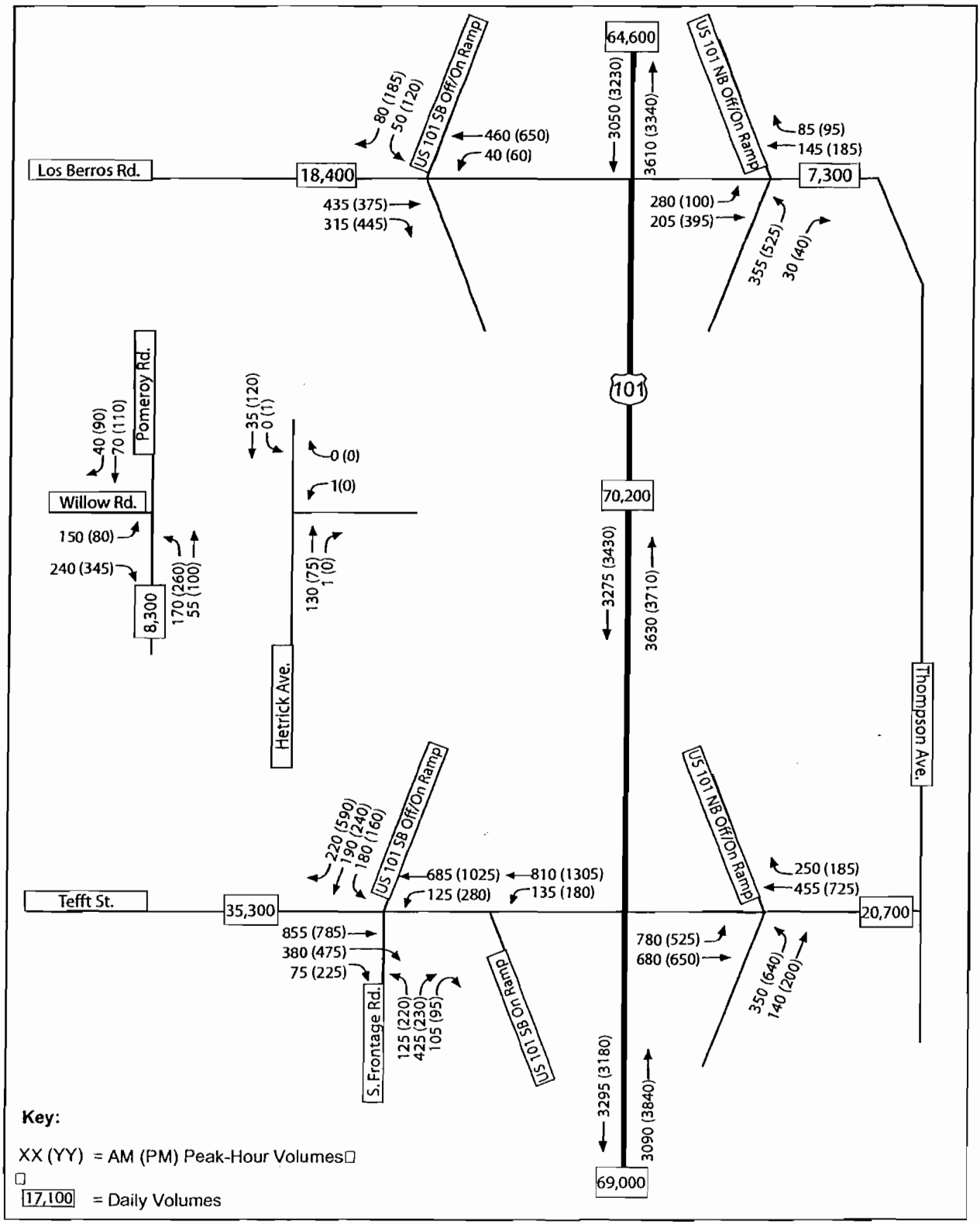
The traffic model for the Nipomo area was prepared using the TModel software, which provides PM peak hour forecasts for all of the roadways in the study area including the US 101 freeway. 2030 forecasts were provided by the County, and these volumes were used to estimate future peak hour turning movement volumes at the study intersections. As is the typically the case with model forecasts, traffic volumes were not used directly from the model but were manually refined to reflect reasonable estimates of growth in the corridor. Future year (2030) projections were also compared to both existing volumes and previous 2060 buildout forecasts to ensure consistency and reasonableness. Daily forecasts were estimated for roadway segments using the current relationship of peak hour volumes to 24-hour volumes discussed in Chapter III.

Figures 4 through 7 illustrate the peak hour traffic volumes for each alternative.

The volumes on Figure 3 for 2030 No Project Conditions show significant increases in traffic in both the Los Berros and Tefft Street corridors and on the corresponding U.S. 101 ramps. The majority of growth in the area is expected to occur on the west side of the freeway between Willow Road (west of Pomeroy Road) and Tefft Street. Some additional growth is anticipated on Tefft Street east of the freeway, but only a small amount of traffic in this area is expected to travel north to the Los Berros Road interchange. These volumes were also used to analyze operations under Alternative 3 (Tefft Street Improvements) since volumes would not be expected to change substantially with no other improvements in the study area.

As shown on Figure 4, the extension of Willow Road and the frontage road under the CEQA Baseline Alternative are not expected to significantly change traffic volumes in the immediately vicinity of the Tefft Street or Los Berros Road interchanges on the freeway mainline. Although the new roadways would provide faster travel speeds, connections to Tefft Street and Los Berros Road on the west side of the freeway already exist and the new roadways would not change travel patterns at the ramp intersections (e.g., drivers may be more apt to use the extended frontage road and Mary Avenue when approaching from the west, but the volumes on Tefft Street at the southbound ramps intersection would be unchanged).

Provision of a new interchange on Willow Road approximately midway between Tefft Street and Los Berros Road would result in reduced volumes at both of the existing interchanges (compared to no build conditions as shown on Figure 5. Some of the traffic generated by the large specific plan areas planned west of the existing developed area of Nipomo would use the more direction connection provided by the Willow Road interchange. As noted above, the amount of traffic generated on the section of Willow Road between the freeway and Thompson Avenue is expected to be limited given the planned uses in the eastern area. However, this interchange will provide relief if substantial congestion occurs at the Tefft Street Northbound ramps intersection.



Willow Road - US 101 Interchange

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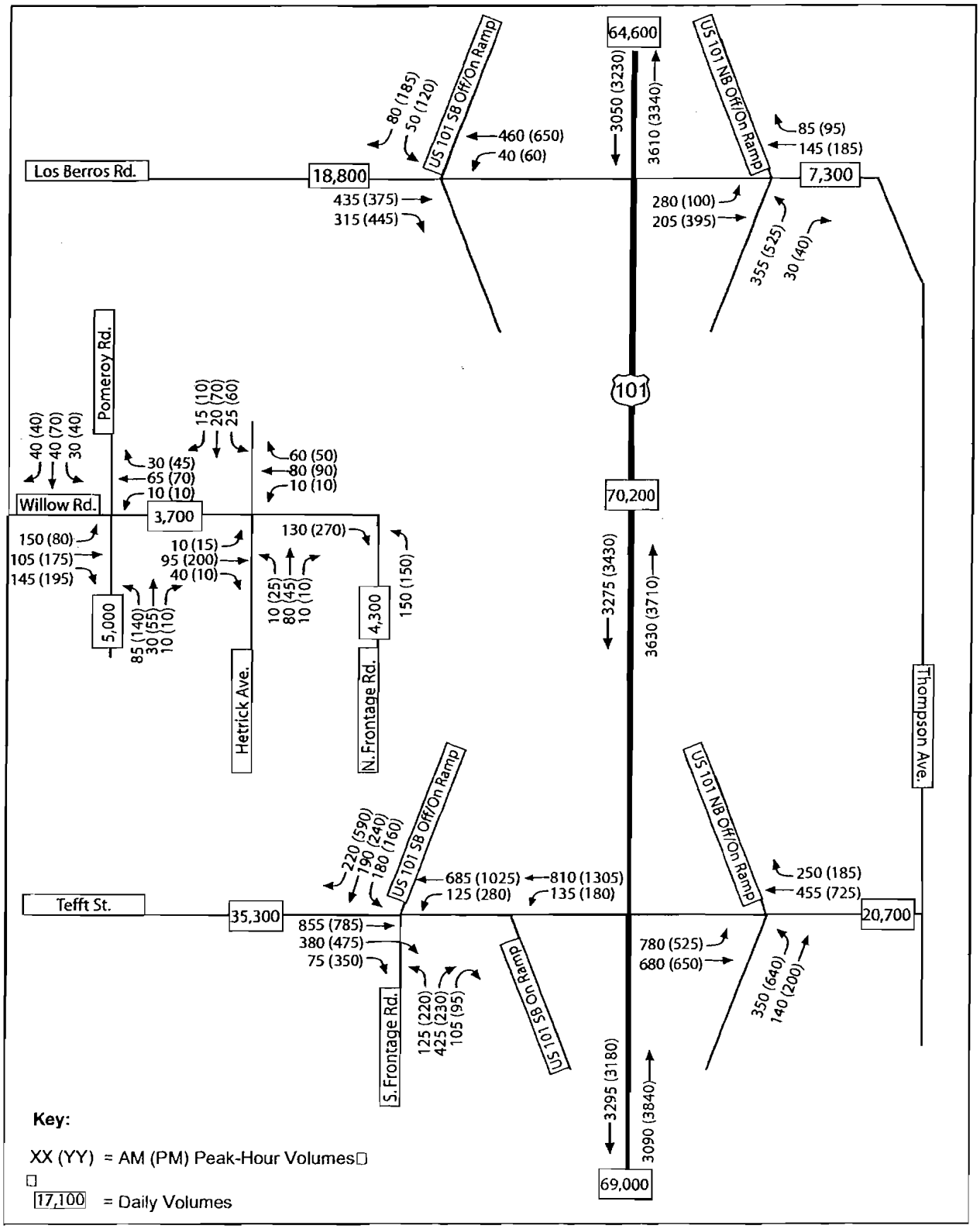
1035-613

2030 NO PROJECT TRAFFIC VOLUMES

Figure 4



Willow Road - US 101 Interchange

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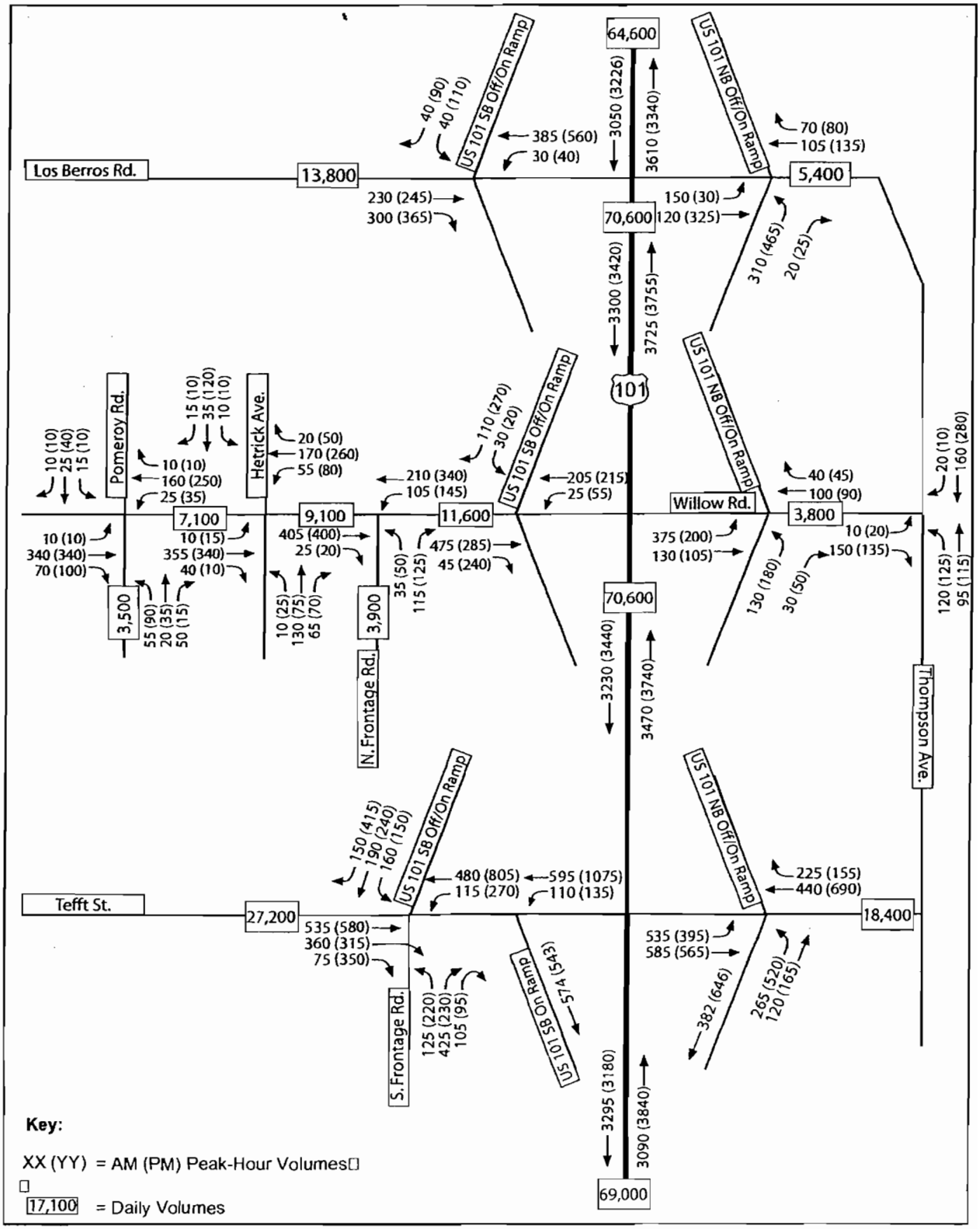
1035-613

CEQA BASELINE ALTERNATIVE 2030 TRAFFIC VOLUMES

Figure 5



Willow Road - US 101 Interchange

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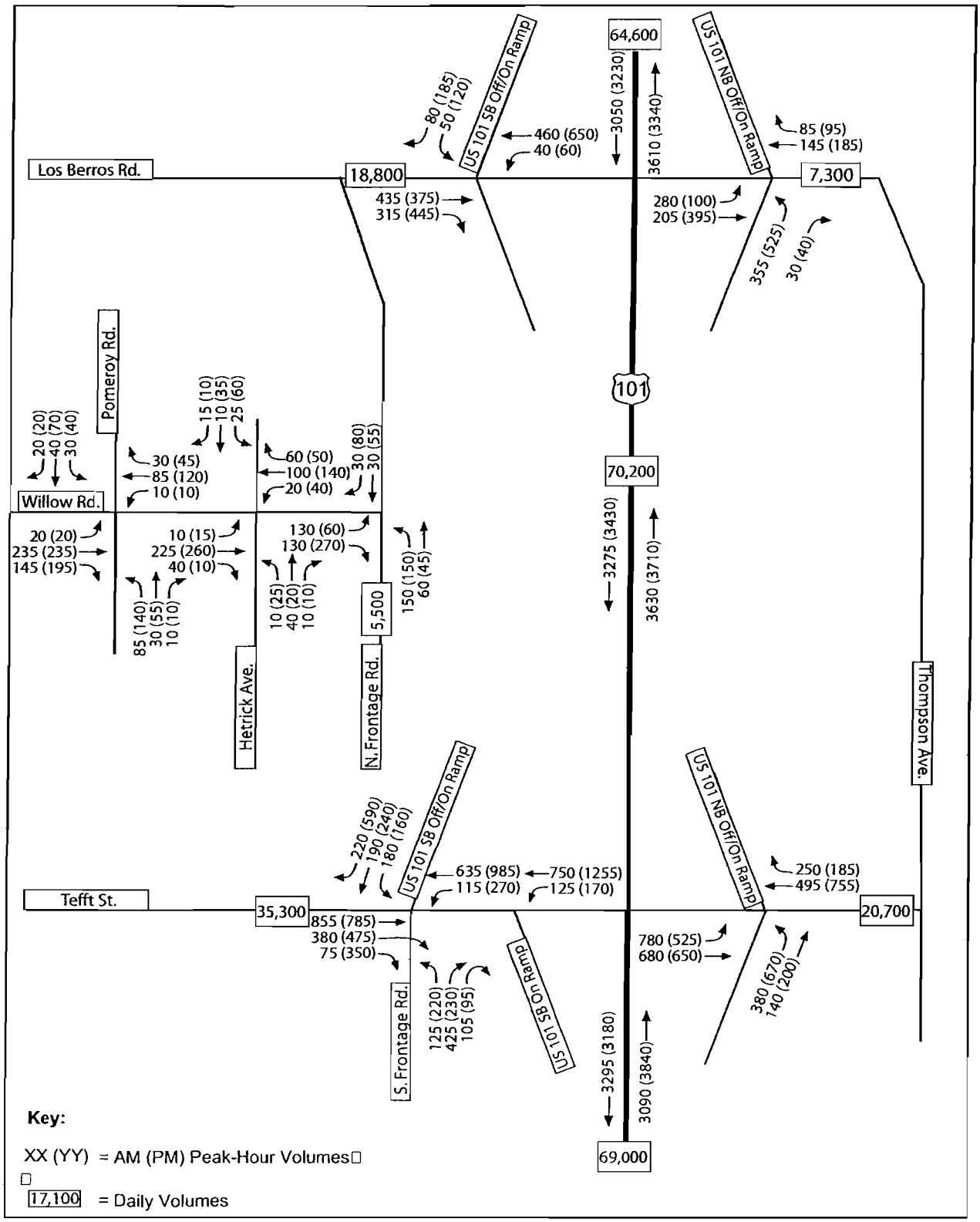
ALTERNATIVE 1 (PREFERRED PROJECT) 2030 VOLUMES

Figure 6



Willow Road - US 101 Interchange

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ALTERNATIVE 2 (FRONTAGE ROAD ONLY) 2030 VOLUMES

Figure 7

Extension of a continuous frontage road between the Los Berros Road and Tefft Street interchanges shown on Figure 6 is not expected to change volumes at any of the ramp intersections. Travel patterns will shift on the west side of the freeway due to the higher speed facilities and more direct roadway links. However, connections between the growth areas to the west and the interchanges already exist (albeit with slower roadways and slightly more circuitous travel). Thus, traffic will continue to approach the west ramp intersections from the same direction. As is evidenced under existing conditions, the presence of a link between the two interchanges (Thompson Avenue) does not result in a distribution of traffic that minimizes congestion at the Tefft Street interchange.

The traffic volumes presented on Figures 4 through 7 were used to analyze operations on the freeway at the ramp junctions, as well as at the intersections. These analyses are presented below.

Freeway Operations

Table 7 presents the results of the ramp junction analysis for the study interchanges under each project alternative using 2030 peak hour traffic volumes. It should be noted that the Alternative 3 results are the same as the No Build scenario, because improvements to the freeway are proposed and no change in volume within the study area is expected with improvements at Tefft Street only.

Table 7
Design Year (2030) Ramp Junction LOS Summary

US 101 Ramp Junction Location	Density / LOS									
	2030 No Build		CEQA Baseline		Alternative 1 (Preferred)		Alternative 2		Alternative 3	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Southbound off-ramp – Los Berros Rd.	29 / D	31 / D	29 / D	31 / D	29 / D	31 / D	29 / D	31 / D	29 / D	31 / D
Southbound on-ramp – Los Berros Rd.	31 / D	32 / D	31 / D	32 / D	31 / D	32 / D	31 / D	32 / D	31 / D	32 / D
Southbound off-ramp – Willow Rd.	N/A	N/A	N/A	N/A	32 / D	32 / D	N/A	N/A	N/A	N/A
Southbound on-ramp – Willow Rd.	N/A	N/A	N/A	N/A	31 / D	33 / D	N/A	N/A	N/A	N/A
Southbound off-ramp – Tefft St.	32 / D	33 / D	32 / D	33 / D	31 / D	33 / D	32 / D	33 / D	32 / D	33 / D
Southbound on-ramp – Tefft St.	31 / D	30 / D	31 / D	30 / D	31 / D	30 / D	31 / D	30 / D	31 / D	30 / D
Northbound off-ramp – Tefft St.	30 / D	**37 / E**	30 / D	**37 / E**	30 / D	**37 / E**	30 / D	**37 / E**	30 / D	**37 / E**
Northbound on-ramp – Tefft St.	34 / D	34 / D	29 / D	34 / D	32 / D	34 / D	34 / D	34 / D	29 / D	34 / D
Northbound off-ramp – Willow Rd.	N/A	N/A	N/A	N/A	32 / D	35 / D	N/A	N/A	N/A	N/A
Northbound on-ramp – Willow Rd.	N/A	N/A	N/A	N/A	35 / D	35 / D	N/A	N/A	N/A	N/A
Northbound off-ramp – Los Berros Rd.	**35 / E**	**36 / E**	**35 / E**	**36 / E**	**36 / E**	**36 / E**	**35 / E**	**36 / E**	**35 / E**	**36 / E**
Northbound on-ramp – Los Berros Rd.	34 / D	32 / D	34 / D	32 / D	34 / D	32 / D	34 / D	32 / D	34 / D	32 / D

Note: Density is in passenger cars per lane-mile.
Bold type indicates LOS E or F operations.
Source: Fehr & Peers Associates, Inc. November 2004

Based on the HCM methodology, most of the ramps are expected to operate at LOS D. The northbound off-ramp to Tefft Street is expected to operate at LOS E during the PM peak hour under all scenarios. The northbound off-ramp to Los Berros Road is also expected to operate at LOS E during both AM and PM peak hours. These more congested operating conditions are caused by high traffic volumes on the freeway mainline. All of the ramps at Willow Road would operate at LOS D during both peak hours under Alternative 1, the only scenario that includes the construction of these ramps. The northbound off- and on-ramps at this location are planned to include extended merge and diverge distances of 165 meters and 190 meters, respectively.

The LOS is based on future traffic projections for the year 2030. Because of the somewhat speculative nature of these forecasts, no mitigation is recommended at this time. However, the design of these facilities should not preclude the future construction of a second ramp lane. Future ramp metering would also be beneficial to merging operations on the freeway.

Arterial Intersection Operations

The 2030 traffic volumes were input to the SYNCHRO software to analyze arterial intersection operations using the existing lane configurations at the existing intersections and the proposed configurations shown on Figure 8 for the new intersections on Willow Road. Table 8 presents the results of the operations analysis for all project scenarios, including the No Build scenario.

Table 8
Design Year (2030) Intersection LOS Summary
(Without Additional Improvements)

Intersection	Traffic Control[2]	Average Delay[1] / LOS									
		2030 No Build		CEQA Baseline		Alternative 1 (Preferred)		Alternative 2		Alternative 3	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Los Berros Road / US 101 SB Ramps	SSS	20.8/C	**76.9/F**	20.4/C	**73.9/F**	15.2/C	31.1/D	20.4/C	**73.9/F**	20.8/C	**76.9/F**
Los Berros Road / US 101 NB Ramps	SSS	**384.5/F**	**433.7/F**	**376.0/F**	**427.3/F**	**36.3/E**	**92.3/F**	**376.0/F**	**427.3/F**	**384.5/F**	**433.7/F**
Willow Road / Pomeroy Road	SSS	16.6/C	20.6/C	21.3/C	29.8/C	16.0/C	26.0/D	16.0/C	25.5/D	16.6/C	20.6/C
Willow Road / Hetrick Avenue	SSS/ AWS[2]	9.4/A	0.1/A	11.8/B	13.9/B	12.6/B	16.3/C	9.1/A	9.9/A	9.4/A	0.1/A
Willow Road / N. Frontage Road	SSS/ AWS[2]	N/A	N/A	N/A	N/A	12.3/B	16.3/C	8.5/A	9.1/A	N/A	N/A
Willow Road / US 101 SB Ramps	SSS/ AWS[2]	N/A	N/A	N/A	N/A	16.8/C	18.9/C	N/A	N/A	N/A	N/A
Willow Road / US 101 NB Ramps	SSS/ AWS[2]	N/A	N/A	N/A	N/A	11.5/B	9.5/A	N/A	N/A	N/A	N/A
Willow Road / Thompson Avenue	SSS/ AWS[3]	N/A	N/A	N/A	N/A	8.8/A	9.7/A	N/A	N/A	N/A	N/A
Tefft Street / US 101 SB Ramps / S. Frontage Road	SIG	**102.5/F**	**151.5/F**	**104.2/F**	**149.5/F**	**81.2/F**	**93.3/F**	**103.0/F**	**145.7/F**	53.8/D	54.6/D
Tefft Street / US 101 NB Ramps	SIG	39.4/D	**61.2/E**	40.7/D	**55.1/E**	28.5/C	35.8/D	46.8/D	**61.6/E**	34.4/C	46.3/D

Notes: 1. Delays in excess or 120 seconds are presented for comparison purposes only. Delays above this threshold are not considered accurate since the calculation is unreliable with excessive congestion.
2. SSS = Side Street Stop Control, AWS = All-way Stop Control, SIG = Signal Control
3. Intersection controlled as SSS for 2030 No Build and CEQA Baseline Alternatives. Alternatives 1 and 2 assume AWS control.

Bold type indicates unacceptable (i.e, LOS E or F) traffic operations.
Source: Fehr & Peers Associates, Inc., October 2003

The intersections of Los Berros Road/US 101 SB Ramps and Tefft Street/US 101 NB Ramps are expected to operate at unacceptable LOS F and LOS E, respectively, during the PM peak hour for the No Build, CEQA Baseline, Alternative 2, and Alternative 3 scenarios. Based on criteria for Warrant 11 (Peak Hour Volumes) published in the Caltrans *Traffic Manual*, traffic signals would be warranted at both the Los Berros Ramp intersections during the PM peak hour under these four scenarios. Warrants are not projected to be met at either of the Los Berros Road ramp intersections or at any of the other unsignalized study intersections with the preferred project (Alternative 1). The signal warrant analysis worksheets are included in Appendix D.

The Los Berros Road/US 101 NB Ramps and Tefft Street/US 101 SB Ramps-S. Frontage Road intersections are expected to operate at LOS E or F under all but one of the scenarios in both the AM and PM peak hours. Alternative 3 would provide acceptable operations at the Tefft Street/US 101 Ramp intersections under both peak hours assuming the addition of lane capacity is feasible. Although Alternative 1 would substantially reduce delay at the Tefft Street interchange by diverting traffic to the Willow Road interchange, both Tefft Street ramp intersections would operate unacceptably during the peak hours in 2030. The Los Berros NB Ramp intersection would require additional capacity to operate acceptably under all alternatives.

A comparison of all four alternatives indicates that Alternative 1, the preferred alternative, would provide the best area-wide benefit by reducing delays at both interchanges, while Alternative 3 improves Tefft Street operations only.

Potential Spillback Conditions

With increased traffic volumes due to growth, it is possible that vehicle queues at off-ramp intersections may spill back to the freeway mainline during peak times. The results of the SYNCHRO analysis were used to determine the potential for spillback at the US 101 / Tefft Street interchange assuming existing lane configurations for all but one alternative. Alternative 3 includes additional turn lanes at the Tefft Street ramp intersections to provide additional capacity to clear queues. Table 9 presents the results of the operations analysis for all project scenarios.

Table 9
Potential Vehicle Queue Spillback at the US 101 / Tefft Street Interchange [1]

Intersection	Peak Hour	Existing	2030 No Build	CEQA Baseline	Alternative 1 (Preferred)	Alternative 2	Alternative 3
Tefft / US 101 SB Off-ramp	AM	-	x	x	x	x	-
	PM	-	x	x	x	x	-
Tefft / US 101 NB Off-ramp	AM	-	x	x	-	x	-
	PM	-	x	x	x	x	x

Notes: 1. Scenarios in which ramp queues are projected to spillback onto the freeway mainline are designated with an 'x'.
Source: Fehr & Peers Associates, Inc., October 2003

As shown, queues on both off-ramps are expected to spill back onto US 101 under most 2030 scenarios. Under Alternative 1, no spillback is expected at the Tefft Street / US 101 Northbound Ramps during the AM peak hour, but spillback would occur. Under Alternative 3, spillback is expected to occur only at the Tefft Street / US 101 Northbound Off-ramp during the PM peak hour.

Additional Required Improvements

An analysis was performed using the SYNCHRO software to identify potential improvements to study intersections that would be required to achieve acceptable (LOS D or better) operations. Table 10 presents a comparison of all scenarios to illustrate the potential improvements needed to achieve acceptable intersection operations.

Table 10
Additional Improvements Required for Acceptable Operations under Existing and 2030 Conditions

Improvement	Existing	2030 No Build	CEQA Baseline	Alternative 1 (Preferred)	Alternative 2	Alternative 3
Tefft / US 101 SB Ramps						
Add NB Right-turn Lane	x	x	x	x	x	-
Add SB Right-turn Lane	-	x	x	x	x	-
Add 2nd WB Left-turn Lane	-	x	x	-	x	-
Tefft / US 101 NB Ramps						
Add WB Right-turn Lane	-	x	x	-	x	-
Los Berros / US 101 SB Ramps						
Signalize	-	x	x	-	x	x
Los Berros / US 101 NB Ramps						
Signalize	-	x	x	x	x	x

Source: Fehr & Peers Associates, Inc., October 2003 and May 2004.

As shown in the table, all future scenarios except the preferred alternative and Alternative 3 would require extensive improvements to some or all of the study intersections. The preferred alternative would only require two additional turn lanes at the intersection of Tefft Street with US 101 SB Ramps, but would not require potential structure widening of the Tefft Street overcrossing to provide a second westbound left-turn lane. Signalization of the Los Berros Road / US 101 NB Ramps intersection would also be required. Although the peak hour warrant is not expected to be met at the Los Berros Road location with Alternative 1, average control delays for off-ramp are projected to be in excess of 90 seconds LOS F during the PM peak hour and signalization would be desirable.

Alternative 3 includes all of the improvements at the Tefft Street intersections including the potential structure widening, and would still require traffic signals at both of the Los Berros Road intersections.

It should be noted that is currently possible to travel between the two existing interchanges using existing local roads so that the CEQA Baseline Alternative and Alternative 2 do not represent substantial changes to circulation and access. Implementation of Alternative 2, which includes the provision of a continuous, upgraded frontage road, would improve local circulation along the west side of the freeway. However, Alternative 2 would not increase access capacity to or across the freeway.

Without additional east-west capacity including new access to the freeway, significant improvements would be required at Tefft Street under No Build, CEQA Baseline, and Alternative 2 conditions. These improvements would involve major reconstruction of the interchange and/or substantial right-of-way and building impacts. Some of these improvements are included in Alternative 3. For example, construction of other alternative improvements such as a loop ramp from eastbound Tefft Street to northbound US 101 would require right-of-way and or building acquisition. Also, the proximity of the frontage road intersection to the southbound ramps intersection on Los Berros Road would be less than 150 feet with increased peak hour traffic volumes in 2030. This configuration would result in limited storage for queued westbound vehicles turning left onto the frontage road and abrupt lane change movements across Los Berros Road at the ramp intersection.

Other Planned Improvements

The *2000 Update to the South County Circulation Study* included several alternatives for reconfiguring the Tefft Street/Southbound US 101 Ramps-South Frontage Road intersection. In Chapter 6, Figure 14: Proposed Mary Avenue Extension Alternatives on Page 48 illustrated four alternatives for improving circulation around the west side of the interchange (Alternative 1 represented the "No Build" condition). These alternatives all included extending Mary Avenue to Hill Street to provide an alternate connection to the South Frontage Road intersection. Two of the alternatives included relocation of the southbound on-ramp to the south with access directly from the frontage road, which would minimize the number of conflicting movements at this intersection. The recommended alternative (#5) included relocation of the on-ramp opposite Hill Street and maintaining the frontage road as a two-way street, but only provided a right-turn movement at Tefft Street. This modification, along with widening of the Tefft Street bridge, is included on Figure B-5 of the *South County Circulation Study*.

To evaluate these changes, the LOS analysis at this intersection under Willow Road Project Alternative 1 (Preferred Alternative) was revised to include a right turn-only lane from northbound South Frontage Road to eastbound Tefft Street, but no widening of the Tefft Street bridge structure was assumed. This analysis assumed that all traffic on the frontage road destined for westbound Tefft Street would use the Hill Street/Mary Avenue connection outside the study area.

The revised analysis showed that the southbound off-ramp intersection would operate at LOS E (56 seconds of delay) and LOS D (49 seconds of delay) during the AM and PM peak hours, respectively, with the new Willow Road interchange in place in 2030. As expected with the elimination of the northbound left-turn movement from the frontage road, the operating level at this intersection would improve dramatically. It should be noted that this is a planned but unfunded improvement at this time and is not included as part of any of the project alternatives.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction:Nipomo
Intersection:Los Berros Rd./101 N/B Ramp
North/South St.:HWY 101 N/B Off Ramp
East/West St.:Los Berros Rd.

File Name : NIPOMO-2AM
Site Code : 00000002
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	Southbound				LOS BERROS RD. Westbound				HWY 101-N/B OFF RAMP Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	0	0	0	20	14	0	34	3	0	38	41	0	16	25	41	116
07:15 AM	0	0	0	0	23	17	0	40	4	4	40	48	0	18	28	46	134
07:30 AM	0	0	0	0	28	12	0	40	4	0	53	57	0	20	47	67	164
07:45 AM	0	0	0	0	26	17	0	43	7	0	35	42	0	28	32	60	145
Total	0	0	0	0	97	60	0	157	18	4	166	188	0	82	132	214	559
08:00 AM	0	0	0	0	17	8	0	25	4	1	25	30	0	16	37	53	108
08:15 AM	0	0	0	0	21	12	0	33	1	1	28	30	0	20	16	36	99
08:30 AM	0	0	0	0	30	12	0	42	2	1	20	23	0	23	17	40	105
08:45 AM	0	0	0	0	17	10	0	27	2	1	24	27	0	22	29	51	105
Total	0	0	0	0	85	42	0	127	9	4	97	110	0	81	99	180	417
Grand Total	0	0	0	0	182	102	0	284	27	8	263	298	0	163	231	394	976
Apprch %	0.0	0.0	0.0		64.1	35.9	0.0		9.1	2.7	88.3		0.0	41.4	58.6		
Total %	0.0	0.0	0.0	0.0	18.6	10.5	0.0	29.1	2.8	0.8	26.9	30.5	0.0	16.7	23.7	40.4	

	Southbound				LOS BERROS RD. Westbound				HWY 101-N/B OFF RAMP Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:00 AM																
Volume	0	0	0	0	97	60	0	157	18	4	166	188	0	82	132	214	559
Percent	0.0	0.0	0.0		61.8	38.2	0.0		9.6	2.1	88.3		0.0	38.3	61.7		
High Int.	6:45:00 AM				07:45 AM				07:30 AM				07:30 AM				07:30
Volume	0	0	0	0	28	12	0	40	4	0	53	57	0	20	47	67	164
Peak Factor								0.913				0.825				0.799	0.852

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction:Nipomo
Intersection:Los Berros Rd./101 N/B Ramp
North/South St.:HWY. 101 N/B Off Ramp
East/West St.:Los Berros Rd.

File Name : NIPOMO-2PM
Site Code : 00000002
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	Southbound				LOS BERROS RD. Westbound				HWY 101 - N/B OFF RAMP Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	0	0	0	0	10	16	0	26	5	0	41	46	0	34	12	46	118
04:15 PM	0	0	0	0	18	18	0	36	6	0	50	56	0	40	13	53	145
04:30 PM	0	0	0	0	22	18	0	40	2	0	59	61	0	54	19	73	174
04:45 PM	0	0	0	0	16	26	0	42	5	0	52	57	0	63	18	81	180
Total	0	0	0	0	66	78	0	144	18	0	202	220	0	191	62	253	617
05:00 PM	0	0	0	0	22	23	0	45	4	0	50	54	0	57	12	69	168
05:15 PM	0	0	0	0	16	13	0	29	5	1	65	71	0	46	15	61	161
05:30 PM	0	0	0	0	22	22	0	44	10	2	56	68	0	53	13	66	178
05:45 PM	0	0	0	0	16	11	0	27	6	4	51	61	0	46	15	61	149
Total	0	0	0	0	76	69	0	145	25	7	222	254	0	202	55	257	656
Grand Total	0	0	0	0	142	147	0	289	43	7	424	474	0	393	117	510	1273
Apprch %	0.0	0.0	0.0		49.1	50.9	0.0		9.1	1.5	89.5		0.0	77.1	22.9		
Total %	0.0	0.0	0.0	0.0	11.2	11.5	0.0	22.7	3.4	0.5	33.3	37.2	0.0	30.9	9.2	40.1	

	Southbound				LOS BERROS RD. Westbound				HWY 101 - N/B OFF RAMP Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	0	0	0	0	76	84	0	160	24	3	223	250	0	219	58	277	687
Percent	0.0	0.0	0.0		47.5	52.5	0.0		9.6	1.2	89.2		0.0	79.1	20.9		
High Int.	3:45:00 PM				05:00 PM				05:15 PM				04:45 PM				04:45
Volume	0	0	0	0	16	26	0	42	5	0	52	57	0	63	18	81	180
Peak Factor								0.889				0.880				0.855	0.954

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction: Nipomo
Intersection:Los Beroos Rd./101 S/B Ramp
North/South St.: HWY 101 S/B Off Ramp
East/West St.: Los Berros Rd.

File Name : NIPOMO-1AM
Site Code : 00000001
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	HWY 101 - S/B RAMP Southbound				LOS BERROS RD. Westbound				Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	6	0	14	20	0	42	5	47	0	0	0	0	42	27	0	69	136
07:15 AM	4	1	5	10	0	45	7	52	0	0	0	0	56	39	0	95	157
07:30 AM	1	0	13	14	0	63	3	66	0	0	0	0	50	60	0	110	190
07:45 AM	6	1	17	24	0	38	7	45	0	0	0	0	37	39	0	76	145
Total	17	2	49	68	0	188	22	210	0	0	0	0	185	165	0	350	628
08:00 AM	8	0	12	20	0	32	3	35	0	0	0	0	31	36	0	67	122
08:15 AM	10	0	11	21	0	33	6	39	0	0	0	0	33	24	0	57	117
08:30 AM	6	0	11	17	0	33	7	40	0	0	0	0	34	34	0	68	125
08:45 AM	11	0	13	24	0	31	3	34	0	0	0	0	37	32	0	69	127
Total	35	0	47	82	0	129	19	148	0	0	0	0	135	126	0	261	491
Grand Total	52	2	96	150	0	317	41	358	0	0	0	0	320	291	0	611	1119
Apprch %	34.7	1.3	64.0		0.0	88.5	11.5		0.0	0.0	0.0		52.4	47.6	0.0		
Total %	4.6	0.2	8.6	13.4	0.0	28.3	3.7	32.0	0.0	0.0	0.0	0.0	28.6	26.0	0.0	54.6	

	HWY 101 - S/B RAMP Southbound				LOS BERROS RD. Westbound				Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:00 AM																
Volume	17	2	49	68	0	188	22	210	0	0	0	0	185	165	0	350	628
Percent	25.0	2.9	72.1		0.0	89.5	10.5		0.0	0.0	0.0		52.9	47.1	0.0		
High Int.	07:45 AM				07:30 AM				6:45:00 AM				07:30 AM				07:30
Volume	1	0	13	14	0	63	3	66	0	0	0	0	50	60	0	110	190
Peak Factor				0.708				0.795								0.795	0.826

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction: Nipomo
Intersection:Los Berros Rd./101 S/B Ramp
North/South St.:HWY 101 S/B Off Ramp
East/West St.:Los Berros Rd.

File Name : NIPOMO-1PM
Site Code : 00000001
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	HWY 101 S/B OFF RAMP Southbound				LOS BERROS RD. Westbound				Northbound				LOS BERROS RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	26	0	20	46	0	52	4	56	0	0	0	0	48	26	0	74	176
04:15 PM	15	0	23	38	0	65	4	69	0	0	0	0	47	30	0	77	184
04:30 PM	21	1	36	58	0	70	6	76	0	0	0	0	62	37	0	99	233
04:45 PM	24	1	44	69	0	70	9	79	0	0	0	0	55	38	0	93	241
Total	86	2	123	211	0	257	23	280	0	0	0	0	212	131	0	343	834
05:00 PM	19	0	46	65	0	64	8	72	0	0	0	0	68	26	0	94	231
05:15 PM	24	0	33	57	0	74	4	78	0	0	0	0	56	29	0	85	220
05:30 PM	20	1	36	57	0	75	4	79	0	0	0	0	54	34	0	88	224
05:45 PM	23	1	29	53	0	56	6	62	0	0	0	0	45	25	0	70	185
Total	86	2	144	232	0	269	22	291	0	0	0	0	223	114	0	337	860
Grand Total	172	4	267	443	0	526	45	571	0	0	0	0	435	245	0	680	1694
Apprch %	38.8	0.9	60.3		0.0	92.1	7.9		0.0	0.0	0.0		64.0	36.0	0.0		
Total %	10.2	0.2	15.8	26.2	0.0	31.1	2.7	33.7	0.0	0.0	0.0	0.0	25.7	14.5	0.0	40.1	

	HWY 101 S/B OFF RAMP Southbound				LOS BERROS RD. Westbound				Northbound				LOS BERROS RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:30 PM																
Volume	88	2	159	249	0	278	27	305	0	0	0	0	241	130	0	371	925
Percent	35.3	0.8	63.9		0.0	91.1	8.9		0.0	0.0	0.0		65.0	35.0	0.0		
High Int.	04:45 PM				04:45 PM				3:45:00 PM				04:30 PM				04:45
Volume	24	1	44	69	0	70	9	79	0	0	0	0	55	38	0	93	241
Peak Factor				0.902				0.965								0.937	0.960

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction:Nipomo
Intersection:Hetrick Ave./Willow Rd.
North/South St.:Hetrick Ave.
East/West St.:Willow Rd.

File Name : NIPOMO-4AM
Site Code : 00000004
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	HETRICK AVE. Southbound				WILLOW RD. Westbound				HETRICK AVE. Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	5	0	5	0	0	0	0	0	14	0	14	0	0	0	0	19
07:15 AM	0	3	0	3	0	0	0	0	0	14	0	14	0	0	0	0	17
07:30 AM	0	4	0	4	0	0	0	0	0	35	0	35	0	0	0	0	39
07:45 AM	0	6	0	6	0	0	0	0	0	20	0	20	0	0	0	0	26
Total	0	18	0	18	0	0	0	0	0	83	0	83	0	0	0	0	101
08:00 AM	0	5	0	5	0	0	1	1	1	14	0	15	0	0	0	0	21
08:15 AM	0	8	0	8	0	0	0	0	0	15	0	15	0	0	0	0	23
08:30 AM	0	3	1	4	1	0	0	1	0	10	0	10	0	0	0	0	15
08:45 AM	0	9	0	9	0	0	0	0	0	11	0	11	0	0	0	0	20
Total	0	25	1	26	1	0	1	2	1	50	0	51	0	0	0	0	79
Grand Total	0	43	1	44	1	0	1	2	1	133	0	134	0	0	0	0	180
Apprch %	0.0	97.7	2.3		50.0	0.0	50.0		0.7	99.3	0.0		0.0	0.0	0.0		
Total %	0.0	23.9	0.6	24.4	0.6	0.0	0.6	1.1	0.6	73.9	0.0	74.4	0.0	0.0	0.0	0.0	

	HETRICK AVE. Southbound				WILLOW RD. Westbound				HETRICK AVE. Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:30 AM																
Volume	0	23	0	23	0	0	1	1	1	84	0	85	0	0	0	0	109
Percent	0.0	100.0	0.0		0.0	0.0	100.0		1.2	98.8	0.0		0.0	0.0	0.0		
High Int.	08:15 AM				08:00 AM				07:30 AM				6:45:00 AM				07:30
Volume	0	4	0	4	0	0	0	0	0	35	0	35	0	0	0	0	39
Peak Factor				0.719				0.250				0.607					0.699

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction:Nipomo
Intersection:Hetrick Ave./Willow Rd.
North/South St.:Hetrick Ave.
East/West St.:Willow Rd.

File Name : NIPOMO-4PM
Site Code : 00000004
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	HETRICK AVE. Southbound				WILLOW RD. Westbound				HETRICK AVE. Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	0	11	0	11	0	0	1	1	1	8	0	9	0	0	0	0	21
04:15 PM	0	15	0	15	0	0	0	0	0	12	0	12	0	0	0	0	27
04:30 PM	0	8	0	8	0	0	0	0	0	6	0	6	0	0	0	0	14
04:45 PM	0	20	0	20	0	0	0	0	0	6	0	6	0	0	0	0	26
Total	0	54	0	54	0	0	1	1	1	32	0	33	0	0	0	0	88
05:00 PM	0	16	1	17	0	0	0	0	0	7	0	7	0	0	0	0	24
05:15 PM	0	20	0	20	0	0	0	0	0	18	0	18	0	0	0	0	38
05:30 PM	0	22	0	22	0	0	0	0	0	17	0	17	0	0	0	0	39
05:45 PM	0	14	0	14	0	0	0	0	0	9	0	9	0	0	0	0	23
Total	0	72	1	73	0	0	0	0	0	51	0	51	0	0	0	0	124
Grand Total	0	126	1	127	0	0	1	1	1	83	0	84	0	0	0	0	212
Apprch %	0.0	99.2	0.8		0.0	0.0	100.0		1.2	98.8	0.0		0.0	0.0	0.0		
Total %	0.0	59.4	0.5	59.9	0.0	0.0	0.5	0.5	0.5	39.2	0.0	39.6	0.0	0.0	0.0	0.0	

	HETRICK AVE. Southbound				WILLOW RD. Westbound				HETRICK AVE. Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	0	78	1	79	0	0	0	0	0	48	0	48	0	0	0	0	127
Percent	0.0	98.7	1.3		0.0	0.0	0.0		0.0	100.0	0.0		0.0	0.0	0.0		
High Int.	05:30 PM				3:45:00 PM				05:15 PM				3:45:00 PM				05:30
Volume	0	22	0	22	0	0	0	0	0	17	0	17	0	0	0	0	39
Peak Factor				0.898								0.667					0.814

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction: Nipomo
Intersection: Pomero Rd./Willow Rd.
North/South St.: Pomeroy Rd.
East/West St.: Willow Rd.

File Name : NIPOMO-3AM
Site Code : 00000003
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	POMEROY RD. Southbound				Westbound				POMEROY RD. Northbound				WILLOW RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	3	13	0	16	0	0	0	0	0	8	19	27	20	0	1	21	64
07:15 AM	2	12	0	14	0	0	0	0	0	13	28	41	32	0	4	36	91
07:30 AM	1	9	0	10	0	0	0	0	0	19	28	47	35	0	1	36	93
07:45 AM	2	3	0	5	0	0	0	0	0	7	26	33	40	0	1	41	79
Total	8	37	0	45	0	0	0	0	0	47	101	148	127	0	7	134	327
08:00 AM	6	8	0	14	0	0	0	0	0	8	32	40	36	0	1	37	91
08:15 AM	8	9	0	17	0	0	0	0	0	8	25	33	34	0	3	37	87
08:30 AM	2	13	0	15	0	0	0	0	0	7	29	36	29	0	5	34	85
08:45 AM	3	15	0	18	0	0	0	0	0	12	24	36	39	0	1	40	94
Total	19	45	0	64	0	0	0	0	0	35	110	145	138	0	10	148	357
Grand Total	27	82	0	109	0	0	0	0	0	82	211	293	265	0	17	282	684
Apprch %	24.8	75.2	0.0		0.0	0.0	0.0		0.0	28.0	72.0		94.0	0.0	6.0		
Total %	3.9	12.0	0.0	15.9	0.0	0.0	0.0	0.0	0.0	12.0	30.8	42.8	38.7	0.0	2.5	41.2	

	POMEROY RD. Southbound				Westbound				POMEROY RD. Northbound				WILLOW RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	08:00 AM																
Volume	19	45	0	64	0	0	0	0	0	35	110	145	138	0	10	148	357
Percent	29.7	70.3	0.0		0.0	0.0	0.0		0.0	24.1	75.9		93.2	0.0	6.8		
High Int.	08:45 AM				6:45:00 AM				08:00 AM				08:45 AM				08:45
Volume	3	15	0	18	0	0	0	0	0	12	24	36	39	0	1	40	94
Peak Factor				0.889								0.906				0.925	0.949

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction: Nipomo
Intersection: Pomoroy Rd./Willow Rd.
North/South St.: Pomoroy Rd.
East/West St.: Willow Rd.

File Name : NIPOMO-3PM
Site Code : 00000003
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	POMEROY RD. Southbound				Westbound				POMEROY RD. Northbound				WILLOW RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	6	24	0	30	0	0	0	0	0	20	41	61	49	0	2	51	142
04:15 PM	2	15	0	17	0	0	0	0	0	21	47	68	61	0	5	66	151
04:30 PM	7	25	0	32	0	0	0	0	0	9	48	57	49	0	1	50	139
04:45 PM	4	16	0	20	0	0	0	0	0	17	55	72	43	0	7	50	142
Total	19	80	0	99	0	0	0	0	0	67	191	258	202	0	15	217	574
05:00 PM	4	21	0	25	0	0	0	0	0	16	32	48	56	0	3	59	132
05:15 PM	1	9	0	10	0	0	0	0	0	19	41	60	63	0	5	68	138
05:30 PM	1	18	0	19	0	0	0	0	1	17	38	56	42	0	3	45	120
05:45 PM	6	13	0	19	0	0	0	0	0	10	35	45	39	0	4	43	107
Total	12	61	0	73	0	0	0	0	1	62	146	209	200	0	15	215	497
Grand Total	31	141	0	172	0	0	0	0	1	129	337	467	402	0	30	432	1071
Apprch %	18.0	82.0	0.0		0.0	0.0	0.0		0.2	27.6	72.2		93.1	0.0	6.9		
Total %	2.9	13.2	0.0	16.1	0.0	0.0	0.0	0.0	0.1	12.0	31.5	43.6	37.5	0.0	2.8	40.3	

	POMEROY RD. Southbound				Westbound				POMEROY RD. Northbound				WILLOW RD. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	19	80	0	99	0	0	0	0	0	67	191	258	202	0	15	217	574
Percent	19.2	80.8	0.0		0.0	0.0	0.0		0.0	26.0	74.0		93.1	0.0	6.9		
High Int.	04:30 PM				3:45:00 PM				04:45 PM				04:15 PM				04:15
Volume	2	15	0	17	0	0	0	0	0	21	47	68	61	0	5	66	151
Peak Factor				0.773								0.896				0.822	0.950

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

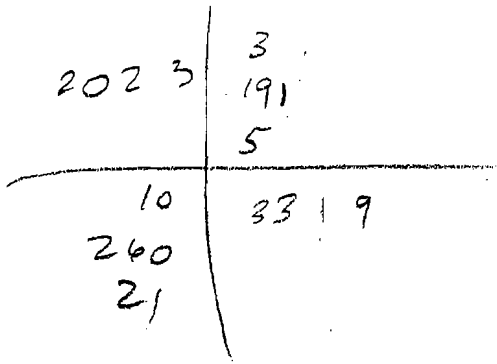
Jurisdiction:Nipomo
Intersection:West Tefft St./Oakglen Ave.
North/South St.:oakglen Ave.
East/West St.:West Tefft St.

File Name : NIPOMO-5AM
Site Code : 00000005
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	OAKGLEN AVE. Southbound				WEST TEFFT ST. Westbound				OAKGLEN AVE. Northbound				WEST TEFFT ST. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	3	0	0	3	1	20	1	22	3	6	0	9	9	38	1	48	82
07:15 AM	1	0	0	1	0	41	2	43	1	0	12	13	7	39	1	47	104
07:30 AM	9	0	1	10	0	58	0	58	2	0	23	25	2	46	3	51	144
07:45 AM	3	0	1	4	1	53	1	55	4	0	20	24	4	64	1	69	152
Total	16	0	2	18	2	172	4	178	10	6	55	71	22	187	6	215	482
08:00 AM	5	1	1	7	1	46	1	48	0	0	10	10	3	54	4	61	126
08:15 AM	2	0	0	2	1	48	1	50	3	0	8	11	6	55	1	62	125
08:30 AM	7	0	0	7	1	46	2	49	2	1	6	9	5	59	4	68	133
08:45 AM	6	1	2	9	0	51	1	52	4	0	9	13	7	92	1	100	174
Total	20	2	3	25	3	191	5	199	9	1	33	43	21	260	10	291	558
Grand Total	36	2	5	43	5	363	9	377	19	7	88	114	43	447	16	506	1040
Apprch %	83.7	4.7	11.6		1.3	96.3	2.4		16.7	6.1	77.2		8.5	88.3	3.2		
Total %	3.5	0.2	0.5	4.1	0.5	34.9	0.9	36.3	1.8	0.7	8.5	11.0	4.1	43.0	1.5	48.7	

	OAKGLEN AVE. Southbound				WEST TEFFT ST. Westbound				OAKGLEN AVE. Northbound				WEST TEFFT ST. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	08:00 AM																
Volume	20	2	3	25	3	191	5	199	9	1	33	43	21	260	10	291	558
Percent	80.0	8.0	12.0		1.5	96.0	2.5		20.9	2.3	76.7		7.2	89.3	3.4		
High Int.	08:45 AM				08:45 AM				08:45 AM				08:45 AM				08:45
Volume	6	1	2	9	0	51	1	52	4	0	9	13	7	92	1	100	174
Peak Factor				0.694				0.957				0.827				0.728	0.802



MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

Jurisdiction:Nipomo
Intersection:West Tefft St./Oakglen Ave.
North/South St.:Oakglen Ave.
East/West St.:West Tefft St.

File Name : NIPOMO-5PM
Site Code : 00000005
Start Date : 07/22/2003
Page No : 1

Groups PrintedVehicles

	OAKGLEN AVE. Southbound				WEST TEFFT ST. Westbound				OAKGLEN AVE. Northbound				WEST TEFFT ST. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	1	0	0	1	2	84	4	90	2	0	9	11	19	71	11	101	203
04:15 PM	2	0	0	2	1	77	4	82	4	0	13	17	13	97	6	116	217
04:30 PM	0	0	0	0	1	84	4	89	0	1	27	28	19	71	2	92	209
04:45 PM	3	1	1	5	1	76	4	81	2	0	14	16	28	83	4	115	217
Total	6	1	1	8	5	321	16	342	8	1	63	72	79	322	23	424	846
05:00 PM	4	1	2	7	3	89	4	96	2	0	10	12	20	94	5	119	234
05:15 PM	2	1	0	3	0	71	4	75	2	0	19	21	20	93	5	118	217
05:30 PM	0	0	0	0	2	94	2	98	2	0	17	19	19	108	11	138	255
05:45 PM	4	0	3	7	4	89	4	97	4	0	9	13	23	82	6	111	228
Total	10	2	5	17	9	343	14	366	10	0	55	65	82	377	27	486	934
Grand Total	16	3	6	25	14	664	30	708	18	1	118	137	161	699	50	910	1780
Apprch %	64.0	12.0	24.0		2.0	93.8	4.2		13.1	0.7	86.1		17.7	76.8	5.5		
Total %	0.9	0.2	0.3	1.4	0.8	37.3	1.7	39.8	1.0	0.1	6.6	7.7	9.0	39.3	2.8	51.1	

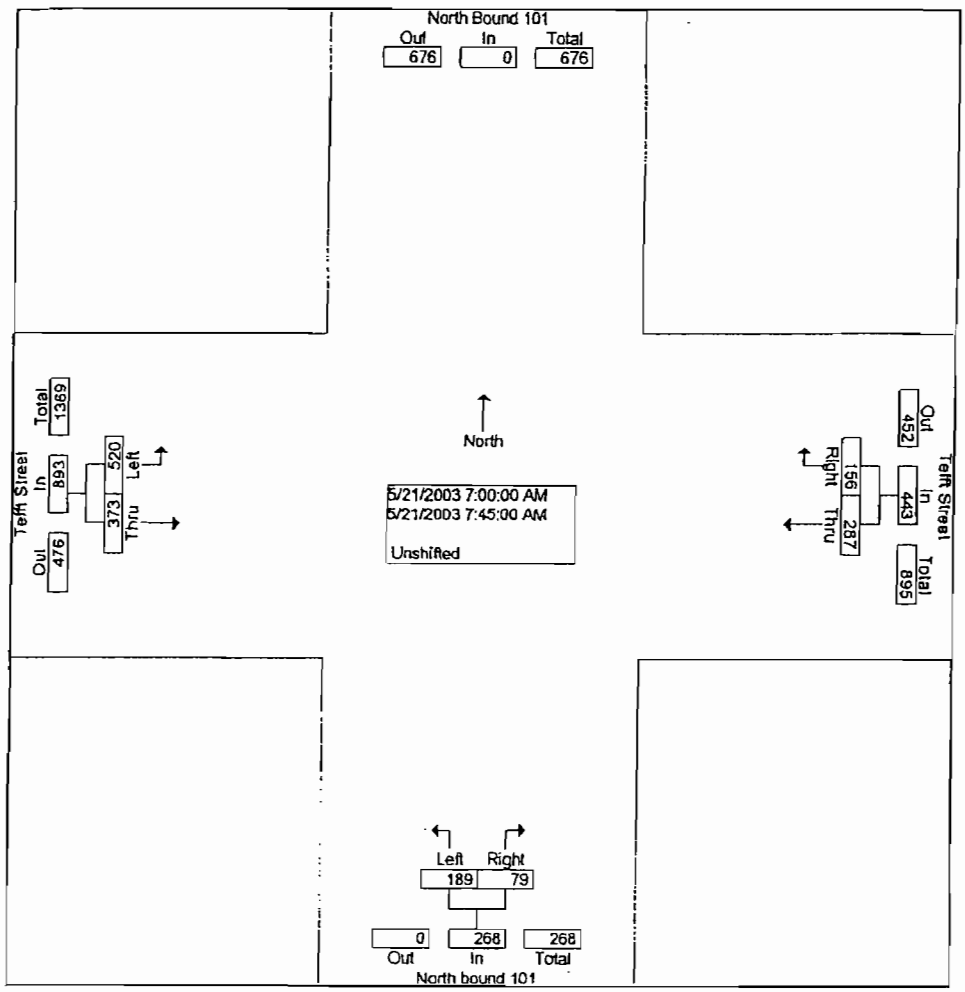
	OAKGLEN AVE. Southbound				WEST TEFFT ST. Westbound				OAKGLEN AVE. Northbound				WEST TEFFT ST. Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	05:00 PM																
Volume	10	2	5	17	9	343	14	366	10	0	55	65	82	377	27	486	934
Percent	58.8	11.8	29.4		2.5	93.7	3.8		15.4	0.0	84.6		16.9	77.6	5.6		
High Int.	05:00 PM				05:30 PM				05:15 PM				05:30 PM				05:30
Volume	0	0	0	0	2	94	2	98	2	0	17	19	19	108	11	138	255
Peak Factor				0.607				0.934				0.774				0.880	0.916

Default Comments
Change These in The Preferences Window
Select File/Preference in the Main Scree
Then Click the Comments Tab

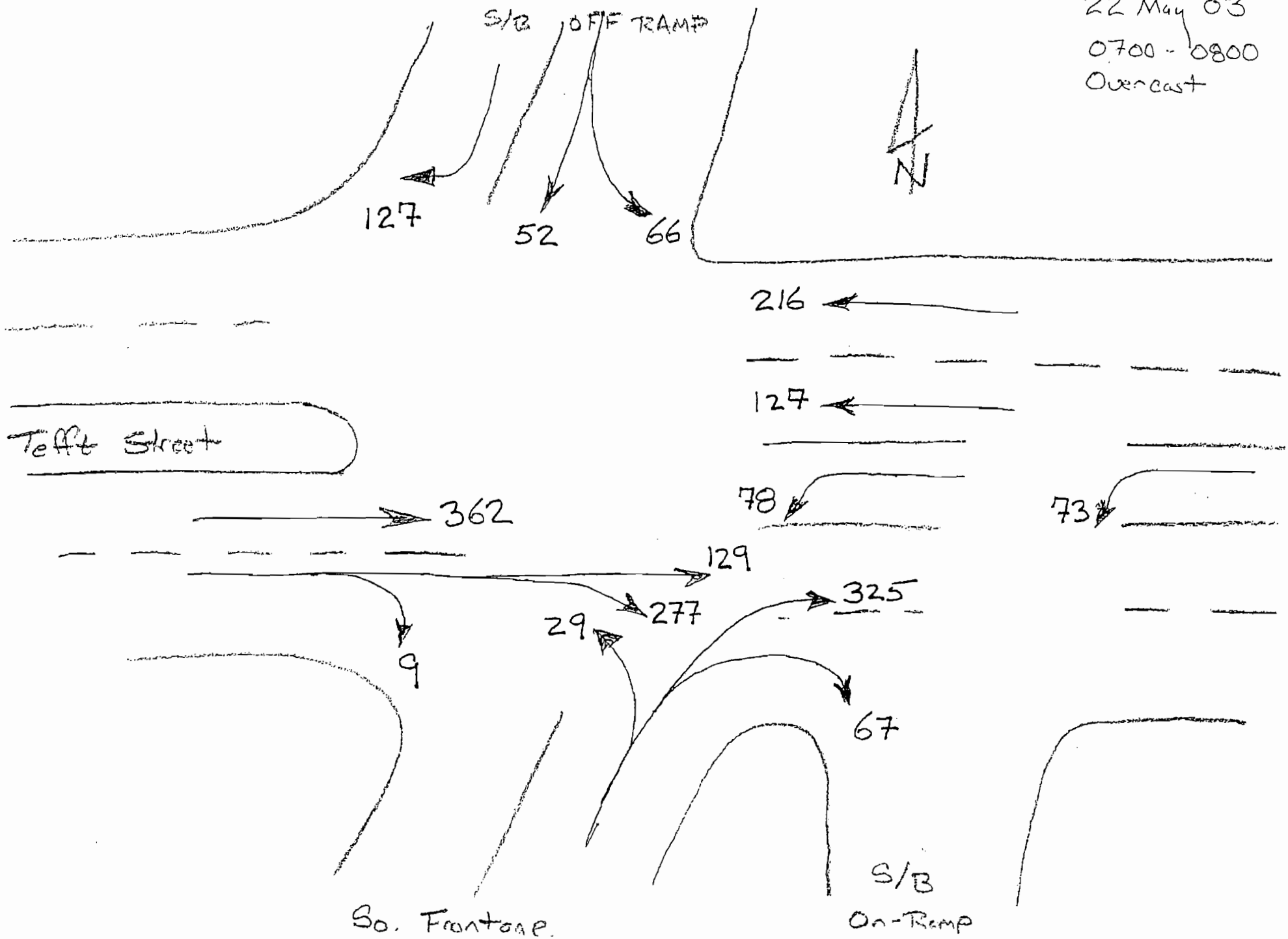
File Name : 101 and tefft nb 101
Site Code : 00000000
Start Date : 05/21/2003
Page No : 1

Groups Printed- Unshifted

	Tefft Street From East			North bound 101 From South			Tefft Street From West			
Start Time	Right	Thru	App. Total	Right	Left	App. Total	Thru	Left	App. Total	Int. Total
Factor	1.0	1.0		1.0	1.0		1.0	1.0		
07:00 AM	32	51	83	17	43	60	51	97	148	291
07:15 AM	42	60	102	23	53	76	88	133	221	399
07:30 AM	42	84	126	17	39	56	135	142	277	459
07:45 AM	40	92	132	22	54	76	99	148	247	455
Total	156	287	443	79	189	268	373	520	893	1604
Grand Total	156	287	443	79	189	268	373	520	893	1604
Apprch %	35.2	64.8		29.5	70.5		41.8	58.2		
Total %	9.7	17.9	27.6	4.9	11.8	16.7	23.3	32.4	55.7	



22 May 03
0700 - 0800
Overcast



VEHICLE TURNING MOVEMENT COUNT

FOUR-APPROACH FIELD SHEET

Time 4:30 to 6:00

N/S Street Teff N-B RAMP

E/W Street Teff St.

Date 12-11-02 Day Wed

Weather Clear.

Observer D. Flynn

P = passenger cars, stationwagons, motorcycles, pick-up trucks.

T = other trucks. (Record any school bus as SB; other buses as B).

~~N-B~~ RAMP Teff

P	T		T	P	T
21	69	4:30-4:45	121	504	
22	60	4:45-5:00	129	520	
28	62	5:00-5:15	144	482	
18		5:15-5:30	110		
12		5:30-5:45	137		
24		5:45-6:00	91		

N

NB ON Teff Ramp

P	T
4:30-4:45	
4:45-5:00	
5:00-5:15	
5:15-5:30	
5:30-5:45	
5:45-6:00	

P	T
4:30-4:45	
4:45-5:00	
5:00-5:15	
5:15-5:30	
5:30-5:45	
5:45-6:00	

P	T
4:30-4:45	1
4:45-5:00	0
5:00-5:15	0
5:15-5:30	0
5:30-5:45	0
5:45-6:00	0

P	T	
4:30-4:45	35	149
4:45-5:00	51	152
5:00-5:15	30	131
5:15-5:30	33	
5:30-5:45	38	
5:45-6:00	30	

P	T	
4:30-4:45	100	423
4:45-5:00	131	441
5:00-5:45	100	386
5:15-5:30	92	
5:30-5:45	118	
5:45-6:00	76	

P	T		P	T		T
66	287	4:30-4:45	117	R		490
73	293	4:45-5:00	127			502
74	235	5:00-5:15	110			491
74		5:15-5:30	136			
72		5:30-5:45	129			
65		5:45-6:00	116			

430 1922
445 1968
5:00 1837

Figure G-3 Refer to Figure 2-1 on page 8.

VEHICLE TURNING MOVEMENT COUNT

FOUR-APPROACH FIELD SHEET

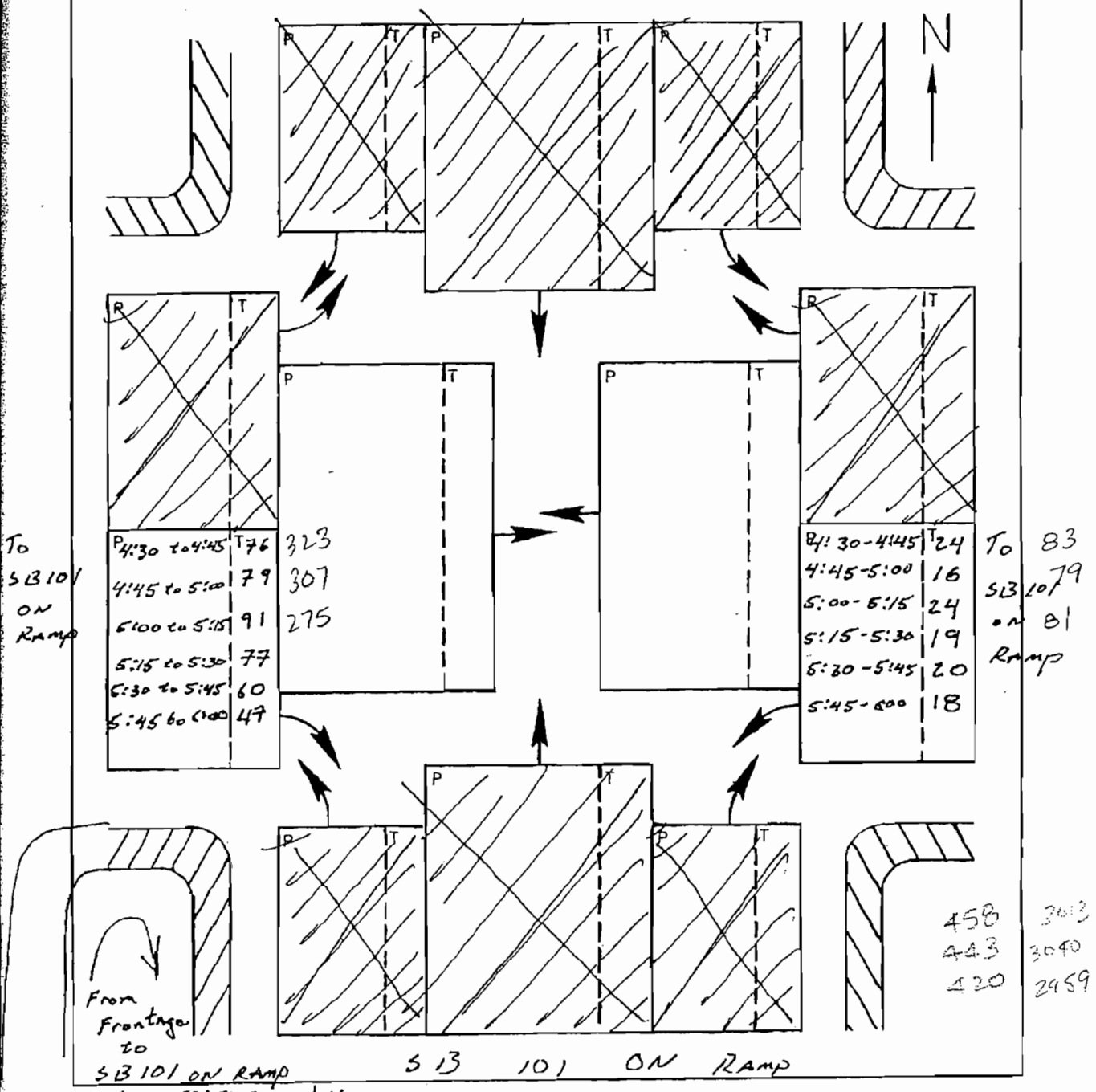
Time 4:30 to 6:00

N/S Street S.B. 101/Frontage Date 12-11-02 Day WED

E/W Street Tefft Street Weather Clear

P = passenger cars, stationwagons, motorcycles, pick-up trucks. Observer R. Chapman

T = other trucks. (Record any school bus as SB; other buses as B).



4:30-4:45	13 52	5:15-5:30	11
4:45-5:00	12 57	5:30-5:45	18
5:00-5:45	16 64	5:45-6:00	19

Figure G-3 Refer to Figure 2-1 on page 8.

VEHICLE TURNING MOVEMENT COUNT

FOUR-APPROACH FIELD SHEET

Time 4:30 to 6:00

N/S Street S.13 101 / Frontage Date 12-11-02 Day WED

E/W Street Tefft Street Weather Clear

P = passenger cars, stationwagons, motorcycles, pick-up trucks.

T = other trucks. (Record any school bus as SB; other buses as B).

Observer R. Chapman

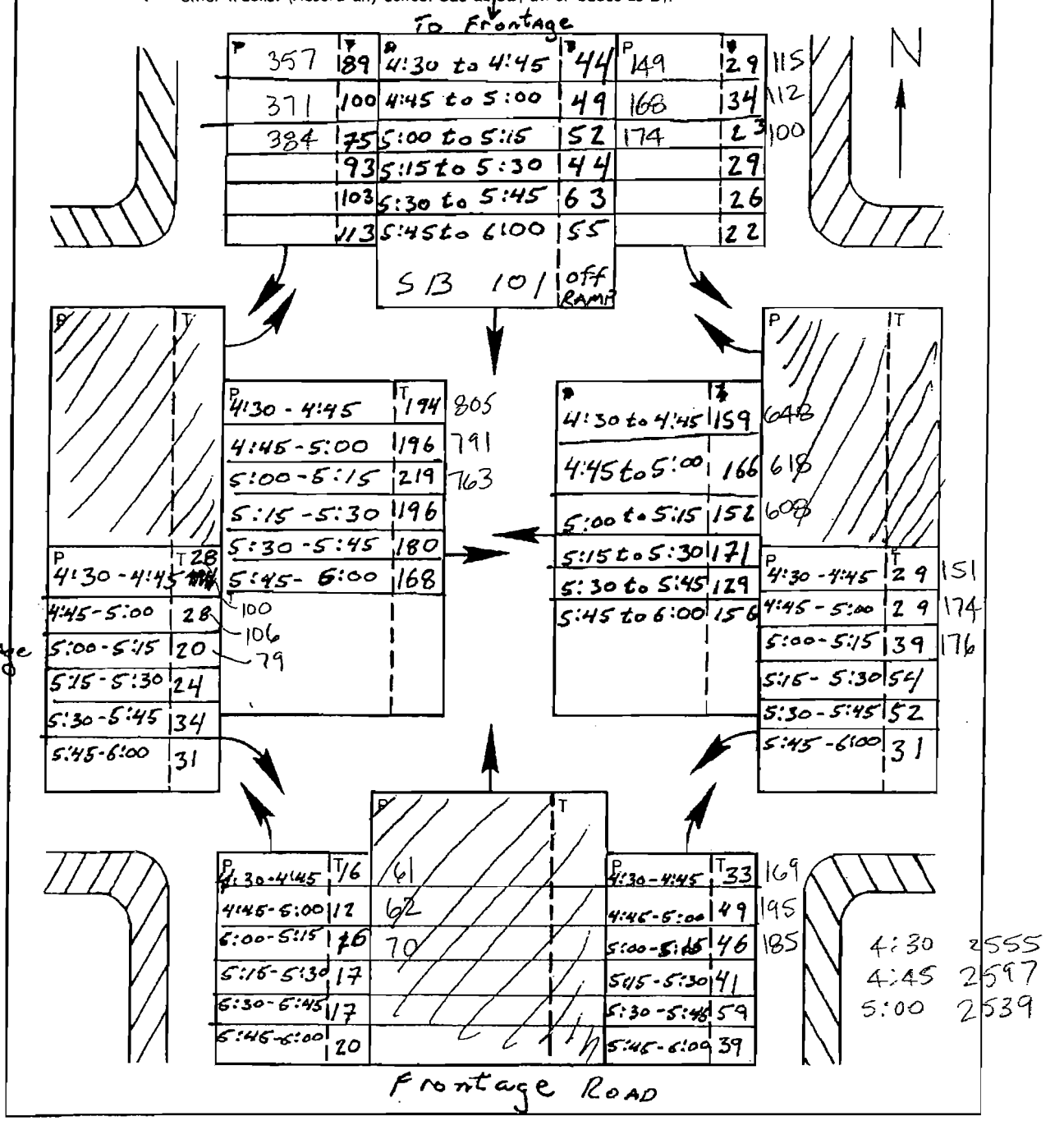


Figure G-3 Refer to Figure 2-1 on page 8.

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

) - JUR. : NIPOMO
ICATION: : LOS BERROS ROAD
MITS: : W/O US 101 SB RA

Site: 006
Date: 07/23/03
Day: Wednesday

erval	EB				WB				Combined			
gin	AM		PM		AM		PM		AM		PM	
12:00	0	11	40	209	7	19	54	202	7	30	94	411
12:15	1		60		5		50		6		110	
12:30	6		62		2		48		8		110	
12:45	4		47		5		50		9		97	
01:00	1	8	68	262	5	17	54	209	6	25	122	471
01:15	3		66		3		66		6		132	
01:30	3		56		2		48		5		104	
01:45	1		72		7		41		8		113	
02:00	0	10	56	230	3	9	51	227	3	19	107	457
02:15	6		48		4		64		10		112	
02:30	1		56		1		64		2		120	
02:45	3		70		1		48		4		118	
03:00	5	16	54	280	2	13	72	293	7	29	126	573
03:15	5		60		3		59		8		119	
03:30	4		92		5		88		9		180	
03:45	2		74		3		74		5		148	
04:00	2	26	82	315	2	11	90	315	4	37	172	630
04:15	12		64		3		78		15		142	
04:30	8		84		2		72		10		156	
04:45	4		85		4		75		8		160	
05:00	8	77	88	320	7	63	86	349	15	140	174	669
05:15	20		98		10		88		30		186	
05:30	27		72		16		103		43		175	
05:45	22		62		30		72		52		134	
06:00	52	211	72	230	37	233	64	258	89	444	136	488
06:15	42		50		40		75		82		125	
06:30	53		58		80		63		133		121	
06:45	64		50		76		56		140		106	
07:00	61	351	60	160	34	182	54	181	95	533	114	341
07:15	90		42		52		49		142		91	
07:30	98		26		44		46		142		72	
07:45	102		32		52		32		154		64	
08:00	52	254	36	115	37	155	36	168	89	409	72	283
08:15	72		20		40		36		112		56	
08:30	72		35		32		52		104		87	
08:45	58		24		46		44		104		68	
09:00	49	260	28	91	43	163	58	143	92	423	86	234
09:15	62		16		36		37		98		53	
09:30	79		22		44		32		123		54	
09:45	70		25		40		16		110		41	
10:00	52	223	15	45	29	133	26	67	81	356	41	112
10:15	56		11		28		20		84		31	
10:30	59		7		38		13		97		20	
10:45	56		12		38		8		94		20	
11:00	53	209	6	24	44	190	16	55	97	399	22	79
11:15	48		4		40		14		88		18	
11:30	60		8		46		12		106		20	
11:45	48		6		60		13		108		19	
s	1,656		2,281		1,188		2,467		2,844		4,748	
%	58.2		48.0		41.8		52.0					
Totals		3,937				3,655				7,592		
Splits		51.9				48.1						
Hour	07:00		04:30		06:30		04:45		07:00		04:45	
me	351		355		242		352		533		695	
-	0.86		0.91		0.76		0.85		0.87		0.93	
									7%		9%	

a File : STM$0001

Printed : 7/30/2003

MULTIKANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
LIMITS: : W/O US 101 SB RA

Site: 006
Date: 07/24/03

Interval	EB				WB				Combined				Day: Thursday
Begin	AM		PM		AM		PM		AM		PM		
12:00	6	21	71	267	11	34	60	223	17	55	131	490	
12:15	4		61		13		44		17		105		
12:30	6		65		5		57		11		122		
12:45	5		70		5		62		10		132		
01:00	2	12	60	225	7	15	51	208	9	27	111	433	
01:15	6		50		3		53		9		103		
01:30	2		56		2		53		4		109		
01:45	2		59		3		51		5		110		
02:00	3	9	49	232	2	9	58	249	5	18	107	481	
02:15	4		60		1		58		5		118		
02:30	0		66		5		56		5		122		
02:45	2		57		1		77		3		134		
03:00	2	15	54	295	2	13	60	283	4	28	114	578	
03:15	10		74		5		64		15		138		
03:30	1		85		3		77		4		162		
03:45	2		82		3		82		5		164		
04:00	3	22	69	318	2	18	72	310	5	40	141	628	
04:15	5		68		0		80		5		148		
04:30	9		91		6		80		15		171		
04:45	5		90		10		78		15		168		
05:00	7	87	92	320	8	72	80	338	15	159	172	658	
05:15	18		90		10		102		28		192		
05:30	29		82		17		84		46		166		
05:45	33		56		37		72		70		128		
06:00	52	221	76	262	32	224	70	276	84	445	146	538	
06:15	39		79		46		60		85		139		
06:30	62		60		68		74		130		134		
06:45	68		47		78		72		146		119		
07:00	70	347	51	166	50	198	60	201	120	545	111	367	
07:15	74		33		34		58		108		91		
07:30	107		48		42		44		149		92		
07:45	96		34		72		39		168		73		
08:00	69	289	30	114	44	160	48	160	113	449	78	274	
08:15	72		30		42		34		114		64		
08:30	77		32		40		44		117		76		
08:45	71		22		34		34		105		56		
09:00	60	236	24	96	41	153	36	130	101	389	60	226	
09:15	54		20		36		27		90		47		
09:30	58		24		32		40		90		64		
09:45	64		28		44		27		108		55		
10:00	71	223	18	66	32	164	36	94	103	387	54	160	
10:15	46		20		40		24		86		44		
10:30	58		16		40		20		98		36		
10:45	48		12		52		14		100		26		
11:00	54	218	14	29	46	182	12	58	100	400	26	87	
11:15	52		6		50		16		102		22		
11:30	60		2		46		16		106		18		
11:45	52		7		40		14		92		21		
Totals	1,700		2,390		1,242		2,530		2,942		4,920		
Split%	57.8		48.6		42.2		51.4						
Day Totals		4,090				3,772				7,862			
Day Splits		52.0				48.0							
Peak Hour	07:00		04:30		06:15		04:45		07:00		04:30		
Volume	347		363		242		344		545		703		
Factor	0.81		0.99		0.78		0.84		0.81		0.92		

7% 9%

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

)- JUR: : NIPOMO
)CATION: : LOS BERROS ROAD
MITS: : W/O US 101 SB RA

Site: 006
Date: 07/25/03

Day: Friday

erval	EB				WB				Combined			
gin	AM		PM		AM		PM		AM		PM	
12:00	8	30	68	264	6	18	52	225	14	48	120	489
12:15	9		60		7		59		16		119	
12:30	6		68		2		50		8		118	
12:45	7		68		3		64		10		132	
)1:00	2	9	70	241	14	20	56	230	16	29	126	471
)1:15	1		56		5		60		6		116	
)1:30	5		63		1		63		6		126	
)1:45	1		52		0		51		1		103	
)2:00	2	6	50	251	2	12	54	260	4	18	104	511
)2:15	0		55		2		77		2		132	
2:30	3		70		2		72		5		142	
2:45	1		76		6		57		7		133	
3:00	5	17	68	283	2	19	74	313	7	36	142	596
3:15	2		63		8		73		10		136	
3:30	6		70		1		76		7		146	
3:45	4		82		8		90		12		172	
4:00	1	27	74	321	1	13	89	347	2	40	163	668
4:15	6		74		3		90		9		164	
4:30	2		95		8		76		10		171	
4:45	18		78		1		92		19		170	
5:00	12	81	81	284	8	64	96	393	20	145	177	677
5:15	16		60		10		84		26		144	
5:30	17		63		18		115		35		178	
5:45	36		80		28		98		64		178	
6:00	40	221	68	249	36	201	86	320	76	422	154	569
6:15	55		66		41		78		96		144	
6:30	62		69		54		80		116		149	
6:45	64		46		70		76		134		122	
7:00	51	299	60	194	44	190	64	199	95	489	124	393
7:15	82		41		34		52		116		93	
7:30	90		46		42		44		132		90	
7:45	76		47		70		39		146		86	
8:00	66	240	39	145	24	152	48	162	90	392	87	307
8:15	64		34		50		46		114		80	
8:30	50		36		34		34		84		70	
8:45	60		36		44		34		104		70	
9:00	62	276	38	127	52	172	52	167	114	448	90	294
9:15	72		32		28		39		100		71	
9:30	72		32		50		40		122		72	
9:45	70		25		42		36		112		61	
10:00	56	221	22	101	46	183	35	107	102	404	57	208
10:15	56		26		42		26		98		52	
10:30	52		22		49		28		101		50	
10:45	57		31		46		18		103		49	
11:00	52	206	10	56	37	187	30	93	89	393	40	149
11:15	68		13		62		27		130		40	
11:30	46		20		38		20		84		40	
11:45	40		13		50		16		90		29	
	1,633		2,516		1,231		2,816		2,864		5,332	
	57.0		47.2		43.0		52.8					
otals		4,149				4,047				8,196		
ilits		50.6				49.4						
our	07:15		04:15		06:15		05:00		07:00		04:15	
:	314		328		209		393		489		682	
	0.87		0.86		0.75		0.85		0.84		0.96	

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
LIMITS: : W/O US 101 SB RA

Site: 006
Date: 07/26/03

Day: Saturday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	14	42	81	262	8	44	68	268	22	86	149	530
12:15	8		61		14		72		22		133	
12:30	16		60		16		64		32		124	
12:45	4		60		6		64		10		124	
01:00	4	15	66	250	14	50	74	294	18	65	140	544
01:15	2		74		21		82		23		156	
01:30	8		48		11		66		19		114	
01:45	1		62		4		72		5		134	
02:00	6	22	71	274	3	20	69	273	9	42	140	547
02:15	6		68		8		81		14		149	
02:30	3		64		1		71		4		135	
02:45	7		71		8		52		15		123	
03:00	1	10	52	238	8	15	70	249	9	25	122	487
03:15	3		60		3		66		6		126	
03:30	5		60		2		46		7		106	
03:45	1		66		2		67		3		133	
04:00	1	15	68	260	7	19	62	246	8	34	130	506
04:15	6		62		2		74		8		136	
04:30	4		73		6		63		10		136	
04:45	4		57		4		47		8		104	
05:00	2	41	50	195	8	53	44	211	10	94	94	406
05:15	8		48		8		66		16		114	
05:30	12		56		14		51		26		107	
05:45	19		41		23		50		42		91	
06:00	22	95	54	193	30	132	54	208	52	227	108	401
06:15	22		52		28		64		50		116	
06:30	25		48		36		48		61		96	
06:45	26		39		38		42		64		81	
07:00	28	128	36	184	24	105	47	168	52	233	83	352
07:15	30		44		24		42		54		86	
07:30	32		52		26		41		58		93	
07:45	38		52		31		38		69		90	
08:00	29	159	32	126	32	119	35	137	61	278	67	263
08:15	34		28		30		40		64		68	
08:30	42		33		28		32		70		65	
08:45	54		33		29		30		83		63	
09:00	49	223	19	70	36	140	28	113	85	363	47	183
09:15	54		14		30		36		84		50	
09:30	61		20		32		26		93		46	
09:45	59		17		42		23		101		40	
10:00	64	268	25	82	38	181	28	130	102	449	53	212
10:15	56		20		45		36		101		56	
10:30	80		19		58		30		138		49	
10:45	68		18		40		36		108		54	
11:00	58	249	23	66	56	240	28	91	114	489	51	157
11:15	64		20		56		18		120		38	
11:30	62		13		60		20		122		33	
11:45	65		10		68		25		133		35	
Totals	1,267		2,200		1,118		2,388		2,385		4,588	
Split%	53.1		48.0		46.9		52.0					
Day Totals		3,467				3,506				6,973		
Day Splits		49.7				50.3						
Peak Hour	10:30		02:00		11:00		01:00		11:00		01:45	
Volume	270		274		240		294		489		558	
Factor	0.84		0.96		0.88		0.90		0.92		0.94	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

LOCATION: : LOS BERROS ROAD

LIMITS: : W/O US 101 SB RA.

Site: 006

Date: 07/27/03

Day: Sunday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	12	43	64	278	23	79	70	268	35	122	134	546
12:15	12		63		18		62		30		125	
12:30	14		69		28		59		42		128	
12:45	5		82		10		77		15		159	
01:00	4	18	66	236	10	29	46	206	14	47	112	442
01:15	4		60		9		59		13		119	
01:30	5		69		6		44		11		113	
01:45	5		41		4		57		9		98	
02:00	8	24	68	249	14	32	61	256	22	56	129	505
02:15	8		62		8		51		16		113	
02:30	3		56		6		62		9		118	
02:45	5		63		4		82		9		145	
03:00	3	11	54	215	5	11	53	206	8	22	107	421
03:15	1		46		5		48		6		94	
03:30	3		62		1		52		4		114	
03:45	4		53		0		53		4		106	
04:00	8	14	56	228	3	5	67	237	11	19	123	465
04:15	4		66		0		62		4		128	
04:30	2		52		2		56		4		108	
04:45	0		54		0		52		0		106	
05:00	8	30	42	170	6	16	62	206	14	46	104	376
05:15	6		33		2		53		8		86	
05:30	6		42		2		51		8		93	
05:45	10		53		6		40		16		93	
06:00	13	67	29	159	6	37	46	178	19	104	75	337
06:15	14		47		7		56		21		103	
06:30	24		50		13		42		37		92	
06:45	16		33		11		34		27		67	
07:00	22	87	34	143	12	74	40	151	34	161	74	294
07:15	21		40		16		37		37		77	
07:30	20		29		14		34		34		63	
07:45	24		40		32		40		56		80	
08:00	23	135	22	114	21	95	42	146	44	230	64	260
08:15	44		32		28		42		72		74	
08:30	41		28		22		30		63		58	
08:45	27		32		24		32		51		64	
09:00	42	198	40	92	21	119	30	119	63	317	70	211
09:15	54		20		28		33		82		53	
09:30	48		19		34		28		82		47	
09:45	54		13		36		28		90		41	
10:00	59	228	14	52	36	154	19	83	95	382	33	135
10:15	61		12		42		24		103		36	
10:30	55		17		36		18		91		35	
10:45	53		9		40		22		93		31	
11:00	65	269	11	36	46	203	12	49	111	472	23	85
11:15	54		8		50		16		104		24	
11:30	69		8		53		11		122		19	
11:45	81		9		54		10		135		19	
Totals	1,124		1,972		854		2,105		1,978		4,077	
Split%	56.8		48.4		43.2		51.6					
Day Totals		3,096				2,959				6,055		
Day Splits		51.1				48.9						
Peak Hour	11:00		12:15		11:00		12:00		11:00		12:00	
Volume	269		280		203		268		472		546	
Factor	0.83		0.85		0.94		0.87		0.87		0.86	

MULTIKANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
LIMITS: : W/O US 101 SB RA

Site: 006
Date: 07/28/03

Day: Monday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	2	18	60	220	6	27	61	208	8	45	121	428
12:15	4		51		8		52		12		103	
12:30	6		51		5		45		11		96	
12:45	6		58		8		50		14		108	
01:00	10	18	54	221	4	20	49	215	14	38	103	436
01:15	2		50		8		43		10		93	
01:30	4		56		7		63		11		119	
01:45	2		61		1		60		3		121	
02:00	6	11	52	216	1	10	52	236	7	21	104	452
02:15	1		47		5		72		6		119	
02:30	3		64		0		56		3		120	
02:45	1		53		4		56		5		109	
03:00	0	14	70	287	1	11	56	254	1	25	126	541
03:15	6		64		4		56		10		120	
03:30	3		67		2		68		5		135	
03:45	5		86		4		74		9		160	
04:00	5	18	68	328	4	18	66	319	9	36	134	647
04:15	4		74		4		81		8		155	
04:30	2		97		4		80		6		177	
04:45	7		89		6		92		13		181	
05:00	16	94	87	347	3	53	74	315	19	147	161	662
05:15	18		88		8		102		26		190	
05:30	24		74		14		78		38		152	
05:45	36		98		28		61		64		159	
06:00	48	225	58	214	31	197	77	235	79	422	135	449
06:15	48		55		42		64		90		119	
06:30	55		54		64		54		119		108	
06:45	74		47		60		40		134		87	
07:00	62	296	39	139	38	176	55	187	100	472	94	326
07:15	68		42		40		42		108		84	
07:30	92		32		38		42		130		74	
07:45	74		26		60		48		134		74	
08:00	64	258	25	77	43	167	41	147	107	425	66	224
08:15	56		22		40		34		96		56	
08:30	68		12		40		44		108		56	
08:45	70		18		44		28		114		46	
09:00	58	211	18	94	36	132	25	129	94	343	43	223
09:15	41		28		18		38		59		66	
09:30	62		16		38		32		100		48	
09:45	50		32		40		34		90		66	
10:00	61	243	10	54	54	175	23	70	115	418	33	124
10:15	59		18		47		16		106		34	
10:30	68		18		40		18		108		36	
10:45	55		8		34		13		89		21	
11:00	64	238	10	40	49	184	15	46	113	422	25	86
11:15	46		12		50		12		96		24	
11:30	66		7		44		9		110		16	
11:45	62		11		41		10		103		21	
Totals	1,644		2,237		1,170		2,361		2,814		4,598	
Split%	58.4		48.7		41.6		51.3					
Day Totals		3,881				3,531				7,412		
Day Splits		52.4				47.6						
Peak Hour	07:15		04:30		06:15		04:30		07:15		04:30	
Volume	298		361		204		348		479		709	
Factor	0.81		0.93		0.80		0.85		0.89		0.93	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

- JUR: : NIPOMO
CATION: : LOS BERROS ROAD
MITS: : W/O US 101 SB RA

Site: 006
Date: 07/29/03

Day: Tuesday

rval	EB				WB				Combined			
in	AM		PM		AM		PM		AM		PM	
2:00	4	21	50	226	8	24	46	210	12	45	96	436
2:15	6		50		7		59		13		109	
2:30	6		62		4		49		10		111	
2:45	5		64		5		56		10		120	
1:00	5	10	59	223	8	13	45	204	13	23	104	427
1:15	2		55		3		39		5		94	
1:30	1		64		1		52		2		116	
1:45	2		45		1		68		3		113	
2:00	1	9	40	222	4	12	52	232	5	21	92	454
2:15	5		42		6		49		11		91	
2:30	0		60		1		64		1		124	
2:45	3		80		1		67		4		147	
3:00	0	17	70	304	3	10	62	317	3	27	132	621
3:15	2		70		1		78		3		148	
3:30	8		86		1		86		9		172	
3:45	7		78		5		91		12		169	
4:00	5	15	81	355	4	11	66	324	9	26	147	679
4:15	3		80		2		76		5		156	
4:30	3		96		2		92		5		188	
4:45	4		98		3		90		7		188	
5:00	14	100	100	354	7	70	88	361	21	170	188	715
5:15	17		84		7		101		24		185	
5:30	34		92		20		96		54		188	
5:45	35		78		36		76		71		154	
6:00	52	227	51	197	42	235	80	264	94	462	131	461
6:15	43		48		46		57		89		105	
6:30	64		52		66		69		130		121	
6:45	68		46		81		58		149		104	
7:00	62	302	49	132	40	194	59	198	102	496	108	330
7:15	75		25		48		64		123		89	
7:30	99		30		48		41		147		71	
7:45	66		28		58		34		124		62	
8:00	80	284	31	111	40	149	27	140	120	433	58	251
8:15	74		26		36		33		110		59	
8:30	46		28		19		40		65		68	
8:45	84		26		54		40		138		66	
9:00	48	237	24	111	33	150	34	142	81	387	58	253
9:15	61		31		35		43		96		74	
9:30	58		34		40		33		98		67	
9:45	70		22		42		32		112		54	
00	58	229	13	63	50	199	32	91	108	428	45	154
15	63		18		44		28		107		46	
30	48		16		57		19		105		35	
45	60		16		48		12		108		28	
00	52	226	9	24	38	171	11	47	90	397	20	71
15	60		6		40		22		100		28	
30	56		7		48		8		104		15	
45	58		2		45		6		103		8	
	1,677		2,322		1,238		2,530		2,915		4,852	
%	57.5		47.9		42.5		52.1					
otals		3,999				3,768				7,767		
plits		51.5				48.5						
Hour	07:15		04:30		06:00		04:45		06:45		04:30	
ie	320		378		235		375		521		749	
	0.81		0.94		0.73		0.93		0.87		1.00	
									6.7%		9.6%	

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
MITS: : E/O US 101 NB RA

Site: 007
Date: 07/23/03

Day: Wednesday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	2	5	30	110	2	7	20	94	4	12	50	204
12:15	1		26		2		20		3		46	
12:30	1		24		2		28		3		52	
12:45	1		30		1		26		2		56	
01:00	2	6	26	103	3	6	36	139	5	12	62	242
01:15	3		24		3		45		6		69	
01:30	1		24		0		28		1		52	
01:45	0		29		0		30		0		59	
02:00	1	5	37	144	1	5	28	127	2	10	65	271
02:15	2		42		2		26		4		68	
02:30	2		38		2		35		4		73	
02:45	0		27		0		38		0		65	
03:00	0	2	30	155	0	3	52	164	0	5	82	319
03:15	1		38		0		34		1		72	
03:30	1		49		3		38		4		87	
03:45	0		38		0		40		0		78	
04:00	0	14	39	130	0	2	47	187	0	16	86	317
04:15	8		22		2		52		10		74	
04:30	3		35		0		44		3		79	
04:45	3		34		0		44		3		78	
05:00	2	50	28	138	0	19	64	222	2	69	92	360
05:15	13		40		0		56		13		96	
05:30	12		38		5		62		17		100	
05:45	23		32		14		40		37		72	
06:00	16	114	35	134	8	54	44	150	24	168	79	284
06:15	18		38		12		42		30		80	
06:30	44		31		16		34		60		65	
06:45	36		30		18		30		54		60	
07:00	25	148	26	80	26	101	24	83	51	249	50	163
07:15	38		22		27		15		65		37	
07:30	43		14		22		24		65		38	
07:45	42		18		26		20		68		38	
08:00	26	138	13	77	26	96	24	83	52	234	37	160
08:15	38		9		22		16		60		25	
08:30	38		36		20		21		58		57	
08:45	36		19		28		22		64		41	
09:00	46	137	24	47	22	95	19	74	68	232	43	121
09:15	38		9		19		25		57		34	
09:30	26		9		26		19		52		28	
09:45	27		5		28		11		55		16	
10:00	20	108	7	18	26	104	8	26	46	212	15	44
10:15	26		5		18		2		44		7	
10:30	30		4		17		7		47		11	
10:45	32		2		43		9		75		11	
11:00	26	120	2	5	22	80	4	24	48	200	6	29
11:15	26		2		19		8		45		10	
11:30	34		0		21		8		55		8	
11:45	34		1		18		4		52		5	
Totals	847		1,141		572		1,373		1,419		2,514	
Split%	59.7		45.4		40.3		54.6					
Day Totals		1,988				1,945				3,933		
Day Splits		50.5				49.5						
Peak Hour	08:15		03:15		10:45		04:45		07:15		04:45	
Volume	158		164		105		226		250		366	
Factor	0.86		0.84		0.61		0.88		0.92		0.92	
									6.3%		9.3%	

Data File : STM$0002

Printed : 7/30/2003

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

LOCATION: : LOS BERROS ROAD

LIMITS: : E/O US 101 NB RA

Site: 007

Date: 07/24/03

Day: Thursday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	7	11	41	145	5	22	32	113	12	33	73	258
12:15	0		34		10		29		10		63	
12:30	1		40		3		22		4		62	
12:45	3		30		4		30		7		60	
01:00	1	1	31	104	3	7	26	119	4	8	57	223
01:15	0		21		2		32		2		53	
01:30	0		22		0		32		0		54	
01:45	0		30		2		29		2		59	
02:00	0	3	32	116	0	2	27	130	0	5	59	246
02:15	2		26		2		35		4		61	
02:30	0		29		0		28		0		57	
02:45	1		29		0		40		1		69	
03:00	0	4	56	178	1	6	38	169	1	10	94	347
03:15	2		34		1		29		3		63	
03:30	2		48		4		48		6		96	
03:45	0		40		0		54		0		94	
04:00	1	13	44	132	0	3	48	196	1	16	92	328
04:15	8		35		0		54		8		89	
04:30	0		27		1		50		1		77	
04:45	4		26		2		44		6		70	
05:00	5	40	33	142	2	23	62	218	7	63	95	360
05:15	6		29		2		60		8		89	
05:30	15		46		10		60		25		106	
05:45	14		34		9		36		23		70	
06:00	25	133	66	149	12	72	42	124	37	205	108	273
06:15	20		27		10		32		30		59	
06:30	42		30		20		30		62		60	
06:45	46		26		30		20		76		46	
07:00	26	173	23	87	22	102	27	82	48	275	50	169
07:15	42		23		28		20		70		43	
07:30	48		20		24		18		72		38	
07:45	57		21		28		17		85		38	
08:00	34	121	17	56	22	103	13	58	56	224	30	114
08:15	32		11		18		18		50		29	
08:30	28		18		22		14		50		32	
08:45	27		10		41		13		68		23	
09:00	28	112	10	49	19	98	22	62	47	210	32	111
09:15	34		12		22		15		56		27	
09:30	22		17		27		11		49		28	
09:45	28		10		30		14		58		24	
10:00	25	90	10	28	26	96	9	40	51	186	19	68
10:15	18		6		24		6		42		12	
10:30	18		9		24		12		42		21	
10:45	29		3		22		13		51		16	
11:00	29	119	2	12	24	104	8	27	53	223	10	39
11:15	28		2		26		8		54		10	
11:30	26		1		27		8		53		9	
11:45	36		7		27		3		63		10	
Totals	820		1,198		638		1,338		1,458		2,536	
Split%	56.2		47.2		43.8		52.8					
Day Totals		2,018				1,976				3,994		
Day Splits		50.5				49.5						
Peak Hour	07:15		03:00		08:45		04:45		07:15		05:15	
Volume	181		178		109		226		283		373	
Factor	0.79		0.79		0.66		0.91		0.83		0.86	

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
MITS: : E/O US 101 NB RA

Site: 007
Date: 07/25/03

Day: Friday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	4	7	41	148	3	14	24	118	7	21	65	266
12:15	2		26		8		32		10		58	
12:30	0		46		2		26		2		72	
12:45	1		35		1		36		2		71	
01:00	2	6	25	135	2	4	42	134	4	10	67	269
01:15	1		34		0		37		1		71	
01:30	3		46		1		30		4		76	
01:45	0		30		1		25		1		55	
02:00	1	2	31	147	5	6	20	142	6	8	51	289
02:15	0		44		0		46		0		90	
02:30	1		31		1		38		2		69	
02:45	0		41		0		38		0		79	
03:00	0	2	28	155	2	3	30	163	2	5	58	318
03:15	1		34		0		48		1		82	
03:30	0		40		0		37		0		77	
03:45	1		53		1		48		2		101	
04:00	1	13	34	148	0	4	38	185	1	17	72	333
04:15	5		34		1		51		6		85	
04:30	3		38		2		48		5		86	
04:45	4		42		1		48		5		90	
05:00	6	42	52	184	0	15	51	183	6	57	103	367
05:15	8		36		0		52		8		88	
05:30	13		44		3		48		16		92	
05:45	15		52		12		32		27		84	
06:00	14	108	37	129	11	76	44	138	25	184	81	267
06:15	24		38		18		34		42		72	
06:30	40		31		20		30		60		61	
06:45	30		23		27		30		57		53	
07:00	34	133	30	91	29	97	30	102	63	230	60	193
07:15	38		24		16		22		54		46	
07:30	37		15		24		24		61		39	
07:45	24		22		28		26		52		48	
08:00	26	140	16	55	22	97	16	59	48	237	32	114
08:15	32		20		24		17		56		37	
08:30	44		11		25		8		69		19	
08:45	38		8		26		18		64		26	
09:00	30	130	10	45	28	112	30	103	58	242	40	148
09:15	34		16		15		29		49		45	
09:30	28		9		37		24		65		33	
09:45	38		10		32		20		70		30	
10:00	25	111	14	42	22	96	12	45	47	207	26	87
10:15	25		9		23		4		48		13	
10:30	37		8		21		19		58		27	
10:45	24		11		30		10		54		21	
11:00	33	119	10	27	20	90	7	33	53	209	17	60
11:15	34		6		25		9		59		15	
11:30	23		7		19		10		42		17	
11:45	29		4		26		7		55		11	
Totals	813		1,306		614		1,405		1,427		2,711	
Split%	57.0		48.2		43.0		51.8					
Day Totals		2,119				2,019				4,138		
Day Splits		51.2				48.8						
Peak Hour	08:30		05:00		09:30		04:30		08:15		04:45	
Volume	146		184		114		199		247		373	
Factor	0.83		0.88		0.77		0.96		0.89		0.91	

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

JUR: : NIPOMO
ATION: : LOS BERROS ROAD
ITS: : E/O US 101 NB RA

Site: 007
Date: 07/26/03

Day: Saturday

val	WB				EB				Combined			
n	AM		PM		AM		PM		AM		PM	
:00	10	19	31	132	7	18	24	108	17	37	55	240
:15	5		35		3		26		8		61	
:30	2		31		4		36		6		67	
:45	2		35		4		22		6		57	
:00	7	18	25	130	5	16	32	116	12	34	57	246
:15	3		37		4		32		7		69	
:30	5		32		4		24		9		56	
:45	3		36		3		28		6		64	
:00	1	7	34	148	3	11	36	140	4	18	70	288
:15	5		43		4		38		9		81	
:30	1		37		1		32		2		69	
:45	0		34		3		34		3		68	
:00	0	6	35	132	3	9	38	148	3	15	73	280
:15	4		29		1		28		5		57	
:30	2		28		3		40		5		68	
:45	0		40		2		42		2		82	
:00	3	15	32	119	3	6	39	158	6	21	71	277
:15	1		30		2		43		3		73	
:30	6		29		1		36		7		65	
:45	5		28		0		40		5		68	
:00	1	22	19	81	1	13	28	103	2	35	47	184
:15	5		21		2		30		7		51	
:30	4		23		5		29		9		52	
:45	12		18		5		16		17		34	
:00	10	48	24	104	4	40	19	70	14	88	43	174
:15	11		30		6		17		17		47	
:30	16		30		14		18		30		48	
:45	11		20		16		16		27		36	
:00	6	48	23	76	14	30	12	64	20	78	35	140
:15	8		16		3		17		11		33	
:30	16		17		7		16		23		33	
:45	18		20		6		19		24		39	
:00	13	72	22	71	10	65	16	71	23	137	38	142
:15	15		9		6		18		21		27	
:30	22		15		16		21		38		36	
:45	22		25		33		16		55		41	
:00	14	80	14	52	28	83	24	51	42	163	38	103
:15	20		10		18		7		38		17	
:30	17		13		18		9		35		22	
:45	29		15		19		11		48		26	
:00	37	106	7	33	30	110	30	64	67	216	37	97
:15	25		6		18		10		43		16	
:30	16		8		28		16		44		24	
:45	28		12		34		8		62		20	
:00	24	125	8	27	26	81	10	44	50	206	18	71
:15	33		5		16		14		49		19	
:30	40		5		14		11		54		16	
:45	28		9		25		9		53		18	
	566		1,105		482		1,137		1,048		2,242	
	54.0		49.3		46.0		50.7					
otals		1,671				1,619				3,290		
plits		50.8				49.2						
Hour	10:45		01:45		10:00		03:30		10:00		03:30	
ne	125		150		110		164		216		294	
	0.78		0.87		0.81		0.95		0.81		0.90	

MULTI TRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
LIMITS: : E/O US 101 NB RA

Site: 007
Date: 07/27/03
Day: Sunday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	7	18	47	158	9	24	30	109	16	42	77	267
12:15	4		44		6		34		10		78	
12:30	3		37		3		15		6		52	
12:45	4		30		6		30		10		60	
01:00	0	5	30	105	3	17	26	114	3	22	56	219
01:15	3		18		5		30		8		48	
01:30	2		27		2		34		4		61	
01:45	0		30		7		24		7		54	
02:00	0	1	34	120	3	11	34	114	3	12	68	234
02:15	1		24		4		26		5		50	
02:30	0		30		1		22		1		52	
02:45	0		32		3		32		3		64	
03:00	0	1	29	109	0	4	12	109	0	5	41	218
03:15	0		30		0		30		0		60	
03:30	1		24		2		33		3		57	
03:45	0		26		2		34		2		60	
04:00	2	5	19	81	4	5	38	116	6	10	57	197
04:15	0		22		0		24		0		46	
04:30	2		22		0		38		2		60	
04:45	1		18		1		16		2		34	
05:00	1	12	28	94	0	12	19	98	1	24	47	192
05:15	1		20		0		21		1		41	
05:30	6		27		4		24		10		51	
05:45	4		19		8		34		12		53	
06:00	7	25	26	89	6	23	24	93	13	48	50	182
06:15	6		20		3		30		9		50	
06:30	4		19		9		17		13		36	
06:45	8		24		5		22		13		46	
07:00	7	27	15	59	5	31	18	85	12	58	33	144
07:15	2		18		5		28		7		46	
07:30	10		13		7		21		17		34	
07:45	8		13		14		18		22		31	
08:00	11	49	11	58	5	27	12	51	16	76	23	109
08:15	11		14		8		16		19		30	
08:30	17		15		4		11		21		26	
08:45	10		18		10		12		20		30	
09:00	12	84	12	48	16	68	18	60	28	152	30	108
09:15	21		9		16		12		37		21	
09:30	22		14		22		18		44		32	
09:45	29		13		14		12		43		25	
10:00	20	92	4	15	26	98	8	37	46	190	12	52
10:15	21		0		33		7		54		7	
10:30	23		8		24		12		47		20	
10:45	28		3		15		10		43		13	
11:00	24	130	3	13	20	81	12	30	44	211	15	43
11:15	34		2		17		12		51		14	
11:30	36		3		14		4		50		7	
11:45	36		5		30		2		66		7	
Totals	449		949		401		1,016		850		1,965	
Split%	52.8		48.3		47.2		51.7					
Day Totals		1,398				1,417				2,815		
Day Splits		49.7				50.3						
Peak Hour	11:00		12:00		10:00		03:15		11:00		12:00	
Volume	130		158		98		135		211		267	
Factor	0.90		0.84		0.74		0.89		0.80		0.86	

MULTITRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

JUR: : NIPOMO
ATION: : LOS BERROS ROAD
ITS: : E/O US 101 NB RA

Site: 007
Date: 07/28/03

val	WB				EB				Combined				Day: Monday
n	AM		PM		AM		PM		AM		PM		
:00	4	8	47	158	6	18	16	105	10	26	63	263	
:15	2		49		2		26		4		75		
:30	2		26		8		29		10		55		
:45	0		36		2		34		2		70		
:00	0	5	29	127	4	8	30	114	4	13	59	241	
:15	1		22		1		36		2		58		
:30	2		44		2		29		4		73		
:45	2		32		1		19		3		51		
:00	0	8	30	121	0	2	34	113	0	10	64	234	
:15	3		32		0		28		3		60		
:30	0		31		0		32		0		63		
:45	5		28		2		19		7		47		
:00	0	1	35	156	0	1	41	165	0	2	76	321	
:15	1		40		0		32		1		72		
:30	0		39		0		40		0		79		
:45	0		42		1		52		1		94		
:00	0	7	32	140	0	1	42	166	0	8	74	306	
15	4		30		1		35		5		65		
30	1		36		0		48		1		84		
45	2		42		0		41		2		83		
00	2	42	35	118	1	22	46	198	3	64	81	316	
15	10		29		1		57		11		86		
30	8		32		6		37		14		69		
45	22		22		14		58		36		80		
00	14	111	28	119	6	61	48	141	20	172	76	260	
15	22		38		9		41		31		79		
30	35		29		22		30		57		59		
45	40		24		24		22		64		46		
00	34	140	18	66	20	83	22	82	54	223	40	148	
15	38		18		16		22		54		40		
30	32		14		27		20		59		34		
45	36		16		20		18		56		34		
00	19	136	20	62	21	88	19	58	40	224	39	120	
15	50		16		24		14		74		30		
30	30		15		14		14		44		29		
45	37		11		29		11		66		22		
00	28	117	13	54	30	101	16	56	58	218	29	110	
15	22		20		18		14		40		34		
30	29		9		29		15		58		24		
45	38		12		24		11		62		23		
00	34	120	4	17	21	94	13	41	55	214	17	58	
15	34		3		20		11		54		14		
0	28		4		26		10		54		14		
45	24		6		27		7		51		13		
00	29	113	5	13	27	113	5	18	56	226	10	31	
15	30		1		28		3		58		4		
30	24		2		28		7		52		9		
45	30		5		30		3		60		8		
	808		1,151		592		1,257		1,400		2,408		
	57.7		47.8		42.3		52.2						

otals		1,959				1,849				3,808		
plits		51.4				48.6						
lour	06:30		12:00		11:00		05:15		08:15		04:30	
ie	147		158		113		200		242		334	
	0.92		0.81		0.94		0.86		0.82		0.97	

MULTI TRANS
WALNUT CREEK, CALIFORNIA
(925) 930-0500

CO - JUR: : NIPOMO
LOCATION: : LOS BERROS ROAD
LIMITS: : E/O US 101 NB RA

Site: 007
Date: 07/29/03

Day: Tuesday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	0	1	55	155	5	18	23	100	5	19	78	255
12:15	0		34		3		25		3		59	
12:30	1		24		6		27		7		51	
12:45	0		42		4		25		4		67	
01:00	2	3	35	130	3	6	28	116	5	9	63	246
01:15	0		36		1		30		1		66	
01:30	1		30		1		28		2		58	
01:45	0		29		1		30		1		59	
02:00	1	6	28	120	2	7	24	104	3	13	52	224
02:15	3		30		1		28		4		58	
02:30	0		16		1		8		1		24	
02:45	2		46		3		44		5		90	
03:00	2	4	44	160	0	2	42	156	2	6	86	316
03:15	1		38		0		35		1		73	
03:30	1		43		2		38		3		81	
03:45	0		35		0		41		0		76	
04:00	1	8	30	152	0	1	38	192	1	9	68	344
04:15	3		36		0		38		3		74	
04:30	2		44		1		48		3		92	
04:45	2		42		0		68		2		110	
05:00	3	52	46	148	2	18	52	201	5	70	98	349
05:15	10		28		0		49		10		77	
05:30	18		43		5		56		23		99	
05:45	21		31		11		44		32		75	
06:00	22	114	34	114	16	72	40	135	38	186	74	249
06:15	22		26		12		26		34		52	
06:30	25		30		18		36		43		66	
06:45	45		24		26		33		71		57	
07:00	29	137	23	69	14	74	39	99	43	211	62	168
07:15	34		18		16		20		50		38	
07:30	46		21		20		22		66		43	
07:45	28		7		24		18		52		25	
08:00	34	142	7	40	22	92	27	76	56	234	34	116
08:15	29		6		22		22		51		28	
08:30	39		17		28		9		67		26	
08:45	40		10		20		18		60		28	
09:00	24	114	11	42	26	106	12	47	50	220	23	89
09:15	22		10		32		14		54		24	
09:30	35		11		24		14		59		25	
09:45	33		10		24		7		57		17	
10:00	31	92	9	19	26	86	8	30	57	178	17	49
10:15	23		4		20		8		43		12	
10:30	20		2		22		8		42		10	
10:45	18		4		18		6		36		10	
11:00	28	114	7	11	22	109	6	23	50	223	13	34
11:15	26		2		32		3		58		5	
11:30	32		1		22		11		54		12	
11:45	28		1		33		3		61		4	
Totals	787		1,160		591		1,279		1,378		2,439	
%	57.1		47.6		42.9		52.4					
Day Totals		1,947				1,870				3,817		
Day Splits		51.0				49.0						
Peak Hour	06:45		02:45		11:00		04:45		08:00		04:45	
Volume	154		171		109		225		234		384	
Factor	0.84		0.93		0.83		0.83		0.87		0.87	

Data File : STM$0002

Printed : 7/30/2003

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

JUR: : NIPOMO

ATION : POMEROY ROAD

TS: : S/O LIVE OAK RID

Site: 008

Date: 07/22/03

Day: Tuesday

al	SB				NB				Combined			
	AM		PM		AM		PM		AM		PM	
:00	4	13	47	207	7	13	48	201	11	26	95	408
:15	3		54		3		54		6		108	
:30	3		48		1		55		4		103	
45	3		58		2		44		5		102	
00	1	9	40	190	2	8	52	204	3	17	92	394
15	3		42		2		51		5		93	
30	4		52		2		54		6		106	
45	1		56		2		47		3		103	
00	1	2	52	199	2	5	52	198	3	7	104	397
15	1		55		1		58		2		113	
30	0		46		2		48		2		94	
45	0		46		0		40		0		86	
00	0	5	52	234	1	12	48	202	1	17	100	436
15	2		66		2		52		4		118	
30	1		50		3		60		4		110	
45	2		66		6		42		8		108	
00	1	14	74	290	4	23	56	252	5	37	130	542
5	3		80		8		64		11		144	
30	7		72		8		66		15		138	
45	3		64		3		66		6		130	
00	8	40	80	248	10	76	42	205	18	116	122	453
5	8		61		14		69		22		130	
0	10		59		10		52		20		111	
5	14		48		42		42		56		90	
0	12	69	62	194	26	217	49	173	38	286	111	367
5	17		34		70		57		87		91	
0	24		54		64		39		88		93	
5	16		44		57		28		73		72	
0	37	127	38	125	34	184	36	103	71	311	74	228
5	26		34		53		28		79		62	
0	30		36		40		20		70		56	
5	34		17		57		19		91		36	
0	50	194	22	78	47	197	23	97	97	391	45	175
5	47		19		48		30		95		49	
0	50		15		48		23		98		38	
5	47		22		54		21		101		43	
0	62	201	10	54	58	200	14	72	120	401	24	126
5	52		18		44		23		96		41	
0	39		12		42		22		81		34	
5	48		14		56		13		104		27	
0	38	177	11	26	46	191	10	37	84	368	21	63
5	40		7		41		10		81		17	
0	54		7		58		11		112		18	
5	45		1		46		6		91		7	
	48	157	0	12	46	151	3	12	94	308	3	24
	47		4		65		3		112		7	
	12		4		4		2		16		6	
	50		4		36		4		86		8	
	1,008		1,857		1,277		1,756		2,285		3,613	
	44.1		51.4		55.9		48.6					

als	2,865		3,033		5,898	
ts	48.6		51.4			
ur	08:30	04:15	06:15	04:00	08:30	04:00
	211	296	225	252	415	542
	0.85	0.93	0.80	0.95	0.86	0.94

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

LOCATION: : POMEROY ROAD

LIMITS: : S/O LIVE OAK RD

Site: 008

Date: 07/23/03

Day: Wednesday

Interval	SB				NB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	7	12	50	182	0	10	44	202	7	22	94	384
12:15	1		42		3		53		4		95	
12:30	2		50		4		49		6		99	
12:45	2		40		3		56		5		96	
01:00	3	5	46	193	3	4	52	192	6	9	98	385
01:15	2		48		1		48		3		96	
01:30	0		48		0		46		0		94	
01:45	0		51		0		46		0		97	
02:00	2	6	51	187	1	3	33	189	3	9	84	376
02:15	1		34		1		46		2		80	
02:30	3		54		0		50		3		104	
02:45	0		48		1		60		1		108	
03:00	3	6	60	222	1	10	44	201	4	16	104	423
03:15	2		54		0		54		2		108	
03:30	0		60		8		55		8		115	
03:45	1		48		1		48		2		96	
04:00	2	19	74	258	3	21	40	206	5	40	114	464
04:15	4		68		6		54		10		122	
04:30	4		48		8		51		12		99	
04:45	9		68		4		61		13		129	
05:00	6	32	74	251	8	64	64	224	14	96	138	475
05:15	6		72		9		54		15		126	
05:30	6		49		14		50		20		99	
05:45	14		56		33		56		47		112	
06:00	14	90	50	200	18	182	38	143	32	272	88	343
06:15	20		52		58		41		78		93	
06:30	30		59		44		32		74		91	
06:45	26		39		62		32		88		71	
07:00	40	165	44	123	56	200	27	112	96	365	71	235
07:15	34		26		60		40		94		66	
07:30	42		23		45		29		87		52	
07:45	49		30		39		16		88		46	
08:00	40	200	14	67	44	153	24	100	84	353	38	167
08:15	44		22		43		26		87		48	
08:30	45		19		36		21		81		40	
08:45	71		12		30		29		101		41	
09:00	42	173	14	57	47	171	22	80	89	344	36	137
09:15	34		15		40		18		74		33	
09:30	46		11		36		24		82		35	
09:45	51		17		48		16		99		33	
10:00	48	192	5	35	55	153	13	33	103	345	18	68
10:15	54		18		32		7		86		25	
10:30	44		8		30		8		74		16	
10:45	46		4		36		5		82		9	
11:00	44	200	4	15	31	159	12	23	75	359	16	38
11:15	52		2		38		4		90		6	
11:30	48		2		54		5		102		7	
11:45	56		7		36		2		92		9	
Totals	1,100		1,790		1,130		1,705		2,230		3,495	
%	49.3		51.2		50.7		48.8					
Totals		2,890				2,835				5,725		
Splits		50.5				49.5						
Peak Hour	08:15		04:45		06:45		04:15		09:30		04:30	
Volume	202		263		223		230		370		492	
Factor	0.71		0.89		0.90		0.90		0.90		0.89	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

IUR: : NIPOMO

TION: : POMEROY ROAD

TS: : S/O LIVE OAK RD

Site: 008

Date: 07/24/03

Day: Thursday

al	SB AM		SB PM		NB AM		NB PM		Combined AM		Combined PM	
00	8	17	44	205	3	13	62	196	11	30	106	401
15	5		52		4		36		9		88	
30	1		52		3		43		4		95	
45	3		57		3		55		6		112	
00	1	5	48	181	3	7	60	194	4	12	108	375
5	1		52		0		50		1		102	
30	2		37		3		42		5		79	
15	1		44		1		42		2		86	
00	0	4	52	175	1	3	55	207	1	7	107	382
5	1		44		1		50		2		94	
0	1		47		0		42		1		89	
5	2		32		1		60		3		92	
0	3	8	62	227	2	17	52	202	5	25	114	429
5	1		59		1		44		2		103	
0	3		60		6		56		9		116	
5	1		46		8		50		9		96	
0	1	7	58	260	0	25	45	207	1	32	103	467
5	2		75		7		46		9		121	
0	0		72		9		59		9		131	
5	4		55		9		57		13		112	
0	16	55	72	266	2	61	51	207	18	116	123	473
5	12		76		12		52		24		128	
0	9		51		12		61		21		112	
5	18		67		35		43		53		110	
0	12	72	44	166	30	170	50	163	42	242	94	329
5	17		42		44		37		61		79	
0	23		48		46		34		69		82	
5	20		32		50		42		70		74	
0	25	121	25	124	25	136	25	108	50	257	50	232
5	34		42		42		32		76		74	
0	28		27		42		26		70		53	
5	34		30		27		25		61		55	
0	36	151	22	73	32	121	30	88	68	272	52	161
5	36		20		30		20		66		40	
0	44		17		26		18		70		35	
5	35		14		33		20		68		34	
0	29	162	15	67	30	150	21	79	59	312	36	146
5	44		24		36		27		80		51	
0	42		12		38		15		80		27	
5	47		16		46		16		93		32	
0	51	195	5	30	38	152	14	39	89	347	19	69
5	51		10		36		10		87		20	
0	47		6		42		9		89		15	
5	46		9		36		6		82		15	
0	43	176	3	14	43	174	5	22	86	350	8	36
5	47		3		46		5		93		8	
0	42		4		43		5		85		9	
5	44		4		42		7		86		11	
	973		1,788		1,029		1,712		2,002		3,500	
	48.6		51.1		51.4		48.9					
als		2,761				2,741				5,502		
its		50.2				49.8						
ur	09:45		04:30		11:00		04:45		09:45		04:30	
	196		275		174		221		358		494	
	0.96		0.90		0.95		0.91		0.96		0.94	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

LOCATION: : POMEROY ROAD

SLITS: : S/O LIVE OAK RD

Site: 008

Date: 07/25/03

Day: Friday

Interval	SB AM		SB PM		NB AM		NB PM		Combined AM		Combined PM	
Begin												
12:00	5	13	44	190	3	14	38	182	8	27	82	372
12:15	1		48		7		57		8		105	
12:30	6		53		2		44		8		97	
12:45	1		45		2		43		3		88	
01:00	2	3	50	184	2	5	52	206	4	8	102	390
01:15	0		38		1		56		1		94	
01:30	1		44		1		44		2		88	
01:45	0		52		1		54		1		106	
02:00	1	3	45	192	1	7	58	189	2	10	103	381
02:15	1		49		1		50		2		99	
02:30	1		59		0		26		1		85	
02:45	0		39		5		55		5		94	
03:00	3	9	58	246	0	11	46	186	3	20	104	432
03:15	1		62		1		42		2		104	
03:30	4		72		4		54		8		126	
03:45	1		54		6		44		7		98	
04:00	1	15	66	260	0	23	56	238	1	38	122	498
04:15	3		64		8		72		11		136	
04:30	3		60		4		56		7		116	
04:45	8		70		11		54		19		124	
05:00	9	39	65	291	5	61	56	216	14	100	121	507
05:15	6		63		11		63		17		126	
05:30	12		101		14		45		26		146	
05:45	12		62		31		52		43		114	
06:00	9	78	38	167	16	156	39	150	25	234	77	317
06:15	19		46		50		45		69		91	
06:30	24		43		47		36		71		79	
06:45	26		40		43		30		69		70	
07:00	30	157	38	127	38	160	28	124	68	317	66	251
07:15	41		26		40		38		81		64	
07:30	42		29		40		34		82		63	
07:45	44		34		42		24		86		58	
08:00	36	189	26	97	29	156	26	91	65	345	52	188
08:15	42		35		35		20		77		55	
08:30	54		24		46		23		100		47	
08:45	57		12		46		22		103		34	
09:00	25	156	14	59	30	146	21	77	55	302	35	136
09:15	38		15		38		22		76		37	
09:30	50		14		30		18		80		32	
09:45	43		16		48		16		91		32	
10:00	50	183	16	47	26	176	15	51	76	359	31	98
10:15	47		16		54		12		101		28	
10:30	42		8		44		12		86		20	
10:45	44		7		52		12		96		19	
11:00	55	200	8	32	44	188	9	29	99	388	17	61
11:15	50		8		42		5		92		13	
11:30	55		7		44		7		99		14	
11:45	40		9		58		8		98		17	
Totals	1,045		1,892		1,103		1,739		2,148		3,631	
Split%	48.6		52.1		51.4		47.9					
Grand Totals		2,937				2,842				5,779		
Grand Splits		50.8				49.2						
Peak Hour	10:45		04:45		10:15		04:00		11:00		04:45	
Volume	204		299		194		238		388		517	
Factor	0.93		0.74		0.90		0.83		0.98		0.89	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

JUR: : NIPOMO

ATION: : POMEROY ROAD

TS: : S/O LIVE OAK RID

Site: 008

Date: 07/26/03

Day: Saturday

	SB				NB				Combined			
	AM		PM		AM		PM		AM		PM	
00	9	24	44	208	4	18	47	208	13	42	91	416
15	4		52		3		42		7		94	
30	8		52		6		62		14		114	
45	3		60		5		57		8		117	
00	5	23	49	216	5	15	54	192	10	38	103	408
15	5		59		6		44		11		103	
30	7		54		2		39		9		93	
45	6		54		2		55		8		109	
00	3	9	46	179	2	11	60	192	5	20	106	371
15	3		51		1		44		4		95	
30	3		38		2		42		5		80	
45	0		44		6		46		6		90	
00	2	11	48	206	4	24	54	197	6	35	102	403
15	2		43		2		48		4		91	
30	2		57		12		48		14		105	
45	5		58		6		47		11		105	
00	1	7	47	186	1	14	46	181	2	21	93	367
15	2		43		2		42		4		85	
30	2		58		5		50		7		108	
45	2		38		6		43		8		81	
00	11	36	46	193	8	51	50	161	19	87	96	354
15	8		49		8		47		16		96	
30	7		58		10		32		17		90	
45	10		40		25		32		35		72	
00	12	57	42	167	9	80	29	126	21	137	71	293
15	14		42		26		36		40		78	
30	18		44		15		29		33		73	
45	13		39		30		32		43		71	
00	16	72	32	124	20	91	36	123	36	163	68	247
15	18		31		18		30		36		61	
30	22		26		26		35		48		61	
45	16		35		27		22		43		57	
00	24	98	29	94	22	114	23	82	46	212	52	176
15	18		14		26		15		44		29	
30	28		25		28		24		56		49	
45	28		26		38		20		66		46	
00	44	155	18	49	29	125	17	69	73	280	35	118
15	27		13		32		15		59		28	
30	42		10		24		19		66		29	
45	42		8		40		18		82		26	
00	32	170	20	45	30	127	12	46	62	297	32	91
15	41		16		28		15		69		31	
30	39		2		39		8		78		10	
45	58		7		30		11		88		18	
00	44	196	9	34	39	150	8	30	83	346	17	64
15	48		7		40		9		88		16	
30	48		10		34		6		82		16	
45	56		8		37		7		93		15	
	858		1,701		820		1,607		1,678		3,308	
	51.1		51.4		48.9		48.6					
als		2,559				2,427				4,986		
its		51.3				48.7						
our	10:45		12:45		11:00		12:30		11:00		12:30	
	198		222		150		217		346		437	
	0.85		0.93		0.94		0.88		0.93		0.93	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

LOCATION: : POMEROY ROAD

LIMITS: : S/O LIVE OAK RD

Site: 008

Date: 07/27/03

Day: Sunday

Interval	SB				NB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
11:00	5	22	46	186	7	26	44	194	12	48	90	380
11:15	5		34		7		51		12		85	
11:30	2		54		4		57		6		111	
11:45	10		52		8		42		18		94	
12:00	2	16	61	210	8	17	53	209	10	33	114	419
12:15	3		51		2		57		5		108	
01:30	5		50		6		53		11		103	
01:45	6		48		1		46		7		94	
02:00	0	3	45	185	2	7	64	212	2	10	109	397
02:15	1		44		1		58		2		102	
02:30	1		54		3		54		4		108	
02:45	1		42		1		36		2		78	
03:00	2	7	48	184	3	9	48	174	5	16	96	358
03:15	1		47		3		41		4		88	
03:30	3		53		3		40		6		93	
03:45	1		36		0		45		1		81	
04:00	1	11	44	159	0	10	42	145	1	21	86	304
04:15	2		28		0		40		2		68	
04:30	2		43		6		33		8		76	
04:45	6		44		4		30		10		74	
05:00	7	17	52	184	4	23	46	150	11	40	98	334
05:15	3		47		7		38		10		85	
05:30	2		52		2		42		4		94	
05:45	5		33		10		24		15		57	
06:00	6	29	32	137	4	24	30	126	10	53	62	263
06:15	1		36		8		26		9		62	
06:30	10		19		7		34		17		53	
06:45	12		50		5		36		17		86	
07:00	8	46	44	126	8	60	36	105	16	106	80	231
07:15	6		26		10		23		16		49	
07:30	14		35		18		25		32		60	
07:45	18		21		24		21		42		42	
08:00	10	80	25	82	12	86	17	83	22	166	42	165
08:15	20		21		14		29		34		50	
08:30	22		16		29		19		51		35	
08:45	28		20		31		18		59		38	
09:00	27	129	21	52	34	120	17	57	61	249	38	109
09:15	30		12		26		16		56		28	
09:30	36		11		24		12		60		23	
09:45	36		8		36		12		72		20	
10:00	45	144	18	30	35	137	14	33	80	281	32	63
10:15	33		3		26		5		59		8	
10:30	34		4		40		7		74		11	
10:45	32		5		36		7		68		12	
11:00	57	173	5	21	32	142	3	15	89	315	8	36
11:15	32		3		28		6		60		9	
11:30	40		8		32		3		72		11	
11:45	44		5		50		3		94		8	
Totals	677		1,556		661		1,503		1,338		3,059	
%	50.6		50.9		49.4		49.1					
Day Totals		2,233				2,164				4,397		
Day Splits		50.8				49.2						
Peak Hour	11:00		12:30		11:00		01:45		11:00		12:30	
Volume	173		218		142		222		315		427	
PHF	0.76		0.89		0.71		0.87		0.84		0.94	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

UR: : NIPOMO

TION: : POMEROY ROAD

S: : S/O LIVE OAK RID

Site: 008

Date: 07/28/03

Day: Monday

	SB				NB				Combined			
	AM		PM		AM		PM		AM		PM	
0	7	18	45	207	2	13	64	187	9	31	109	394
5	3		62		3		37		6		99	
0	4		58		4		42		8		100	
5	4		42		4		44		8		86	
0	2	5	48	210	3	8	48	208	5	13	96	418
5	1		60		3		55		4		115	
0	1		44		1		48		2		92	
5	1		58		1		57		2		115	
0	1	6	44	194	2	6	37	161	3	12	81	355
5	2		50		2		42		4		92	
0	2		60		1		46		3		106	
5	1		40		1		36		2		76	
0	0	5	50	236	1	17	44	207	1	22	94	443
5	2		77		4		63		6		140	
0	3		55		5		46		8		101	
5	0		54		7		54		7		108	
0	3	15	68	275	6	23	58	247	9	38	126	522
	2		81		4		62		6		143	
0	9		48		8		72		17		120	
	1		78		5		55		6		133	
	15	50	60	207	3	53	50	193	18	103	110	400
	10		58		9		52		19		110	
	10		55		12		57		22		112	
	15		34		29		34		44		68	
	12	68	56	169	14	179	52	189	26	247	108	358
	10		58		52		46		62		104	
	24		26		52		46		76		72	
	22		29		61		45		83		74	
	38	145	32	104	33	174	30	134	71	319	62	238
	41		18		42		33		83		51	
	30		26		50		38		80		64	
	36		28		49		33		85		61	
	36	156	18	68	34	138	26	91	70	294	44	159
	40		16		29		22		69		38	
	34		20		32		21		66		41	
	46		14		43		22		89		36	
	50	180	12	36	30	138	26	84	80	318	38	120
	41		12		38		20		79		32	
	57		6		28		12		85		18	
	32		6		42		26		74		32	
	37	185	7	20	40	154	10	35	77	339	17	55
	53		5		39		11		92		16	
	41		4		36		10		77		14	
	54		4		39		4		93		8	
	50	194	8	15	54	186	8	21	104	380	16	36
	46		2		49		5		95		7	
	50		4		41		5		91		9	
	48		1		42		3		90		4	
	1,027		1,741		1,089		1,757		2,116		3,498	
	48.5		49.8		51.5		50.2					
s		2,768				2,846				5,614		
s		49.3				50.7						
r	10:45		04:00		06:15		04:00		10:45		04:00	
	200		275		198		247		383		522	
	0.93		0.85		0.81		0.86		0.92		0.91	

MULTITRANS
(925) 930-0500

CO - JUR: NIPOMO
LOCATION: WEST TAFFT STREET
LIMITS: W/O MAGENTA LN

Site: 009
Date: 7/21/2003
Day: Monday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	15	40	175	696	14	61	102	421	29	101	277	1117
12:15	9	30	164	692	16	56	105	431	25	86	269	1123
12:30	8	27	173	690	17	48	103	434	25	75	276	1124
12:45	8	22	184	702	14	37	111	431	22	59	295	1133
1:00	5	18	171	719	9	27	112	411	14	45	283	1130
1:15	6	16	162	743	8	23	108	393	14	39	270	1136
1:30	3	13	185	754	6	20	100	382	9	33	285	1136
1:45	4	15	201	751	4	19	91	394	8	34	292	1145
2:00	3	18	195	713	5	18	94	418	8	36	289	1131
2:15	3	21	173	716	5	20	97	435	8	41	270	1151
2:30	5	23	182	727	5	21	112	451	10	44	294	1178
2:45	7	22	163	730	3	23	115	463	10	45	278	1193
3:00	6	19	198	770	7	27	111	479	13	46	309	1249
3:15	5	21	184	782	6	24	113	510	11	45	297	1292
3:30	4	20	185	800	7	27	124	522	11	47	309	1322
3:45	4	34	203	822	7	25	131	524	11	59	334	1346
4:00	8	50	210	830	4	21	142	545	12	71	352	1375
4:15	4	71	202	841	9	22	125	571	13	93	327	1412
4:30	18	105	207	840	5	21	126	617	23	126	333	1457
4:45	20	163	211	835	3	18	152	652	23	181	363	1487
5:00	29	227	221	818	5	19	168	654	34	246	389	1472
5:15	38	280	201	769	8	36	171	630	46	316	372	1399
5:30	76	366	202	725	2	51	161	591	78	417	363	1316
5:45	84	458	194	675	4	80	154	553	88	538	348	1228
6:00	82	549	172	622	22	116	144	515	104	665	316	1137
6:15	124	645	157	571	23	136	132	468	147	781	289	1039
6:30	168	703	152	526	31	164	123	424	199	867	275	950
6:45	175	745	141	473	40	165	116	380	215	910	257	853
7:00	178	778	121	410	42	161	97	337	220	939	218	747
7:15	182	721	112	354	51	164	88	312	233	885	200	666
7:30	210	678	99	304	32	151	79	292	242	829	178	596
7:45	208	684	78	265	36	143	73	274	244	827	151	539
8:00	121	696	65	258	45	142	72	266	166	838	137	524
8:15	139	793	62	258	38	144	68	267	177	937	130	525
8:30	216	870	60	261	24	162	61	274	240	1032	121	535
8:45	220	856	71	275	35	199	65	281	255	1055	136	556
9:00	218	847	65	291	47	234	73	271	265	1081	138	562
9:15	216	804	65	290	56	243	75	239	272	1047	140	529
9:30	202	766	74	280	61	249	68	202	263	1015	142	482
9:45	211	735	87	247	70	259	55	169	281	994	142	416
10:00	175	684	64	181	56	272	41	143	231	956	105	324
10:15	178	674	55	128	62	301	38	127	240	975	93	255
10:30	171	670	41	95	71	320	35	108	242	990	76	203
10:45	160	667	21	65	83	321	29	85	243	988	50	150
11:00	165	678	11	51	85	308	25	66	250	986	36	117
11:15	174		22		81		19		255		41	
11:30	168		11		72		12		240		23	
11:45	171		7		70		10		241		17	
Totals	4604		6359		1406		4526		6010		10885	
Day Totals	10963				5932				16895			
Peak Hour	8:30		4:15		10:45		5:00		9:00		4:45	
Volume	870		841		321		654		1081		1487	

MULTITRANS
(925) 930-0500

CO - JUR: NIPOMO
LOCATION: WEST TAFFT STREET
LIMITS: W/O MAGENTA LN

Site: 009
Date: 7/22/2003
Day: Tuesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	16	43	189	721	16	67	108	417	32	110	297	1138
12:15	10	33	165	692	22	59	111	423	32	92	276	1115
12:30	10	29	179	693	13	44	100	418	23	73	279	1111
12:45	7	21	188	708	16	41	98	423	23	62	286	1131
1:00	6	19	160	728	8	28	114	411	14	47	274	1139
1:15	6	17	166	760	7	24	106	403	13	41	272	1163
1:30	2	13	194	766	10	21	105	391	12	34	299	1157
1:45	5	17	208	766	3	17	86	407	8	34	294	1173
2:00	4	20	192	709	4	16	106	435	8	36	298	1144
2:15	2	24	172	739	4	20	94	437	6	44	266	1176
2:30	6	26	194	725	6	21	121	465	12	47	315	1190
2:45	8	25	151	725	2	23	114	482	10	48	265	1207
3:00	8	23	222	781	8	27	108	498	16	50	330	1279
3:15	4	25	158	753	5	22	122	534	9	47	280	1287
3:30	5	25	194	804	8	25	138	542	13	50	332	1346
3:45	6	42	207	821	6	21	130	512	12	63	337	1333
4:00	10	58	194	814	3	17	144	548	13	75	338	1362
4:15	4	79	209	858	8	20	130	578	12	99	339	1436
4:30	22	121	211	848	4	20	108	624	26	141	319	1472
4:45	22	183	200	843	2	16	166	672	24	199	366	1515
5:00	31	249	238	825	6	20	174	666	37	269	412	1491
5:15	46	298	199	749	8	35	176	639	54	333	375	1388
5:30	84	385	206	704	0	49	156	591	84	434	362	1295
5:45	88	476	182	652	6	75	160	538	94	551	342	1190
6:00	80	566	162	606	21	114	147	488	101	680	309	1094
6:15	133	647	154	563	22	148	128	436	155	795	282	999
6:30	175	700	154	527	26	157	103	416	201	857	257	943
6:45	178	737	136	464	45	166	110	391	223	903	246	855
7:00	161	765	119	426	55	147	95	359	216	912	214	785
7:15	186	728	118	372	31	143	108	347	217	871	226	719
7:30	212	694	91	318	35	155	78	322	247	849	169	640
7:45	206	700	98	309	26	145	78	310	232	845	176	619
8:00	124	716	65	265	51	157	83	306	175	873	148	571
8:15	152	804	64	264	43	158	83	295	195	962	147	559
8:30	218	866	82	268	25	170	66	284	243	1036	148	552
8:45	222	844	54	260	38	198	74	282	260	1042	128	542
9:00	212	839	64	294	52	234	72	267	264	1073	136	561
9:15	214	795	68	284	55	236	72	227	269	1031	140	511
9:30	196	768	74	274	53	253	64	194	249	1021	138	468
9:45	217	754	88	238	74	275	59	164	291	1029	147	402
10:00	168	700	54	166	54	282	32	133	222	982	86	299
10:15	187	690	58	126	72	316	39	129	259	1006	97	255
10:30	182	679	38	94	75	324	34	111	257	1003	72	205
10:45	163	689	16	66	81	311	28	91	244	1000	44	157
11:00	158	701	14	62	88	320	28	71	246	1021	42	133
11:15	176		26		80		21		256		47	
11:30	192		10		62		14		254		24	
11:45	175		12		90		8		265		20	
Totals	4699		6397		1429		4599		6128		10996	
Day Totals	11096				6028				17124			
Peak Hour	8:30		4:15		10:30		4:45		9:00		4:45	
Volume	866		858		324		672		1073		1515	

6.2% 8.8%

MULTITRANS
(925) 930-0500

CO - JUR: NIPOMO
LOCATION: WEST TAFFT STREET
LIMITS: W/O MAGENTA LN

Site: 009
Date: 7/23/2003
Day: Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	18	40	186	746	14	37	104	416	32	77	290	1162
12:15	8	30	162	719	12	29	124	426	20	59	286	1145
12:30	8	26	205	732	9	22	92	409	17	48	297	1141
12:45	6	22	193	699	2	23	96	419	8	45	289	1118
1:00	8	19	159	694	6	23	114	425	14	42	273	1119
1:15	4	15	175	711	5	21	107	421	9	36	282	1132
1:30	4	13	172	689	10	18	102	431	14	31	274	1120
1:45	3	17	188	678	2	14	102	421	5	31	290	1099
2:00	4	23	176	670	4	14	110	427	8	37	286	1097
2:15	2	27	153	686	2	16	117	417	4	43	270	1103
2:30	8	28	161	687	6	18	92	451	14	46	253	1138
2:45	9	28	180	720	2	19	108	471	11	47	288	1191
3:00	8	29	192	705	6	19	100	499	14	48	292	1204
3:15	3	30	154	735	4	15	151	545	7	45	305	1280
3:30	8	29	194	773	7	17	112	551	15	46	306	1324
3:45	10	47	165	788	2	14	136	573	12	61	301	1361
4:00	9	65	222	825	2	12	146	623	11	77	368	1448
4:15	2	79	192	779	6	18	157	641	8	97	349	1420
4:30	26	119	209	797	4	16	134	633	30	135	343	1430
4:45	28	169	202	781	0	22	186	687	28	191	388	1468
5:00	23	228	176	771	8	47	164	661	31	275	340	1432
5:15	42	285	210	772	4	58	149	601	46	343	359	1373
5:30	76	386	193	714	10	82	188	572	86	468	381	1286
5:45	87	487	192	683	25	115	160	482	112	602	352	1165
6:00	80	576	177	639	19	140	104	440	99	716	281	1079
6:15	143	636	152	576	28	159	120	446	171	795	272	1022
6:30	177	695	162	530	43	163	98	404	220	858	260	934
6:45	176	747	148	478	50	142	118	393	226	889	266	871
7:00	140	772	114	398	38	128	110	351	178	900	224	749
7:15	202	770	106	378	32	151	78	307	234	921	184	685
7:30	229	740	110	384	22	159	87	290	251	899	197	674
7:45	201	727	68	370	36	155	76	273	237	882	144	643
8:00	138	739.	94	376	61	156	66	291	199	895	160	667
8:15	172	821	112	346	40	145	61	293	212	966	173	639
8:30	216	859	96	293	18	141	70	294	234	1000	166	587
8:45	213	838	74	243	37	165	94	290	250	1003	168	533
9:00	220	846	64	217	50	208	68	244	270	1054	132	461
9:15	210	790	59	182	36	222	62	243	246	1012	121	425
9:30	195	762	46	165	42	251	66	221	237	1013	112	386
9:45	221	743	48	151	80	282	48	185	301	1025	96	336
10:00	164	668	29	123	64	298	67	171	228	966	96	294
10:15	182	674	42	106	65	322	40	132	247	996	82	238
10:30	176	668	32	80	73	338	30	110	249	1006	62	190
10:45	146	676	20	59	96	365	34	115	242	1041	54	174
11:00	170	754	12	53	88	340	28	97	258	1094	40	150
11:15	176		16		81		18		257		34	
11:30	184		11		100		35		284		46	
11:45	224		14		71		16		295		30	
Totals	4759		6217		1422		4645		6181		10862	
Day Totals		10976				6067				17043		
Peak Hour	8:30		4:00		10:45		4:45		11:00		4:45	
Volume	859		825		365		687		1094		1468	

6.4% 8.6%

MULTITRANS
(925) 930-0500

CO - JUR: NIPOMO
LOCATION: WEST TAFFT STREET
LIMITS: W/O MAGENTA LN

Site: 009
Date: 7/24/2003
Day: Thursday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	18	46	195	754	22	82	118	455	40	128	313	1209
12:15	10	32	197	718	28	71	118	441	38	103	315	1159
12:30	11	28	199	701	15	53	113	416	26	81	312	1117
12:45	7	19	163	686	17	46	106	445	24	65	269	1131
1:00	4	22	159	680	11	31	104	447	15	53	263	1127
1:15	6	20	180	679	10	25	93	461	16	45	273	1140
1:30	2	15	184	657	8	20	142	473	10	35	326	1130
1:45	10	17	157	667	2	17	108	423	12	34	265	1090
2:00	2	15	158	673	5	17	118	452	7	32	276	1125
2:15	1	19	158	680	5	20	105	450	6	39	263	1130
2:30	4	23	194	684	5	21	92	465	9	44	286	1149
2:45	8	22	163	682	2	26	137	495	10	48	300	1177
3:00	6	16	165	715	8	32	116	502	14	48	281	1217
3:15	5	21	162	779	6	26	120	496	11	47	282	1275
3:30	3	22	192	835	10	32	122	502	13	54	314	1337
3:45	2	39	196	859	8	25	144	509	10	64	340	1368
4:00	11	50	229	889	2	18	110	495	13	68	339	1384
4:15	6	75	218	845	12	19	126	529	18	94	344	1374
4:30	20	119	216	826	3	16	129	579	23	135	345	1405
4:45	13	193	226	788	1	25	130	607	14	218	356	1395
5:00	36	268	185	747	3	39	144	619	39	307	329	1366
5:15	50	314	199	732	9	64	176	618	59	378	375	1350
5:30	94	386	178	695	12	74	157	550	106	460	335	1245
5:45	88	465	185	672	15	108	142	495	103	573	327	1167
6:00	82	559	170	619	28	147	143	478	110	706	313	1097
6:15	122	650	162	601	19	143	108	433	141	793	270	1034
6:30	173	687	155	560	46	158	102	407	219	845	257	967
6:45	182	706	132	487	54	140	125	399	236	846	257	886
7:00	173	738	152	459	24	132	98	342	197	870	250	801
7:15	159	747	121	397	34	146	82	312	193	893	203	709
7:30	192	730	82	355	28	154	94	300	220	884	176	655
7:45	214	743	104	358	46	150	68	266	260	893	172	624
8:00	182	753	90	306	38	128	68	273	220	881	158	579
8:15	142	743	79	270	42	156	70	273	184	899	149	543
8:30	205	757	85	254	24	172	60	261	229	929	145	515
8:45	224	746	52	214	24	208	75	265	248	954	127	479
9:00	172	736	54	202	66	244	68	249	238	980	122	451
9:15	156	736	63	192	58	226	58	231	214	962	121	423
9:30	194	772	45	181	60	255	64	214	254	1027	109	395
9:45	214	762	40	164	60	273	59	192	274	1035	99	356
10:00	172	720	44	148	48	277	50	161	220	997	94	309
10:15	192	736	52	124	87	301	41	143	279	1037	93	267
10:30	184	710	28	90	78	314	42	122	262	1024	70	212
10:45	172	726	24	80	64	316	28	104	236	1042	52	184
11:00	188	767	20	72	72	341	32	110	260	1108	52	182
11:15	166		18		100		20		266		38	
11:30	200		18		80		24		280		42	
11:45	213		16		89		34		302		50	
Totals	4690		6264		1488		4583		6178		10847	
Day Totals	10954				6071				17025			
Peak Hour	9:30		4:00		11:00		5:00		11:00		4:30	
Volume	772		889		341		619		1108		1405	

6.5% 8.25%

MULTITRANS
(925) 930-0500

CO - JUR: NIPOMO
LOCATION: WEST TAFFT STREET
LIMITS: W/O MAGENTA LN

Site: 009
Date: 7/25/2003
Day: Friday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	14	55	186	765	18	45	114	420	32	100	300	1185
12:15	19	51	179	763	11	37	103	422	30	88	282	1185
12:30	12	40	216	775	12	32	103	455	24	72	319	1230
12:45	10	34	184	731	4	21	100	433	14	55	284	1164
1:00	10	25	184	724	10	21	116	447	20	46	300	1171
1:15	8	21	191	705	6	15	136	449	14	36	327	1154
1:30	6	19	172	686	1	11	81	432	7	30	253	1118
1:45	1	19	177	698	4	18	114	463	5	37	291	1161
2:00	6	23	165	697	4	20	118	465	10	43	283	1162
2:15	6	25	172	670	2	18	119	474	8	43	291	1144
2:30	6	27	184	719	8	16	112	471	14	43	296	1190
2:45	5	25	176	736	6	10	116	505	11	35	292	1241
3:00	8	24	138	758	2	12	127	527	10	36	265	1285
3:15	8	22	221	816	0	13	116	522	8	35	337	1338
3:30	4	34	201	794	2	16	146	555	6	50	347	1349
3:45	4	46	198	827	8	16	138	543	12	62	336	1370
4:00	6	68	196	849	3	8	122	525	9	76	318	1374
4:15	20	98	199	873	3	9	149	552	23	107	348	1425
4:30	16	122	234	872	2	8	134	558	18	130	368	1430
4:45	26	172	220	878	0	25	120	542	26	197	340	1420
5:00	36	230	220	866	4	41	149	522	40	271	369	1388
5:15	44	278	198	830	2	61	155	489	46	339	353	1319
5:30	66	364	240	810	19	90	118	444	85	454	358	1254
5:45	84	453	208	738	16	112	100	425	100	565	308	1163
6:00	84	505	184	647	24	163	116	415	108	668	300	1062
6:15	130	559	178	611	31	173	110	375	161	732	288	986
6:30	155	593	168	541	41	164	99	366	196	757	267	907
6:45	136	634	117	494	67	141	90	352	203	775	207	846
7:00	138	718	148	495	34	111	76	345	172	829	224	840
7:15	164	770	108	439	22	95	101	343	186	865	209	782
7:30	196	782	121	405	18	109	85	328	214	891	206	733
7:45	220	782	118	370	37	119	83	319	257	901	201	689
8:00	190	778	92	312	18	131	74	308	208	909	166	620
8:15	176	775	74	281	36	146	86	305	212	921	160	586
8:30	196	759	86	263	28	171	76	301	224	930	162	564
8:45	216	741	60	239	49	215	72	290	265	956	132	529
9:00	187	716	61	251	33	247	71	277	220	963	132	528
9:15	160	704	56	242	61	282	82	262	221	986	138	504
9:30	178	711	62	243	72	287	65	221	250	998	127	464
9:45	191	723	72	214	81	296	59	198	272	1019	131	412
10:00	175	748	52	167	68	264	56	169	243	1012	108	336
10:15	167	747	57	135	66	284	41	145	233	1031	98	280
10:30	190	765	33	97	81	306	42	125	271	1071	75	222
10:45	216	756	25	82	49	305	30	115	265	1061	55	197
11:00	174	740	20	74	88	332	32	113	262	1072	52	187
11:15	185		19		88		21		273		40	
11:30	181		18		80		32		261		50	
11:45	200		17		76		28		276		45	
Totals	4630		6605		1395		4533		6025		11138	
Day Totals	11235				5928				17163			
Peak Hour	7:30		4:45		11:00		4:30		11:00		4:30	
Volume	782		878		332		558		1072		1430	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

JUR: : NIPOMO

ATION: : WEST TAFFT STREET

TS: : E/O S. OAKGLEN A

Site: 010

Date: 07/22/03

Day: Tuesday

al	WB AM		WB PM		EB AM		EB PM		Combined AM		Combined PM	
:00	8	18	124	375	6	17	82	300	14	35	206	675
:15	5		99		5		68		10		167	
30	3		66		3		66		6		132	
45	2		86		3		84		5		170	
00	3	18	79	305	7	15	90	306	10	33	169	611
15	6		79		3		66		9		145	
30	6		68		5		62		11		130	
45	3		79		0		88		3		167	
00	4	9	78	307	2	4	70	338	6	13	148	645
15	3		70		0		75		3		145	
30	1		61		0		100		1		161	
45	1		98		2		93		3		191	
00	2	9	84	367	1	7	82	311	3	16	166	678
15	4		99		3		71		7		170	
30	2		98		1		74		3		172	
45	1		86		2		84		3		170	
00	6	16	90	341	0	5	70	332	6	21	160	673
15	4		82		3		98		7		180	
30	4		94		0		74		4		168	
45	2		75		2		90		4		165	
00	6	41	100	380	8	30	88	369	14	71	188	749
15	11		80		4		90		15		170	
30	10		100		14		103		24		203	
45	14		100		4		88		18		188	
00	25	134	83	274	14	105	80	294	39	239	163	568
15	29		67		17		62		46		129	
30	43		69		30		63		73		132	
45	37		55		44		89		81		144	
00	32	162	56	192	24	179	72	178	56	341	128	370
15	44		51		38		38		82		89	
30	36		38		38		42		74		80	
45	50		47		79		26		129		73	
00	50	229	51	193	62	270	49	177	112	499	100	370
15	41		40		54		38		95		78	
30	76		51		60		43		136		94	
45	62		51		94		47		156		98	
00	56	75	44	142	105	527	44	147	161	602	88	289
15	7		41		130		35		137		76	
30	4		27		124		34		128		61	
45	8		30		168		34		176		64	
00	50	242	23	69	32	221	26	70	82	463	49	139
15	66		13		69		16		135		29	
30	66		17		58		14		124		31	
45	60		16		62		14		122		30	
00	70	283	15	38	59	283	10	30	129	566	25	68
15	68		13		56		7		124		20	
30	78		2		74		7		152		9	
45	67		8		94		6		161		14	
	1,236		2,983		1,663		2,852		2,899		5,835	
	42.6		51.1		57.4		48.9					
als		4,219				4,515				8,734		
its		48.3				51.7						
ur	11:00		05:00		09:00		04:45		09:00		05:00	
	283		380		527		371		602		749	
	0.91		0.95		0.78		0.90		0.86		0.92	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

L CATION: : WEST TAFFT STREET

L . ITS: : E/O S. OAKGLEN A

Site: 010

Date: 07/23/03

Day: Wednesday

Interval	WB				EB				Combined			
B n	AM		PM		AM		PM		AM		PM	
2:00	9	21	146	386	9	20	87	338	18	41	233	724
12:15	8		68		3		98		11		166	
12:30	4		90		5		77		9		167	
2:45	0		82		3		76		3		158	
1:00	2	11	84	308	3	5	67	266	5	16	151	574
01:15	2		86		0		65		2		151	
01:30	3		64		1		60		4		124	
1:45	4		74		1		74		5		148	
2:00	2	9	76	293	1	11	70	281	3	20	146	574
02:15	3		66		5		61		8		127	
02:30	0		65		2		60		2		125	
2:45	4		86		3		90		7		176	
3:00	3	7	82	318	0	4	68	296	3	11	150	614
03:15	0		72		0		70		0		142	
03:30	2		76		0		74		2		150	
3:45	2		88		4		84		6		172	
4:00	1	11	81	317	0	7	64	323	1	18	145	640
04:15	1		80		2		78		3		158	
04:30	5		76		3		92		8		168	
4:45	4		80		2		89		6		169	
5:00	12	47	96	380	5	19	80	372	17	66	176	752
05:15	7		81		3		110		10		191	
05:30	13		114		6		90		19		204	
5:45	15		89		5		92		20		181	
6:00	21	135	86	306	15	130	72	327	36	265	158	633
06:15	24		67		23		84		47		151	
06:30	49		79		42		84		91		163	
6:45	41		74		50		87		91		161	
7:00	56	191	53	210	36	193	61	222	92	384	114	432
07:15	46		70		43		58		89		128	
07:30	43		47		48		59		91		106	
7:45	46		40		66		44		112		84	
8:00	53	227	47	249	74	262	42	170	127	489	89	419
08:15	50		75		52		48		102		123	
08:30	64		58		54		46		118		104	
8:45	60		69		82		34		142		103	
9:00	73	270	50	150	64	269	35	119	137	539	85	269
09:15	74		38		57		38		131		76	
09:30	53		41		66		20		119		61	
9:45	70		21		82		26		152		47	
0:00	73	261	31	79	62	272	26	69	135	533	57	148
0:15	58		19		76		20		134		39	
10:30	75		16		72		12		147		28	
0:45	55		13		62		11		117		24	
1:00	83	303	13	35	60	310	8	32	143	613	21	67
1:15	69		8		75		7		144		15	
11:30	64		9		68		5		132		14	
1:45	87		5		107		12		194		17	
T als	1,493		3,031		1,502		2,815		2,995		5,846	
S...t%	49.8		51.8		50.2		48.2					
D Totals		4,524				4,317				8,841		
D Splits		51.2				48.8						
Peak Hour	11:00		12:00		11:00		05:00		11:00		05:00	
V ume	303		386		310		372		613		752	
F tor	0.87		0.66		0.72		0.85		0.79		0.92	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

JUR: : NIPOMO

ATION: : WEST TAFFT STREET

TS: : E/O S. OAKGLEN A

Site: 010

Date: 07/24/03

Day: Thursday

al	WB AM		WB PM		EB AM		EB PM		Combined AM		Combined PM	
00	4	16	152	411	6	16	96	338	10	32	248	749
15	9		112		5		76		14		188	
30	2		82		3		72		5		154	
45	1		65		2		94		3		159	
00	3	11	82	325	0	7	67	287	3	18	149	612
15	3		80		3		84		6		164	
30	1		78		2		68		3		146	
45	4		85		2		68		6		153	
00	3	7	83	320	1	5	68	306	4	12	151	626
15	1		87		2		60		3		147	
30	0		60		2		72		2		132	
45	3		90		0		106		3		196	
00	0	10	98	341	0	5	77	313	0	15	175	654
15	2		66		2		92		4		158	
30	4		103		1		66		5		169	
45	4		74		2		78		6		152	
00	4	13	76	332	6	10	88	374	10	23	164	706
15	5		84		1		105		6		189	
30	1		88		2		88		3		176	
45	3		84		1		93		4		177	
00	10	45	99	374	6	27	82	358	16	72	181	732
15	11		84		6		100		17		184	
30	13		96		7		88		20		184	
45	11		95		8		88		19		183	
00	24	153	112	329	16	123	83	285	40	276	195	614
15	31		75		20		66		51		141	
30	44		77		36		65		80		142	
45	54		65		51		71		105		136	
00	44	183	52	186	40	193	60	213	84	376	112	399
15	48		43		44		49		92		92	
30	50		41		43		48		93		89	
45	41		50		66		56		107		106	
00	53	197	51	191	64	234	45	179	117	431	96	370
15	42		48		44		54		86		102	
30	58		48		40		42		98		90	
45	44		44		86		38		130		82	
00	88	279	60	162	72	273	28	136	160	552	88	298
15	71		29		64		37		135		66	
30	65		43		64		33		129		76	
45	55		30		73		38		128		68	
00	68	271	28	88	63	244	20	82	131	515	48	170
15	63		24		61		28		124		52	
30	70		21		59		20		129		41	
45	70		15		61		14		131		29	
00	71	318	14	54	74	338	9	32	145	656	23	86
15	76		9		83		6		159		15	
30	86		14		83		10		169		24	
45	85		17		98		7		183		24	
	1,503		3,113		1,475		2,903		2,978		6,016	
	50.5		51.7		49.5		48.3					
tals		4,616				4,378				8,994		
lits		51.3				48.7						
our	11:00		12:00		11:00		04:00		11:00		12:00	
e	318		411		338		374		656		749	
	0.92		0.68		0.86		0.89		0.90		0.76	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO - JUR: : NIPOMO

L CATION: : WEST TAFFT STREET

L...MITS: : E/O S. OAKGLEN A

Site: 010

Date: 07/25/03

Day: Friday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	4	17	114	361	9	20	88	322	13	37	202	683
12:15	8		90		5		78		13		168	
12:30	3		74		2		76		5		150	
12:45	2		83		4		80		6		163	
01:00	2	7	95	347	3	9	78	321	5	16	173	668
01:15	1		84		5		96		6		180	
01:30	2		72		0		75		2		147	
01:45	2		96		1		72		3		168	
02:00	6	11	72	295	3	8	84	295	9	19	156	590
02:15	3		83		1		74		4		157	
02:30	2		66		2		72		4		138	
02:45	0		74		2		65		2		139	
03:00	3	7	86	362	3	5	70	289	6	12	156	651
03:15	2		89		0		69		2		158	
03:30	1		90		1		72		2		162	
03:45	1		97		1		78		2		175	
04:00	4	14	91	333	2	13	78	325	6	27	169	658
04:15	2		70		2		75		4		145	
04:30	2		94		3		84		5		178	
04:45	6		78		6		88		12		166	
05:00	5	44	80	298	6	28	86	377	11	72	166	675
05:15	12		80		3		97		15		177	
05:30	13		72		7		96		20		168	
05:45	14		66		12		98		26		164	
06:00	22	120	77	284	13	112	82	296	35	232	159	580
06:15	22		77		19		88		41		165	
06:30	37		72		38		66		75		138	
06:45	39		58		42		60		81		118	
07:00	34	172	76	268	34	185	80	258	68	357	156	526
07:15	38		87		23		62		61		149	
07:30	46		55		48		57		94		112	
07:45	54		50		80		59		134		109	
08:00	55	234	60	208	54	237	54	206	109	471	114	414
08:15	39		55		46		51		85		106	
08:30	72		52		50		47		122		99	
08:45	68		41		87		54		155		95	
09:00	73	290	56	186	73	291	45	159	146	581	101	345
09:15	64		53		66		46		130		99	
09:30	63		31		63		28		126		59	
09:45	90		46		89		40		179		86	
10:00	67	283	34	120	60	288	53	131	127	571	87	251
10:15	74		28		66		27		140		55	
10:30	74		28		78		23		152		51	
10:45	68		30		84		28		152		58	
11:00	86	326	30	90	58	304	18	71	144	630	48	161
11:15	65		24		68		21		133		45	
11:30	87		19		81		17		168		36	
11:45	88		17		97		15		185		32	
Totals	1,525		3,152		1,500		3,050		3,025		6,202	
Split%	50.4		50.8		49.6		49.2					
Day Totals		4,677				4,550				9,227		
Day Splits		50.7				49.3						
Peak Hour	11:00		03:15		11:00		05:00		11:00		04:30	
Volume	326		367		304		377		630		687	
Factor	0.93		0.95		0.78		0.96		0.85		0.96	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

JUR: : NIPOMO

ATION: : WEST TAFFT STREET

TS: : E/O S. OAKGLEN A

Site: 010

Date: 07/26/03

Day: Saturday

al	WB				EB				Combined			
	AM		PM		AM		PM		AM		PM	
00	23	67	84	305	10	41	75	323	33	108	159	628
15	28		61		11		92		39		153	
30	10		90		8		78		18		168	
45	6		70		12		78		18		148	
00	11	34	73	324	2	13	66	293	13	47	139	617
15	16		85		6		69		22		154	
30	5		91		4		54		9		145	
45	2		75		1		104		3		179	
00	4	15	100	328	1	9	56	279	5	24	156	607
15	5		70		1		94		6		164	
30	2		78		2		56		4		134	
45	4		80		5		73		9		153	
00	3	8	66	259	2	9	74	268	5	17	140	527
15	3		71		6		58		9		129	
30	0		70		1		64		1		134	
45	2		52		0		72		2		124	
00	4	14	65	263	2	8	66	321	6	22	131	584
15	3		70		4		74		7		144	
30	2		56		1		91		3		147	
45	5		72		1		90		6		162	
30	1	19	59	242	8	24	74	291	9	43	133	533
15	7		64		2		77		9		141	
30	5		63		4		62		9		125	
45	6		56		10		78		16		134	
00	13	68	86	282	10	71	64	255	23	139	150	537
15	16		70		18		64		34		134	
30	19		62		10		65		29		127	
45	20		64		33		62		53		126	
00	18	116	50	236	28	124	58	239	46	240	108	475
15	26		56		24		57		50		113	
30	40		65		28		70		68		135	
45	32		65		44		54		76		119	
00	36	181	55	241	37	185	61	200	73	366	116	441
15	55		50		42		52		97		102	
30	44		60		50		43		94		103	
45	46		76		56		44		102		120	
00	60	256	56	193	55	244	56	170	115	500	112	363
15	67		60		55		44		122		104	
30	58		46		54		42		112		88	
45	71		31		80		28		151		59	
00	68	291	39	132	76	274	36	112	144	565	75	244
15	62		25		72		25		134		50	
30	72		24		58		30		130		54	
45	89		44		68		21		157		65	
00	94	320	22	106	90	305	16	64	184	625	38	170
15	64		26		62		19		126		45	
30	84		34		74		16		158		50	
45	78		24		79		13		157		37	
	1,389		2,911		1,307		2,815		2,696		5,726	
	51.5		50.8		48.5		49.2					
tals		4,300				4,122				8,422		
lits		51.1				48.9						
our	10:45		01:15		11:00		04:30		10:45		01:30	
e	331		351		305		332		625		644	
	0.88		0.88		0.85		0.91		0.85		0.90	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

CO. - JUR: : NIPOMO

LOCATION: : WEST TAFFT STREET

LIMITS: : E/O S. OAKGLEN A

Site: 010

Date: 07/27/03

Day: Sunday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	31	99	110	373	14	37	67	311	45	136	177	684
12:15	30		143		8		72		38		215	
12:30	15		62		10		88		25		150	
12:45	23		58		5		84		28		142	
01:00	2	16	62	249	11	22	72	254	13	38	134	503
01:15	6		62		6		58		12		120	
01:30	7		61		3		68		10		129	
01:45	1		64		2		56		3		120	
02:00	3	16	58	272	8	16	54	258	11	32	112	530
02:15	6		70		3		72		9		142	
02:30	5		63		4		70		9		133	
02:45	2		81		1		62		3		143	
03:00	0	7	75	304	3	9	48	244	3	16	123	548
03:15	2		81		2		72		4		153	
03:30	5		68		2		64		7		132	
03:45	0		80		2		60		2		140	
04:00	3	9	61	252	3	4	53	235	6	13	114	487
04:15	2		66		0		60		2		126	
04:30	0		64		1		62		1		126	
04:45	4		61		0		60		4		121	
05:00	3	12	55	241	4	12	54	223	7	24	109	464
05:15	3		68		3		63		6		131	
05:30	3		66		3		49		6		115	
05:45	3		52		2		57		5		109	
06:00	6	33	52	209	4	29	68	239	10	62	120	448
06:15	8		56		1		54		9		110	
06:30	12		51		4		69		16		120	
06:45	7		50		20		48		27		98	
07:00	15	62	54	224	14	118	59	236	29	180	113	460
07:15	13		45		16		67		29		112	
07:30	24		53		28		54		52		107	
07:45	10		72		60		56		70		128	
08:00	26	186	44	213	36	138	40	169	62	324	84	382
08:15	25		60		28		44		53		104	
08:30	38		61		32		40		70		101	
08:45	97		48		42		45		139		93	
09:00	63	228	36	132	68	257	45	115	131	485	81	247
09:15	53		28		74		18		127		46	
09:30	59		40		69		30		128		70	
09:45	53		28		46		22		99		50	
10:00	64	241	11	56	58	238	21	71	122	479	32	127
10:15	44		16		57		21		101		37	
10:30	49		16		57		16		106		32	
10:45	84		13		66		13		150		26	
11:00	65	262	9	29	88	285	10	33	153	547	19	62
11:15	73		7		90		5		163		12	
11:30	57		6		58		12		115		18	
11:45	67		7		49		6		116		13	
Totals	1,171		2,554		1,165		2,388		2,336		4,942	
Split%	50.1		51.7		49.9		48.3					
Day Totals		3,725				3,553				7,278		
Day Splits		51.2				48.8						
Peak Hour	10:45		12:00		10:45		12:15		10:45		12:00	
Volume	279		373		302		316		581		684	
Factor	0.83		0.65		0.84		0.90		0.89		0.80	

MULTITRANS

WALNUT CREEK, CALIFORNIA

(925) 930-0500

JUR: : NIPOMO

ATION: : WEST TAFFT STREET

TS: : E/O S. OAKGLEN A

Site: 010

Date: 07/28/03

Day: Monday

al	WB AM		WB PM		EB AM		EB PM		Combined AM		Combined PM	
00	14	23	163	423	7	16	98	340	21	39	261	763
15	3		101		4		80		7		181	
30	3		83		4		78		7		161	
45	3		76		1		84		4		160	
00	3	14	75	311	3	14	79	285	6	28	154	596
15	3		72		2		76		5		148	
30	5		80		6		58		11		138	
45	3		84		3		72		6		156	
00	2	11	84	321	4	7	94	293	6	18	178	614
15	6		90		1		69		7		159	
30	1		73		1		64		2		137	
45	2		74		1		66		3		140	
00	3	7	97	332	1	6	67	279	4	13	164	611
15	0		78		3		68		3		146	
30	2		84		0		74		2		158	
45	2		73		2		70		4		143	
00	4	17	64	316	2	5	64	312	6	22	128	628
15	5		74		0		84		5		158	
30	3		96		1		84		4		180	
45	5		82		2		80		7		162	
00	3	42	88	324	4	32	82	368	7	74	170	692
15	7		74		7		74		14		148	
30	11		88		9		96		20		184	
45	21		74		12		116		33		190	
00	17	119	71	259	10	115	87	361	27	234	158	620
15	27		63		27		113		54		176	
30	49		67		32		93		81		160	
45	26		58		46		68		72		126	
00	48	180	90	272	34	161	82	240	82	341	172	512
15	44		48		38		58		82		106	
30	40		53		32		52		72		105	
45	48		81		57		48		105		129	
00	49	236	72	217	68	267	47	166	117	503	119	383
15	44		60		56		48		100		108	
30	85		51		55		41		140		92	
45	58		34		88		30		146		64	
00	79	272	37	176	73	301	32	103	152	573	69	279
15	73		45		70		32		143		77	
30	62		51		66		20		128		71	
45	58		43		92		19		150		62	
00	62	268	25	68	56	300	26	64	118	568	51	132
15	76		17		74		12		150		29	
30	64		10		90		13		154		23	
45	66		16		80		13		146		29	
00	79	330	9	36	80	330	16	39	159	660	25	75
15	80		16		64		11		144		27	
30	105		8		72		5		177		13	
45	66		3		114		7		180		10	
	1,519		3,055		1,554		2,850		3,073		5,905	
	49.4		51.7		50.6		48.3					
ıals		4,574				4,404				8,978		
lits		50.9				49.1						
ɔur	10:45		12:00		11:00		05:30		11:00		12:00	
:	330		423		330		412		660		763	
	0.79		0.65		0.72		0.89		0.92		0.73	

APPENDIX B

INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

APPENDIX B1
INTERSECTION LOS WORKSHEETS:

EXISTING, 2030, AND ALTERNATIVE 3
(WITHOUT ADDITIONAL IMPROVEMENTS)

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/7/2003

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	165	185	38	188	0	0	0	0	49	2	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 (veh/h)	0	179	201	41	204	0	0	0	0	53	2	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	204			380			586	567	280	557	687	204
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			96			100	100	100	87	99	98
cM capacity (veh/h)	1367			1178			399	418	759	423	366	836

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	380	246	55	18
Volume Left	0	41	53	0
Volume Right	201	0	0	18
cSH	1700	1178	420	836
Volume to Capacity	0.22	0.04	0.13	0.02
Queue Length (ft)	0	3	11	2
Control Delay (s)	0.0	1.6	14.9	9.4
Lane LOS		A	B	A
Approach Delay (s)	0.0	1.6	13.5	
Approach LOS			B	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/6/2003

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)	192	82	0	0	80	97	180	4	18	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 (veh/h)	148	89	0	0	85	105	180	4	20	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	171			89			494	547	89	516	494	148
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	90			100			60	99	98	100	100	100
cM capacity (veh/h)	1407			1506			448	399	969	421	428	934

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	233	171	185	20
Volume Left	148	0	180	0
Volume Right	0	105	0	20
cSH	1407	1700	446	969
Volume to Capacity	0.10	0.10	0.41	0.02
Queue Length (ft)	9	0	50	2
Control Delay (s)	5.2	0.0	18.6	8.8
Lane LOS	A		C	A
Approach Delay (s)	5.2	0.0	17.7	
Approach LOS			C	

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	42.8%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd. 10/6/2003

Movement	EBL	EBT	EBR	NBL	NBT	NBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	138	110	65	45	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	11	150	120	98	49	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	336	59	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
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	85	92			
cM capacity (veh/h)	608	1006	1531			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	161	158	70
Volume Left	11	120	0
Volume Right	150	0	21
cSH	964	1531	1700
Volume to Capacity	0.17	0.08	0.04
Queue Length (ft)	15	6	0
Control Delay (s)	9.5	5.9	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	5.9	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
16: Willow Rd. & Hetrick Ave. 10/6/2003

Movement	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	0	84	1	0	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	1	0	91	1	0	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	117	92			92	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	879	966			1502	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	92	25
Volume Left	1	0	0
Volume Right	0	1	0
cSH	879	1700	1502
Volume to Capacity	0.00	0.05	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	9.1	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.1	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	11.9%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.87			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.97	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1623			1812	1583
Flt Permitted		1.00	1.00	0.95	1.00			1.00			0.97	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1623			1812	1583
Volume (vph)	0	768	9	81	355	0	29	0	392	66	52	127
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)	0	835	10	88	386	0	32	0	426	72	57	138
Lane Group Flow (vph)	0	835	10	88	386	0	0	458	0	0	129	138
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		39.8	39.8	8.0	51.8			20.2			13.0	13.0
Effective Green, g (s)		40.8	40.8	8.0	52.8			21.2			14.0	14.0
Actuated g/C Ratio		0.41	0.41	0.08	0.53			0.21			0.14	0.14
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1444	646	142	1869			344			254	222
v/s Ratio Prot		c0.24		c0.05	0.11			c0.28			0.07	
v/s Ratio Perm			0.01									0.09
v/c Ratio		0.58	0.02	0.62	0.21			1.33			0.51	0.62
Uniform Delay, d1		22.9	17.6	44.5	12.5			39.4			39.8	40.5
Progression Factor		1.00	1.00	0.98	0.58			1.00			1.00	1.00
Incremental Delay, d2		1.7	0.0	7.1	0.2			167.8			1.6	5.3
Delay (s)		24.6	17.7	50.6	7.4			207.2			41.4	45.8
Level of Service		C	B	D	A			F			D	D
Approach Delay (s)		24.5			15.4			207.2			43.7	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	65.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	C
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/7/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.95			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3352			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3352			1770	1583			
Volume (vph)	520	362	0	0	287	156	189	0	79	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)	565	393	0	0	312	170	205	0	86	0	0	0
Lane Group Flow (vph)	565	393	0	0	482	0	0	205	86	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	45.0	73.6			25.6			16.4	16.4			
Effective Green, g (s)	44.0	74.6			26.6			17.4	17.4			
Actuated g/C Ratio	0.44	0.75			0.27			0.17	0.17			
Clearance Time (s)	3.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	779	2640			892			308	275			
v/s Ratio Prot	c0.32	0.11			c0.14							
v/s Ratio Perm								0.12	0.05			
v/c Ratio	0.73	0.15			0.54			0.67	0.31			
Uniform Delay, d1	23.0	3.6			31.5			38.6	36.1			
Progression Factor	0.98	0.39			1.00			1.00	1.00			
Incremental Delay, d2	2.8	0.1			2.3			5.3	0.7			
Delay (s)	25.3	1.5			33.8			43.9	36.7			
Level of Service	C	A			C			D	D			
Approach Delay (s)		15.5			33.8			41.8			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	B
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps 10/7/2003

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	130	241	29	278	0	0	0	0	159	2	88
Peak Hour Factor	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 (veh/h)	0	141	262	32	302	0	0	0	0	173	2	96
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	302			403			734	638	272	638	768	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			97			100	100	100	55	99	87
cM capacity (veh/h)	1259			1155			285	384	766	382	323	737

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	403	334	175	96
Volume Left	0	32	173	0
Volume Right	262	0	0	96
cSH	1700	1155	381	737
Volume to Capacity	0.24	0.03	0.46	0.13
Queue Length (ft)	0	2	58	11
Control Delay (s)	0.0	1.0	22.3	10.6
Lane LOS		A	C	B
Approach Delay (s)	0.0	1.0	18.1	
Approach LOS			C	

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps 10/7/2003

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)	70	219	0	0	84	76	223	3	24	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 (veh/h)	76	238	0	0	91	83	242	3	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	174			238			523	564	238	551	523	133
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	95			100			46	99	97	100	100	100
cM capacity (veh/h)	1403			1329			445	411	801	411	434	917

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	314	174	246	26
Volume Left	76	0	242	0
Volume Right	0	83	0	26
cSH	1400	1700	445	801
Volume to Capacity	0.05	0.10	0.55	0.03
Queue Length (ft)	4	0	82	3
Control Delay (s)	2.2	0.0	22.6	9.6
Lane LOS	A		C	A
Approach Delay (s)	2.2	0.0	21.4	
Approach LOS			C	

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd. 10/6/2003

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	16	202	121	67	80	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	16	220	208	73	87	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	586	97	108			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	77	86			
cM capacity (veh/h)	407	959	1483			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	236	280	108
Volume Left	16	208	0
Volume Right	220	0	21
cSH	877	1483	1700
Volume to Capacity	0.27	0.14	0.06
Queue Length (ft)	27	12	0
Control Delay (s)	10.8	5.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	5.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
16: Willow Rd. & Hetrick Ave. 10/6/2003

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	48	0	1	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	0	0	52	0	1	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	139	52			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	863	1015			1554	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	52	86
Volume Left	0	0	1
Volume Right	0	0	0
cSH	1700	1700	1554
Volume to Capacity	0.00	0.03	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	0.0	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	7.9%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.89			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1645			1826	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1645			1826	1583
Volume (vph)	0	791	106	192	681	0	62	0	252	112	168	371
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)	0	860	115	209	740	0	67	0	274	122	183	403
Lane Group Flow (vph)	0	860	115	209	740	0	0	341	0	0	305	403
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		38.0	38.0	18.0	60.0			20.6			24.4	24.4
Effective Green, g (s)		39.0	39.0	18.0	61.0			21.6			25.4	25.4
Actuated g/C Ratio		0.32	0.32	0.15	0.51			0.18			0.21	0.21
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1150	514	266	1799			296			387	335
v/s Ratio Prot		c0.24		c0.12	0.21			c0.21			0.17	
v/s Ratio Perm			0.07									0.25
v/c Ratio		0.75	0.22	0.79	0.41			1.15			0.79	1.20
Uniform Delay, d1		36.1	29.5	49.1	18.3			49.2			44.8	47.3
Progression Factor		1.00	1.00	0.65	0.26			1.00			1.00	1.00
Incremental Delay, d2		4.5	1.0	11.7	0.6			100.0			10.2	116.3
Delay (s)		40.6	30.5	43.8	5.4			149.2			54.9	163.6
Level of Service		D	C	D	A			F			D	F
Approach Delay (s)		39.4			13.9			149.2			116.8	
Approach LOS		D			B			F			F	

Intersection Summary			
HCM Average Control Delay	62.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/7/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.98			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3484			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3484			1770	1583			
Volume (vph)	289	502	0	0	520	60	441	0	152	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)	314	546	0	0	565	65	479	0	165	0	0	0
Lane Group Flow (vph)	314	546	0	0	630	0	0	479	165	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	34.0	74.1			37.1			35.9	35.9			
Effective Green, g (s)	33.0	75.1			38.1			36.9	36.9			
Actuated g/C Ratio	0.28	0.63			0.32			0.31	0.31			
Clearance Time (s)	3.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	487	2215			1106			544	487			
v/s Ratio Prot	c0.18	0.15			c0.18							
v/s Ratio Perm								0.27	0.10			
v/c Ratio	0.64	0.25			0.57			0.88	0.34			
Uniform Delay, d1	38.3	9.9			34.1			39.5	32.1			
Progression Factor	1.15	0.85			1.00			1.00	1.00			
Incremental Delay, d2	1.8	0.2			2.1			15.3	0.4			
Delay (s)	46.0	8.6			36.2			54.8	32.5			
Level of Service	D	A			D			D	C			
Approach Delay (s)		22.3			36.2			49.1			0.0	
Approach LOS		C			D			D			A	

Intersection Summary			
HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps 10/6/2003

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	485	315	40	460	0	0	0	0	50	2	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	485	315	40	460	0	0	0	0	50	2	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	460			750			1214	1165	592	1132	1290	460
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			95			100	100	100	71	99	87
cM capacity (veh/h)	1101			859			131	194	506	174	156	601

Direction, Location	EB 1	WB 1	SB 1	SB 2
Volume Total	750	500	52	80
Volume Left	0	40	50	0
Volume Right	315	0	0	80
cSH	1700	859	179	601
Volume to Capacity	0.44	0.05	0.30	0.13
Queue Length (ft)	0	4	30	11
Control Delay (s)	0.0	1.3	34.5	11.9
Lane LOS		A	D	B
Approach Delay (s)	0.0	1.3	20.8	
Approach LOS			C	

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps 10/6/2003

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)	280	205	0	0	145	85	255	4	30	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	280	205	0	0	145	85	255	4	30	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	230			205			852	985	205	884	952	188
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	79			100			0	98	96	100	100	100
cM capacity (veh/h)	1338			1366			201	194	836	181	205	855

Direction, Location	EB 1	WB 1	NB 1	NB 2
Volume Total	485	230	359	30
Volume Left	280	0	255	0
Volume Right	0	85	0	30
cSH	1338	1700	210	836
Volume to Capacity	0.21	0.14	1.79	0.04
Queue Length (ft)	20	0	629	3
Control Delay (s)	5.7	0.0	415.8	9.5
Lane LOS	A		F	A
Approach Delay (s)	5.7	0.0	384.5	
Approach LOS			F	

Intersection Summary			
Average Delay	138.0		
Intersection Capacity Utilization	69.0%	ICU Level of Service	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	150	240	170	55	70	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	150	240	170	55	70	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	480	90	110			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	63	75	93			
cM capacity (veh/h)	479	968	1480			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	390	225	110
Volume Left	150	170	0
Volume Right	240	0	40
cSH	695	1480	1700
Volume to Capacity	0.56	0.11	0.06
Queue Length (ft)	88	10	0
Control Delay (s)	16.6	8.1	0.0
Lane LOS	C	A	
Approach Delay (s)	16.6	8.1	0.0
Approach LOS	C		

Average Delay		10.8	
Intersection Capacity Utilization	49.7%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	0	130	1	0	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	1	0	130	1	0	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	165	130			131	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	825	919			1454	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	131	35
Volume Left	1	0	0
Volume Right	0	1	0
cSH	825	1700	1454
Volume to Capacity	0.00	0.08	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	9.4	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.4	0.0	0.0
Approach LOS	A		

Average Delay		0.1	
Intersection Capacity Utilization	16.9%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.89			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1644			1819	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1644			1819	1583
Volume (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	125	685	0	0	655	0	0	370	220
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		41.0	41.0	7.0	52.0			32.0			21.0	21.0
Effective Green, g (s)		42.0	42.0	7.0	53.0			33.0			22.0	22.0
Actuated g/C Ratio		0.35	0.35	0.06	0.44			0.28			0.18	0.18
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1239	554	103	1563			452			333	290
v/s Ratio Prot		c0.35		c0.07	0.19			c0.40			c0.20	
v/s Ratio Perm			0.05									0.14
v/c Ratio		1.00	0.14	1.21	0.44			1.45			1.11	0.76
Uniform Delay, d1		38.9	26.6	56.5	23.2			43.5			49.0	46.5
Progression Factor		1.00	1.00	0.98	0.60			1.00			1.00	1.00
Incremental Delay, d2		24.8	0.6	139.1	0.6			214.2			62.7	10.8
Delay (s)		63.7	27.1	194.2	14.4			257.7			131.7	57.3
Level of Service		E	C	F	B			F			F	E
Approach Delay (s)		61.6			42.2			257.7			104.0	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM Average Control Delay	102.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.0%	ICU Level of Service	G
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/6/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.95			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3351			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3351			1770	1583			
Volume (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	705	0	0	350	140	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	57.0	85.5			25.5			24.5	24.5			
Effective Green, g (s)	58.0	86.5			26.5			25.5	25.5			
Actuated g/C Ratio	0.47	0.72			0.22			0.21	0.21			
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	826	2551			749			375	335			
v/s Ratio Prot	c0.44	0.19			c0.21							
v/s Ratio Perm								0.20	0.09			
v/c Ratio	0.94	0.27			0.95			0.93	0.42			
Uniform Delay, d1	30.5	5.8			46.1			46.4	40.6			
Progression Factor	0.79	0.58			1.00			1.00	1.00			
Incremental Delay, d2	2.7	0.0			23.4			29.4	1.8			
Delay (s)	26.9	3.4			69.5			75.8	41.7			
Level of Service	C	A			E			E	D			
Approach Delay (s)		16.0			69.5			66.0			0.0	
Approach LOS		B			E			E			A	

Intersection Summary			
HCM Average Control Delay	39.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	E
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/6/2003

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	575	445	50	350	0	0	0	0	120	0	185
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	575	445	50	350	0	0	0	0	120	0	185
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	850			820			1554	1995	598	1395	1590	850
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			93			100	100	100	0	95	61
cM capacity (veh/h)	936			809			52	136	503	117	100	469

Direction, Location	EB 1	WB 1	NB 1	SB 1
Volume Total	820	710	122	185
Volume Left	0	50	120	0
Volume Right	445	0	0	185
cSH	1700	809	117	439
Volume to Capacity	0.48	0.07	1.05	0.39
Queue Length (ft)	0	5	129	45
Control Delay (s)	0.0	1.9	166.9	17.6
Lane LOS		A	F	C
Approach Delay (s)	0.0	1.9	76.9	
Approach LOS			F	

Intersection Summary			
Average Delay	13.6		
Intersection Capacity Utilization	101.3%	ICU Level of Service	F

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/6/2003

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)	100	495	0	0	185	95	525	4	40	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	100	495	0	0	185	95	525	4	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)												
vC, conflicting volume	280			695			828	875	595	870	628	292
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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	99	94	100	100	100
cM capacity (veh/h)	1283			1164			273	265	654	237	283	807

Direction, Location	EB 1	WB 1	NB 1	SB 1
Volume Total	495	280	529	40
Volume Left	100	0	525	0
Volume Right	0	95	0	40
cSH	1283	1700	273	654
Volume to Capacity	0.08	0.16	1.94	0.06
Queue Length (ft)	6	0	933	5
Control Delay (s)	2.3	0.0	465.6	10.9
Lane LOS	A		F	B
Approach Delay (s)	2.3	0.0	433.7	
Approach LOS			F	

Intersection Summary			
Average Delay	184.4		
Intersection Capacity Utilization	81.1%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd. 10/6/2003

Movement	EBL	EBT	EBR	NBL	NBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	80	345	260	100	110	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	80	345	260	100	110	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	775	155	200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	61	81			
cM capacity (veh/h)	297	891	1372			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	425	360	200
Volume Left	80	260	0
Volume Right	345	0	90
cSH	647	1372	1700
Volume to Capacity	0.66	0.19	0.12
Queue Length (ft)	122	17	0
Control Delay (s)	20.6	6.4	0.0
Lane LOS	C	A	
Approach Delay (s)	20.6	6.4	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	11.2		
Intersection Capacity Utilization	66.7%	ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
16: Willow Rd. & Hetrick Ave. 10/6/2003

Movement	WBL	WBT	WBR	NBL	NBT	SBR
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	75	0	1	120
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	0	75	0	1	120
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	197	75			(75)	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	791	986			1524	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	75	121
Volume Left	0	0	1
Volume Right	0	0	0
cSH	1700	1700	1524
Volume to Capacity	0.00	0.04	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	0.0	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	9.8%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.92			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1679			1826	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1679			1826	1583
Volume (vph)	0	1260	225	280	1025	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	225	280	1025	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	225	280	1025	0	0	545	0	0	400	590
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		36.0	36.0	12.0	52.0			27.0			26.0	26.0
Effective Green, g (s)		37.0	37.0	12.0	53.0			28.0			27.0	27.0
Actuated g/C Ratio		0.31	0.31	0.10	0.44			0.23			0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1091	488	177	1563			392			411	356
v/s Ratio Prot		c0.36		c0.16	0.29			c0.32			0.22	
v/s Ratio Perm			0.14									0.37
v/c Ratio		1.15	0.46	1.58	0.66			1.39			0.97	1.66
Uniform Delay, d1		41.5	33.5	54.0	26.3			46.0			46.1	46.5
Progression Factor		1.00	1.00	1.30	0.94			1.00			1.00	1.00
Incremental Delay, d2		80.4	3.1	271.9	0.8			190.7			37.1	308.0
Delay (s)		121.9	36.6	341.9	25.5			236.7			83.3	354.5
Level of Service		F	D	F	C			F			F	F
Approach Delay (s)		109.0			93.4			236.7			244.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	151.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	117.3%	ICU Level of Service	G
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/6/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.97			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3431			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3431			1770	1583			
Volume (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	910	0	0	640	200	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	35.0	69.0			31.0			41.0	41.0			
Effective Green, g (s)	34.0	70.0			32.0			42.0	42.0			
Actuated g/C Ratio	0.28	0.58			0.27			0.35	0.35			
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	502	2064			915			620	554			
v/s Ratio Prot	c0.30	0.18			c0.27							
v/s Ratio Perm								0.36	0.13			
v/c Ratio	1.05	0.31			0.99			1.03	0.36			
Uniform Delay, d1	45.0	12.5			44.5			59.0	39.0			
Progression Factor	1.34	1.17			1.00			1.00	1.00			
Incremental Delay, d2	28.4	0.0			28.5			42.7	0.4			
Delay (s)	83.9	14.9			72.4			83.7	29.4			
Level of Service	F	B			E			F	C			
Approach Delay (s)		45.7			72.4			70.8			0.0	
Approach LOS		D			E			E			A	

Intersection Summary			
HCM Average Control Delay	61.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	F
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps 10/6/2003

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	315	40	460	0	0	0	0	50	0	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	435	315	40	460	0	0	0	0	50	0	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	460			750			1212	1132	592	1132	1290	460
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			95			100	100	100	71	100	87
cM capacity (veh/h)	1101			859			133	194	506	174	156	601

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	750	500	50	80
Volume Left	0	40	50	0
Volume Right	315	0	0	80
cSH	1700	859	174	601
Volume to Capacity	0.44	0.05	0.29	0.13
Queue Length (ft)	0	4	28	11
Control Delay (s)	0.0	1.3	33.9	11.9
Lane LOS		A	D	B
Approach Delay (s)	0.0	1.3	20.4	
Approach LOS			C	

Intersection Summary

Average Delay	2.4		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps 10/6/2003

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)	280	205	0	0	145	85	355	0	30	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	280	205	0	0	145	85	355	0	30	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	230			205			952	995	205	982	952	185
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	79			100			0	100	96	100	100	100
cM capacity (veh/h)	1338			1366			201	194	836	184	205	855

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	485	230	355	30
Volume Left	280	0	355	0
Volume Right	0	85	0	30
cSH	1338	1700	201	836
Volume to Capacity	0.21	0.14	1.77	0.04
Queue Length (ft)	20	0	618	3
Control Delay (s)	5.7	0.0	406.9	9.5
Lane LOS	A		F	A
Approach Delay (s)	5.7	0.0	376.0	
Approach LOS			F	

Intersection Summary

Average Delay	134.1		
Intersection Capacity Utilization	68.8%	ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd.

10/6/2003

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	105	145	10	65	30	85	30	10	30	40	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	150	105	145	10	65	30	85	30	10	30	40	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	95			250			668	592	178	602	650	80
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	90			99			73	92	99	91	88	96
cM capacity (veh/h)	1499			1316			313	374	866	351	347	980

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	400	105	125	110
Volume Left	150	10	85	30
Volume Right	145	30	10	40
cSH	1499	1316	344	456
Volume to Capacity	0.10	0.01	0.36	0.24
Queue Length (ft)	8	1	40	23
Control Delay (s)	3.4	0.8	21.3	15.4
Lane LOS	A	A	C	C
Approach Delay (s)	3.4	0.8	21.3	15.4
Approach LOS			C	C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	49.6%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
22: Willow Rd. & Hetrick Ave.

10/6/2003

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)	10	95	40	10	80	60	10	80	10	25	20	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	10	95	40	10	80	60	10	80	10	25	20	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	140			135			290	295	115	315	285	110
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			99			98	87	99	96	97	98
cM capacity (veh/h)	1443			1449			629	608	937	561	616	943

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	145	150	100	60
Volume Left	10	10	10	25
Volume Right	40	60	10	15
cSH	1443	1429	692	649
Volume to Capacity	0.01	0.01	0.16	0.09
Queue Length (ft)	1	1	14	8
Control Delay (s)	0.6	0.6	11.8	11.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	0.6	11.8	11.1
Approach LOS			B	B

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.89			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1644			1819	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1644			1819	1583
Volume (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	125	685	0	0	655	0	0	370	220
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		38.0	38.0	8.0	50.0			33.0			22.0	22.0
Effective Green, g (s)		39.0	39.0	8.0	51.0			34.0			23.0	23.0
Actuated g/C Ratio		0.32	0.32	0.07	0.42			0.28			0.19	0.19
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1150	514	118	1504			466			349	303
v/s Ratio Prot		c0.35		c0.07	0.19			c0.40			c0.20	
v/s Ratio Perm			0.05									0.14
v/c Ratio		1.07	0.15	1.06	0.46			1.41			1.06	0.73
Uniform Delay, d1		40.5	28.7	56.0	24.6			43.0			48.5	45.5
Progression Factor		1.00	1.00	0.88	0.68			1.00			1.00	1.00
Incremental Delay, d2		48.8	0.6	82.6	0.6			195.0			65.0	6.4
Delay (s)		89.3	29.3	132.0	17.3			238.0			113.5	53.9
Level of Service		F	C	F	B			F			F	D
Approach Delay (s)		85.8			35.0			238.0			91.3	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM Average Control Delay	104.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.0%	ICU Level of Service	G

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/6/2003

Movement	SBL2	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SET	SER
Lane Configurations		↰	↑↑			↑↑						↰	↱			
Ideal Flow (vphpl)	1900	1900	1900	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			
Lane Util. Factor		1.00	0.95			0.95						1.00	1.00			
Frt		1.00	1.00			0.95						1.00	0.85			
Flt Protected		0.95	1.00			1.00						0.98	1.00			
Satd. Flow (prot)		1770	3539			3351						1770	1583			
Flt Permitted		0.95	1.00			1.00						0.95	1.00			
Satd. Flow (perm)		1770	3539			3351						1770	1583			
Volume (vph)		780	680	0	0	455	250	350	0	140	0	0	0			
Peak-hour factor, PHF		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj. Flow (vph)		780	680	0	0	455	250	350	0	140	0	0	0			
Lane Group Flow (vph)		780	680	0	0	705	0	0	350	140	0	0	0			
Turn Type		Prot						Perm		Perm						
Protected Phases		5	2			6			8							
Permitted Phases								8		8						
Actuated Green, G (s)		57.0	84.4			24.4			25.6	25.6						
Effective Green, g (s)		58.0	85.4			25.4			26.6	26.6						
Actuated g/C Ratio		0.47	0.71			0.21			0.22	0.22						
Clearance Time (s)		5.0	5.0			5.0			5.0	5.0						
Vehicle Extension (s)		3.0	3.0			3.0			3.0	3.0						
Lane Grp Cap (vph)		826	2519			709			392	351						
v/s Ratio Prot		c0.44	0.19			c0.21										
v/s Ratio Perm									0.20	0.09						
v/c Ratio		0.94	0.27			0.99			0.89	0.40						
Uniform Delay, d1		30.5	5.2			47.2			45.6	39.5						
Progression Factor		0.76	0.57			1.00			1.00	1.00						
Incremental Delay, d2		2.7	0.0			22.8			21.7	0.7						
Delay (s)		26.0	3.5			79.7			67.1	40.6						
Level of Service		C	A			E			E	D						
Approach Delay (s)			15.5			79.7			59.5			0.0				
Approach LOS			B			E			E			A				

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	E

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/6/2003

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	875	445	60	850	0	0	0	0	120	0	135
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	875	445	60	850	0	0	0	0	120	0	135
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	660			620			1552	1568	658	1550	1590	650
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			93			100	100	100	0	100	61
cM capacity (veh/h)	936			809			53	136	503	117	100	469

Direction, Location	EB 1	EB 2	WB 1	WB 2
Volume Total	820	710	120	185
Volume Left	0	60	120	0
Volume Right	445	0	0	185
cSH	1700	809	117	469
Volume to Capacity	0.48	0.07	1.03	0.39
Queue Length (ft)	0	6	112	40
Control Delay (s)	0.0	1.9	160.7	17.6
Lane LOS		A	F	C
Approach Delay (s)	0.0	1.9	73.9	
Approach LOS			F	

Intersection Summary			
Average Delay	13.0		
Intersection Capacity Utilization	101.2%	ICU Level of Service	F

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/6/2003

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)	100	895	0	0	185	95	525	0	40	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	100	895	0	0	185	95	525	0	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)												
vC, conflicting volume	280			895			828	875	895	868	825	237
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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	100	94	100	100	100
cM capacity (veh/h)	1283			1164			273	265	654	241	283	807

Direction, Location	EB 1	EB 2	WB 1	WB 2
Volume Total	495	280	525	40
Volume Left	100	0	525	0
Volume Right	0	95	0	40
cSH	1283	1700	273	954
Volume to Capacity	0.08	0.16	1.92	0.06
Queue Length (ft)	6	0	921	5
Control Delay (s)	2.3	0.0	459.0	10.9
Lane LOS	A		F	B
Approach Delay (s)	2.3	0.0	427.3	
Approach LOS			F	

Intersection Summary			
Average Delay	181.0		
Intersection Capacity Utilization	80.9%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd. 10/8/2003

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)	80	175	195	10	70	45	140	55	10	40	70	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	80	175	195	10	70	45	140	55	10	40	70	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	115			270			620	568	272	582	642	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	95			99			55	86	99	89	81	96
cM capacity (veh/h)	1474			1189			312	406	766	358	368	965

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	450	125	205	150
Volume Left	80	10	140	40
Volume Right	195	45	10	40
cSH	1474	1189	344	496
Volume to Capacity	0.05	0.01	0.60	0.34
Queue Length (ft)	4	1	92	38
Control Delay (s)	1.8	0.7	29.8	17.5
Lane LOS	A	A	D	C
Approach Delay (s)	1.8	0.7	29.8	17.5
Approach LOS			D	C

Intersection Summary			
Average Delay	10.4		
Intersection Capacity Utilization	56.8%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
22: Willow Rd. & Hetrick Ave. 10/6/2003

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	200	10	10	90	50	25	45	10	50	70	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	15	200	10	10	90	50	25	45	10	50	70	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	140			210			415	395	205	405	375	115
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			99			95	92	99	88	87	99
cM capacity (veh/h)	1443			1361			482	532	836	509	546	937

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	225	150	80	140
Volume Left	15	10	25	50
Volume Right	10	50	10	10
cSH	1443	1361	599	645
Volume to Capacity	0.01	0.01	0.15	0.26
Queue Length (ft)	1	1	13	25
Control Delay (s)	0.6	0.6	12.8	13.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	0.6	12.8	13.9
Approach LOS			B	B

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/6/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.92			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1679			1826	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1679			1826	1583
Volume (vph)	0	1260	350	280	1025	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	350	280	1025	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	350	280	1025	0	0	545	0	0	400	590
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		32.0	32.0	14.0	50.0			28.0			27.0	27.0
Effective Green, g (s)		33.0	33.0	14.0	51.0			29.0			28.0	28.0
Actuated g/C Ratio		0.28	0.28	0.12	0.42			0.24			0.23	0.23
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		973	435	207	1504			406			426	369
v/s Ratio Prot		c0.36		c0.16	0.29			c0.32			0.22	
v/s Ratio Perm			0.22									0.37
v/c Ratio		1.29	0.80	1.35	0.68			1.34			0.94	1.60
Uniform Delay, d1		43.5	40.5	53.0	27.9			45.5			45.2	46.0
Progression Factor		1.00	1.00	1.06	0.33			1.00			1.00	1.00
Incremental Delay, d2		140.4	14.6	170.5	1.0			169.8			28.4	282.0
Delay (s)		183.9	55.1	226.6	10.2			215.3			73.5	328.0
Level of Service		F	E	F	B			F			E	F
Approach Delay (s)		155.9			56.6			215.3			225.2	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	149.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	117.3%	ICU Level of Service	G
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/6/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.97			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.99	1.00			
Satd. Flow (prot)	1770	3539			3431			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.99	1.00			
Satd. Flow (perm)	1770	3539			3431			1770	1583			
Volume (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	910	0	0	640	200	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	35.0	69.0			31.0			41.0	41.0			
Effective Green, g (s)	36.0	70.0			32.0			42.0	42.0			
Actuated g/C Ratio	0.28	0.58			0.27			0.35	0.35			
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	502	2064			915			620	554			
v/s Ratio Prot	c0.30	0.18			c0.27							
v/s Ratio Perm								0.36	0.13			
v/c Ratio	1.05	0.31			0.99			1.03	0.36			
Uniform Delay, d1	45.0	13.8			43.0			39.0	29.0			
Progression Factor	0.81	0.46			1.00			1.00	1.00			
Incremental Delay, d2	38.4	0.0			28.5			44.7	0.4			
Delay (s)	61.0	5.9			72.4			83.7	29.4			
Level of Service	E	A			E			F	C			
Approach Delay (s)		30.5			72.4			70.8			0.0	
Approach LOS		C			E			E			A	

Intersection Summary			
HCM Average Control Delay	55.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	F
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/6/2003

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	230	300	50	285	0	0	0	0	40	0	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	230	300	50	285	0	0	0	0	40	0	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	285			530			865	825	550	825	875	285
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			97			100	100	100	96	100	94
cM capacity (veh/h)	1173			1037			252	299	667	265	244	663

Direction, Location	EB 1	EB 2	WB 1	NB 1
Volume Total	530	415	40	40
Volume Left	0	30	40	0
Volume Right	300	0	0	40
cSH	1700	1007	265	663
Volume to Capacity	0.31	0.03	0.14	0.06
Queue Length (ft)	0	2	12	5
Control Delay (s)	0.0	0.9	19.7	10.8
Lane LOS		A	C	B
Approach Delay (s)	0.0	0.9	15.2	
Approach LOS			C	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/6/2003

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	120	0	0	105	70	310	0	20	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	150	120	0	0	105	70	310	0	20	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	175			120			850	595	120	580	680	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	89			100			29	100	98	100	100	100
cM capacity (veh/h)	1401			1468			403	373	931	382	390	908

Direction, Location	EB 1	EB 2	WB 1	NB 1
Volume Total	270	175	310	20
Volume Left	150	0	310	0
Volume Right	0	70	0	20
cSH	1401	1700	403	931
Volume to Capacity	0.11	0.10	0.77	0.02
Queue Length (ft)	9	0	191	2
Control Delay (s)	4.8	0.0	38.1	8.9
Lane LOS	A		E	A
Approach Delay (s)	4.8	0.0	36.3	
Approach LOS			E	

Intersection Summary			
Average Delay	17.1		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd. 10/8/2003

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)	10	340	70	25	160	10	55	20	50	15	25	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	10	340	70	25	160	10	55	20	50	15	25	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	170			410			632	615	375	670	645	165
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			85	95	93	95	93	99
cM capacity (veh/h)	1407			1149			361	395	671	323	380	879

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	420	195	125	50
Volume Left	10	25	55	15
Volume Right	70	10	50	10
cSH	1407	1149	450	402
Volume to Capacity	0.01	0.02	0.28	0.12
Queue Length (ft)	1	2	28	10
Control Delay (s)	0.2	1.2	16.0	15.2
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	1.2	16.0	15.2
Approach LOS			C	C

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
22: Willow Rd. & Hetrick Ave. 10/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	10	355	40	55	170	20	10	130	65	10	35	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	10	355	40	55	170	20	10	130	65	10	35	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	405	245	205	60
Volume Left (vph)	10	55	10	10
Volume Right (vph)	40	20	65	15
Hadj (s)	0.0	0.0	-0.1	-0.1
Departure Headway (s)	5.0	5.7	5.5	5.8
Degree Utilization, x	0.56	0.39	0.31	0.10
Capacity (veh/h)	695	507	598	564
Control Delay (s)	14.1	12.4	10.9	9.4
Approach Delay (s)	14.1	12.4	10.9	9.4
Approach LOS	B	B	B	A

Intersection Summary			
Delay	12.6		
HCM Level of Service	B		
Intersection Capacity Utilization	57.8%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
43: Willow Rd. & N. Frontage Rd.

10/6/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (veh/h)	405	25	105	210	35	115
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	405	25	105	210	35	115

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total (vph)	430	105	210	150
Volume Left (vph)	0	105	0	35
Volume Right (vph)	25	0	0	115
Hadj (s)	0.0	0.2	0.0	0.4
Departure Headway (s)	4.8	6.5	6.3	5.3
Degree Utilization, x	0.58	0.19	0.37	0.22
Capacity (veh/h)	724	458	479	628
Control Delay (s)	14.2	9.8	11.7	9.7
Approach Delay (s)	14.2	11.1		9.7
Approach LOS	B	B		A

Intersection Summary			
Delay	12.3		
HCM Level of Service	B		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
36: Willow Rd. & 101 SB Ramp

10/6/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	0	475	45	25	205	0	0	0	0	30	0	110
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	475	45	25	205	0	0	0	0	30	0	110

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	520	25	205	30	110
Volume Left (vph)	0	25	0	30	0
Volume Right (vph)	45	0	0	0	110
Hadj (s)	0.0	0.2	0.0	0.2	0.6
Departure Headway (s)	5.2	5.9	5.7	6.6	5.8
Degree Utilization, x	0.75	0.04	0.32	0.05	0.18
Capacity (veh/h)	680	472	503	516	584
Control Delay (s)	21.9	7.9	10.2	9.7	8.8
Approach Delay (s)	21.9	10.0		8.8	
Approach LOS	C	A		A	

Intersection Summary			
Delay	16.8		
HCM Level of Service	C		
Intersection Capacity Utilization	57.7%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
39: Willow Rd. & 101 NB Ramp

10/6/2003

Movement												
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	375	130	0	0	100	40	130	0	30	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	375	130	0	0	100	40	130	0	30	0	0	0

Direction, Lane #					
Volume Total (vph)	375	130	140	130	30
Volume Left (vph)	375	0	0	130	0
Volume Right (vph)	0	0	40	0	30
Hed (s)	0.2	0.0	1.0	0.2	0.0
Departure Headway (s)	5.4	5.2	5.9	6.3	5.5
Degree Utilization, x	0.55	0.19	0.25	0.23	0.05
Capacity (veh/h)	652	677	478	537	606
Control Delay (s)	13.4	8.2	10.5	9.0	7.6
Approach Delay (s)	12.3		10.6	9.5	
Approach LOS	B		B	A	

Intersection Summary			
Delay		11.5	
HCM Level of Service		B	
Intersection Capacity Utilization		45.7%	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
19: Willow Rd. & Thompson Ave.

10/6/2003

Movement						
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (veh/h)	10	150	120	95	160	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	10	150	120	95	160	20

Direction, Lane #			
Volume Total (vph)	160	215	180
Volume Left (vph)	10	10	0
Volume Right (vph)	150	0	20
Hed (s)	0.0	0.1	0.0
Departure Headway (s)	4.3	4.6	4.4
Degree Utilization, x	0.19	0.27	0.22
Capacity (veh/h)	783	758	774
Control Delay (s)	8.2	9.3	8.7
Approach Delay (s)	8.2	9.3	8.7
Approach LOS	A	A	A

Intersection Summary			
Delay		8.8	
HCM Level of Service		A	
Intersection Capacity Utilization		41.1%	ICU Level of Service A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.89			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1644			1821	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1644			1821	1583
Volume (vph)	0	895	75	115	480	0	125	0	530	160	190	150
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	895	75	115	480	0	125	0	530	160	190	150
Lane Group Flow (vph)	0	895	75	115	480	0	0	655	0	0	350	150
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		34.0	34.0	8.0	46.0			37.0			22.0	22.0
Effective Green, g (s)		35.0	35.0	8.0	47.0			38.0			23.0	23.0
Actuated g/C Ratio		0.29	0.29	0.07	0.39			0.32			0.19	0.19
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1032	462	118	1386			521			349	303
v/s Ratio Prot		c0.25		c0.06	0.14			c0.40			c0.19	
v/s Ratio Perm			0.05									0.09
v/c Ratio		0.87	0.16	0.97	0.35			1.26			1.00	0.50
Uniform Delay, d1		40.3	31.6	55.9	25.7			41.0			48.5	45.3
Progression Factor		1.00	1.00	0.68	0.67			1.00			1.00	1.00
Incremental Delay, d2		9.8	0.8	63.8	0.5			130.7			48.9	1.3
Delay (s)		50.1	32.4	101.8	17.8			171.7			97.4	44.6
Level of Service		D	C	F	B			F			F	D
Approach Delay (s)		48.7			34.1			171.7			81.6	
Approach LOS		D			C			F			F	

Intersection Summary

HCM Average Control Delay	81.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	F

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps 10/6/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.95			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3360			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3360			1770	1583			
Volume (vph)	535	585	0	0	440	225	255	0	120	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	535	585	0	0	440	225	255	0	120	0	0	0
Lane Group Flow (vph)	535	585	0	0	665	0	0	265	120	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	51.0	88.2			34.2			21.8	21.8			
Effective Green, g (s)	50.0	89.2			35.2			22.8	22.8			
Actuated g/C Ratio	0.42	0.74			0.29			0.19	0.19			
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	736	2620			985			336	301			
v/s Ratio Prot	c0.30	0.17			c0.20							
v/s Ratio Perm								0.15	0.08			
v/c Ratio	0.72	0.22			0.67			0.79	0.40			
Uniform Delay, d1	29.6	4.7			37.4			45.5	42.5			
Progression Factor	0.76	0.60			1.00			1.00	1.00			
Incremental Delay, d2	1.6	0.1			3.7			11.6	0.9			
Delay (s)	23.1	2.9			41.0			57.9	43.5			
Level of Service	C	A			D			E	D			
Approach Delay (s)		12.6			41.0			53.4			0.0	
Approach LOS		B			D			D			A	

Intersection Summary

HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	C

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/6/2003

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	245	355	40	550	0	0	0	0	110	0	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	245	355	40	550	0	0	0	0	110	0	90
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	550			510			1158	1088	425	1068	1350	550
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			96			100	100	100	46	100	93
cM capacity (veh/h)	1011			969			139	213	627	193	166	528

Direction, Location	EB 1	WB 1	NB 1	SB 1
Volume Total	610	600	110	90
Volume Left	0	40	110	0
Volume Right	365	0	0	90
cSH 1	1700	969	166	528
Volume to Capacity	0.36	0.04	0.67	0.17
Queue Length (ft)	0	0	77	15
Control Delay (s)	0.0	1.1	45.7	13.2
Lane LOS		A	E	B
Approach Delay (s)	0.0	1.1	31.1	
Approach LOS			D	

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	83.0%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/6/2003

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)	80	325	0	0	195	80	465	0	25	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	80	325	0	0	195	80	465	0	25	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	275			325			560	600	325	585	660	175
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	95			100			0	100	97	100	100	100
cM capacity (veh/h)	1355			1235			432	405	716	401	427	868

Direction, Location	EB 1	WB 1	NB 1	SB 1
Volume Total	355	215	465	25
Volume Left	80	0	465	0
Volume Right	0	80	0	25
cSH 1	1355	1700	432	716
Volume to Capacity	0.02	0.13	1.08	0.03
Queue Length (ft)	2	0	387	3
Control Delay (s)	0.8	0.0	96.7	10.2
Lane LOS	A		F	B
Approach Delay (s)	0.8	0.0	92.3	
Approach LOS			F	

Intersection Summary			
Average Delay	43.0		
Intersection Capacity Utilization	66.5%	ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd.

10/8/2003

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)	10	340	100	35	250	10	90	35	15	10	40	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	10	340	100	35	250	10	90	35	15	10	40	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	260			440			765	740	690	768	785	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			97			67	89	98	96	87	99
cM capacity (veh/h)	1304			1120			277	331	658	278	312	784

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	450	295	140	60
Volume Left	10	35	90	10
Volume Right	100	10	15	10
cSH	1304	1120	309	339
Volume to Capacity	0.01	0.03	0.45	0.18
Queue Length (ft)	1	2	56	16
Control Delay (s)	0.3	1.3	26.0	17.9
Lane LOS	A	A	D	C
Approach Delay (s)	0.3	1.3	26.0	17.9
Approach LOS			D	C

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	54.1%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
22: Willow Rd. & Hetrick Ave.

10/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	15	340	10	80	260	50	25	75	70	10	120	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	15	340	10	80	260	50	25	75	70	10	120	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	365	390	170	140
Volume Left (vph)	15	80	25	10
Volume Right (vph)	10	50	70	10
Hadj (s)	0.0	0.0	-0.2	0.0
Departure Headway (s)	5.5	6.2	6.1	6.3
Degree Utilization, x	0.56	0.67	0.29	0.25
Capacity (veh/h)	620	522	527	528
Control Delay (s)	15.4	21.1	11.5	11.4
Approach Delay (s)	15.4	21.1	11.5	11.4
Approach LOS	C	C	B	B

Intersection Summary			
Delay	16.3		
HCM Level of Service	C		
Intersection Capacity Utilization	54.6%	ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
43: Willow Rd. & N. Frontage Rd.

10/8/2003

Movement	EBL	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (veh/h)	400	20	145	340	50	125
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	400	20	145	340	50	125

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total (vph)	420	145	340	175
Volume Left (vph)	0	145	0	50
Volume Right (vph)	20	0	0	125
Hadj (s)	0.0	0.2	0.0	-0.3
Departure Headway (s)	5.2	7.2	7.0	5.7
Degree Utilization, x	0.60	0.29	0.66	0.28
Capacity (veh/h)	673	442	471	585
Control Delay (s)	15.8	12.0	21.6	10.9
Approach Delay (s)	15.8	18.7		10.9
Approach LOS	C	C		B

Intersection Summary			
Delay		16.3	
HCM Level of Service		C	
Intersection Capacity Utilization		50.8%	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
36: Willow Rd. & 101 SB Ramp

10/6/2003

Movement	NEL	NET	NER	SWL	SWT	SWR	NWL	NWT	NWR	SEL	SET	SER
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	0	285	240	55	215	0	0	0	0	20	0	270
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	285	240	55	215	0	0	0	0	20	0	270

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	525	55	215	20	270
Volume Left (vph)	0	55	0	20	0
Volume Right (vph)	240	0	0	0	270
Hadj (s)	-0.3	0.2	0.0	0.2	-0.3
Departure Headway (s)	5.5	6.1	5.9	6.7	5.9
Degree Utilization, x	0.80	0.09	0.35	0.04	0.42
Capacity (veh/h)	644	469	494	511	582
Control Delay (s)	25.9	9.5	10.9	9.8	12.4
Approach Delay (s)	26.9	10.4		12.1	
Approach LOS	D	B		B	

Intersection Summary			
Delay		18.9	
HCM Level of Service		C	
Intersection Capacity Utilization		39.7%	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
39: Willow Rd. & 101 NB Ramp 10/6/2003

Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	200	105	0	0	90	45	180	0	50	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	200	105	0	0	90	45	180	0	50	0	0	0

Volume Total (vph)	200	105	135	180	50
Volume Left (vph)	200	0	0	180	0
Volume Right (vph)	0	0	45	0	50
Hadj (s)	0.2	0.0	0.2	0.2	-0.8
Departure Headway (s)	5.5	5.3	5.7	5.8	5.0
Degree Utilization, x	0.31	0.16	0.21	0.29	0.07
Capacity (veh/h)	625	650	492	587	670
Control Delay (s)	9.7	9.1	10.5	10.0	7.2
Approach Delay (s)	9.2		10.3	9.4	
Approach LOS	A		B	A	

Delay	9.5		
HCM Level of Service	A		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
19: Willow Rd. & Thompson Ave. 10/6/2003

Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (veh/h)	20	135	125	115	280	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	20	135	125	115	280	10

Volume Total (vph)	155	240	290
Volume Left (vph)	20	135	0
Volume Right (vph)	135	0	10
Hadj (s)	-0.5	0.1	0.0
Departure Headway (s)	4.6	4.7	4.5
Degree Utilization, x	0.20	0.31	0.37
Capacity (veh/h)	717	736	762
Control Delay (s)	8.7	9.9	10.1
Approach Delay (s)	8.7	9.9	10.1
Approach LOS	A	A	B

Delay	9.7		
HCM Level of Service	A		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.92			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1679			1828	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1679			1828	1583
Volume (vph)	0	895	350	270	805	0	220	0	325	150	240	415
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	895	350	270	805	0	220	0	325	150	240	415
Lane Group Flow (vph)	0	895	350	270	805	0	0	545	0	0	390	415
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		29.0	29.0	17.0	50.0			32.0			23.0	23.0
Effective Green, g (s)		30.0	30.0	17.0	51.0			33.0			24.0	24.0
Actuated g/C Ratio		0.25	0.25	0.14	0.42			0.28			0.20	0.20
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		885	396	251	1504			462			366	317
v/s Ratio Prot		c0.25		c0.15	0.23			c0.32			0.21	
v/s Ratio Perm			0.22									0.26
v/c Ratio		1.01	0.88	1.08	0.54			1.18			1.07	1.31
Uniform Delay, d1		45.0	43.3	51.5	25.7			43.5			48.0	48.0
Progression Factor		1.00	1.00	1.11	0.28			1.00			1.00	1.00
Incremental Delay, d2		33.1	23.8	65.1	0.8			101.3			65.5	160.0
Delay (s)		78.1	67.1	122.1	8.0			144.8			113.5	208.0
Level of Service		E	E	F	A			F			F	F
Approach Delay (s)		75.0			36.7			144.8			162.2	
Approach LOS		E			D			F			F	

Intersection Summary

HCM Average Control Delay	93.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	106.1%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/6/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.98			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3463			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3463			1770	1583			
Volume (vph)	395	565	0	0	690	110	520	0	165	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	395	565	0	0	690	110	520	0	165	0	0	0
Lane Group Flow (vph)	395	565	0	0	805	0	0	520	165	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	34.0	72.3			35.3			37.7	37.7			
Effective Green, g (s)	34.0	72.3			35.3			38.7	38.7			
Actuated g/C Ratio	0.28	0.61			0.30			0.32	0.32			
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	497	2162			1038			571	511			
v/s Ratio Prot	c0.22	0.16			c0.23							
v/s Ratio Perm								0.29	0.10			
v/c Ratio	0.81	0.26			0.77			0.91	0.32			
Uniform Delay, d1	40.6	10.6			38.0			39.0	30.7			
Progression Factor	0.83	0.62			1.00			1.00	1.00			
Incremental Delay, d2	7.0	0.0			5.4			15.8	0.3			
Delay (s)	34.8	6.7			43.4			57.8	31.1			
Level of Service	C	A			D			E	C			
Approach Delay (s)		18.3			43.4			51.3			0.0	
Approach LOS		B			D			D			A	

Intersection Summary

HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	D
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps 10/6/2003

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	315	40	450	0	0	0	0	50	0	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	435	315	40	450	0	0	0	0	50	0	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	460			760			1212	1132	592	1132	1290	450
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			95			100	100	100	71	100	87
cM capacity (veh/h)	1101			859			133	194	506	174	156	601

Direction, Location	EB1	WB1	NB1	SB1
Volume Total	750	500	50	80
Volume Left	0	40	50	0
Volume Right	315	0	0	80
cSH	1700	859	174	601
Volume to Capacity	0.44	0.05	0.29	0.13
Queue Length (ft)	0	4	28	11
Control Delay (s)	0.0	1.3	33.9	11.9
Lane LOS		A	D	B
Approach Delay (s)	0.0	1.3	20.4	
Approach LOS			C	

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps 10/6/2003

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)	280	205	0	0	145	85	955	0	80	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	280	205	0	0	145	85	955	0	80	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	290			205			952	895	205	982	952	186
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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 %	79			100			0	100	95	100	100	100
cM capacity (veh/h)	1338			1366			201	194	836	184	205	855

Direction, Location	EB1	WB1	NB1	SB1
Volume Total	485	230	355	30
Volume Left	280	0	355	0
Volume Right	0	85	0	30
cSH	1325	1700	201	855
Volume to Capacity	0.21	0.14	1.77	0.04
Queue Length (ft)	20	0	619	3
Control Delay (s)	5.7	0.0	406.9	9.5
Lane LOS	A		F	A
Approach Delay (s)	5.7	0.0	376.0	
Approach LOS			F	

Intersection Summary			
Average Delay	134.1		
Intersection Capacity Utilization	68.8%	ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd. 10/8/2003

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)	20	235	145	10	85	30	85	30	10	30	40	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	20	235	145	10	85	30	85	30	10	30	40	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	115			380			508	482	308	494	540	100
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			99			80	94	99	93	91	98
cM capacity (veh/h)	1474			1178			426	473	732	449	439	956

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	400	125	125	90
Volume Left	20	10	85	30
Volume Right	145	30	10	20
cSH	1474	1178	452	503
Volume to Capacity	0.01	0.01	0.28	0.18
Queue Length (ft)	1	1	28	16
Control Delay (s)	0.5	0.7	16.0	13.7
Lane LOS	A	A	C	B
Approach Delay (s)	0.5	0.7	16.0	13.7
Approach LOS			C	B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
22: Willow Rd. & Hetrick Ave. 10/6/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	10	225	40	20	100	60	10	40	10	25	10	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	10	225	40	20	100	60	10	40	10	25	10	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	275	180	60	50
Volume Left (vph)	10	20	10	25
Volume Right (vph)	40	60	10	15
Hadj (s)	0.0	0.01	0.0	0.0
Departure Headway (s)	4.3	4.6	4.9	4.9
Degree Utilization, X	0.33	0.23	0.08	0.07
Capacity (veh/h)	811	589	671	684
Control Delay (s)	9.4	9.0	8.3	8.3
Approach Delay (s)	9.4	9.0	8.3	8.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.1		
HCM Level of Service	A		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
43: Willow Rd. & N. Frontage Rd.

10/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	130	0	130	0	0	0	150	60	0	0	30	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	130	0	130	0	0	0	150	60	0	0	30	30

Pedestrian Volumes	EB1	EB2	WB1	WB2	NB1	SB1
Volume Total (vph)	130	130	0	0	210	60
Volume Left (vph)	130	0	0	0	150	0
Volume Right (vph)	0	130	0	0	0	30
Hadj (s)	0.2	-0.6	0.0	0.0	0.2	-0.3
Departure Headway (s)	5.4	4.6	5.3	5.3	4.7	4.5
Degree Utilization, x	0.19	0.16	0.00	0.00	0.28	0.07
Capacity (veh/h)	640	753	500	500	730	754
Control Delay (s)	8.4	7.3	7.1	7.1	9.5	7.8
Approach Delay (s)	7.9		0.0		9.5	7.8
Approach LOS	A		A		A	A

Intersection Summary				
Delay	8.5			
HCM Level of Service	A			
Intersection Capacity Utilization	32.0%	ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.89			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1644			1819	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1644			1819	1583
Volume (vph)	0	1235	75	115	635	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	115	635	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	115	635	0	0	655	0	0	370	220
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		38.0	38.0	8.0	50.0			33.0			22.0	22.0
Effective Green, g (s)		39.0	39.0	8.0	51.0			34.0			23.0	23.0
Actuated g/C Ratio		0.32	0.32	0.07	0.42			0.28			0.19	0.19
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1150	514	118	1504			466			349	303
v/s Ratio Prot		c0.35		c0.06	0.18			c0.40			c0.20	
v/s Ratio Perm			0.05									0.14
v/c Ratio		1.07	0.15	0.97	0.42			1.41			1.06	0.73
Uniform Delay, d1		40.5	28.7	55.9	24.2			43.0			48.5	45.5
Progression Factor		1.00	1.00	0.91	0.52			1.00			1.00	1.00
Incremental Delay, d2		48.8	0.6	37.3	0.2			195.0			65.0	8.4
Delay (s)		89.3	29.3	88.4	12.9			238.0			113.5	53.9
Level of Service		F	C	F	B			F			F	D
Approach Delay (s)		85.8			24.4			238.0			91.3	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM Average Control Delay	103.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	113.4%	ICU Level of Service	G
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps 10/6/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.95			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3361			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3361			1770	1583			
Volume (vph)	780	680	0	0	495	250	380	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	495	250	380	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	745	0	0	380	140	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	56.0	85.0			25.0			25.0	25.0			
Effective Green, g (s)	56.0	86.0			26.0			26.0	26.0			
Actuated g/C Ratio	0.47	0.72			0.22			0.22	0.22			
Clearance Time (s)	4.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	826	2536			728			384	343			
v/s Ratio Prot	c0.44	0.19			c0.22							
v/s Ratio Perm								0.21	0.09			
v/c Ratio	0.94	0.27			1.02			0.99	0.41			
Uniform Delay, d1	30.5	6.0			47.0			46.9	40.4			
Progression Factor	0.79	0.58			1.00			1.00	1.00			
Incremental Delay, d2	2.7	0.0			39.4			42.7	0.8			
Delay (s)	26.9	3.5			86.4			89.5	41.2			
Level of Service	C	A			F			F	D			
Approach Delay (s)		16.0			86.4			76.5			0.0	
Approach LOS		B			F			E			A	

Intersection Summary

HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	E
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps 10/6/2003

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	875	445	50	650	0	0	0	0	120	0	185
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	0	875	445	50	650	0	0	0	0	120	0	185
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	650			820			1352	1968	526	1350	1590	650
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			93			100	100	100	0	100	61
cM capacity (veh/h)	936			809			53	136	503	117	100	469

Direction, Location	EB 1	WB 1	NB 1	SB 1
Volume Total	820	710	120	185
Volume Left	0	50	120	0
Volume Right	445	0	0	185
cSH	1700	809	117	469
Volume to Capacity	0.48	0.07	1.03	0.39
Queue Length (ft)	0	6	172	46
Control Delay (s)	0.0	1.9	160.7	17.6
Lane LOS		A	F	C
Approach Delay (s)	0.0	1.9	73.9	
Approach LOS			F	

Intersection Summary

Average Delay	13.0		
Intersection Capacity Utilization	101.2%	ICU Level of Service	F

HCM Unsignalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/6/2003

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)	100	395	0	0	185	95	825	0	40	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	100	395	0	0	185	95	825	0	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)												
vC, conflicting volume	280				695			825	875	495	868	825	232
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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	100	94	100	100	100
cM capacity (veh/h)	1283				1164			273	265	654	241	283	807

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	495	280	525	40
Volume Left	100	0	525	0
Volume Right	0	95	0	40
cSH	1283	1700	273	554
Volume to Capacity	0.08	0.16	1.92	0.06
Queue Length (ft)	6	0	921	5
Control Delay (s)	2.3	0.0	459.0	10.9
Lane LOS	A		F	B
Approach Delay (s)	2.3	0.0	427.3	
Approach LOS			F	

Intersection Summary			
Average Delay	181.0		
Intersection Capacity Utilization	80.9%	ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
11: Willow Rd. & Pomery Rd.

10/8/2003

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)	20	235	195	10	120	45	140	55	10	40	70	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	20	235	195	10	120	45	140	55	10	40	70	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	165			430			590	558	332	572	682	142
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
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			99			60	87	99	89	82	98
cM capacity (veh/h)	1413			1129			347	428	709	376	388	905

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	450	175	205	130
Volume Left	20	10	140	40
Volume Right	195	45	10	20
cSH	1413	1129	376	421
Volume to Capacity	0.01	0.01	0.55	0.31
Queue Length (ft)	1	1	79	32
Control Delay (s)	0.5	0.5	25.5	17.3
Lane LOS	A	A	D	C
Approach Delay (s)	0.5	0.5	25.5	17.3
Approach LOS			D	C

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	61.0%	ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
22: Willow Rd. & Hetrick Ave. 10/6/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	15	260	10	40	140	50	25	20	10	60	35	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	15	260	10	40	140	50	25	20	10	60	35	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	285	230	55	105
Volume Left (vph)	15	40	25	60
Volume Right (vph)	10	50	10	10
Hadj (s)	0.0	-0.1	0.0	0.1
Departure Headway (s)	4.6	4.9	5.2	5.2
Degree Utilization, x	0.36	0.31	0.08	0.15
Capacity (veh/h)	746	578	621	646
Control Delay (s)	10.2	10.1	8.7	9.2
Approach Delay (s)	10.2	10.1	8.7	9.2
Approach LOS	B	B	A	A

Intersection Summary			
Delay	9.9		
HCM Level of Service	A		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
43: Willow Rd. & N. Frontage Rd. 10/6/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (veh/h)	60	0	270	0	0	0	150	45	0	0	55	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (veh/h)	60	0	270	0	0	0	150	45	0	0	55	80

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	60	270	0	0	195	135
Volume Left (vph)	60	0	0	0	150	0
Volume Right (vph)	0	270	0	0	0	80
Hadj (s)	0.2	-0.5	0.0	0.0	0.2	-0.1
Departure Headway (s)	5.5	4.7	5.3	5.3	5.0	4.6
Degree Utilization, x	0.09	0.35	0.00	0.00	0.27	0.17
Capacity (veh/h)	621	731	490	490	685	735
Control Delay (s)	7.9	9.1	7.1	7.1	9.8	8.5
Approach Delay (s)	8.8		0.0		9.8	8.5
Approach LOS	A		A		A	A

Intersection Summary			
Delay	9.1		
HCM Level of Service	A		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.92			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1679			1826	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.98			0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1679			1826	1583
Volume (vph)	0	1260	350	270	985	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	350	270	985	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	350	270	985	0	0	545	0	0	400	590
Turn Type			Perm	Prot			Split			Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2									4
Actuated Green, G (s)		33.0	33.0	13.0	50.0			28.0			27.0	27.0
Effective Green, g (s)		34.0	34.0	13.0	51.0			29.0			28.0	28.0
Actuated g/C Ratio		0.28	0.28	0.11	0.42			0.24			0.23	0.23
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		1003	449	192	1504			406			426	369
v/s Ratio Prot		c0.36		c0.15	0.28			c0.32			0.22	
v/s Ratio Perm			0.22									0.37
v/c Ratio		1.26	0.78	1.41	0.65			1.34			0.94	1.60
Uniform Delay, d1		43.0	39.6	53.5	27.5			45.5			45.2	46.0
Progression Factor		1.00	1.00	1.06	0.27			1.00			1.00	1.00
Incremental Delay, d2		123.5	12.6	185.7	0.2			169.8			28.4	282.0
Delay (s)		166.5	52.1	242.4	7.5			215.3			73.5	328.0
Level of Service		F	D	F	A			F			E	F
Approach Delay (s)		141.7			58.0			215.3			225.2	
Approach LOS		F			E			F			F	

Intersection Summary

HCM Average Control Delay	145.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.8%	ICU Level of Service	G
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.97			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539			3435			1770	1583			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1770	3539			3435			1770	1583			
Volume (vph)	525	650	0	0	755	185	670	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	755	185	670	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	940	0	0	670	200	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	35.0	69.0			31.0			41.0	41.0			
Effective Green, g (s)	34.0	70.0			32.0			42.0	42.0			
Actuated g/C Ratio	0.28	0.58			0.27			0.35	0.35			
Clearance Time (s)	3.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	502	2064			916			620	554			
v/s Ratio Prot	c0.30	0.18			c0.27							
v/s Ratio Perm								0.38	0.13			
v/c Ratio	1.05	0.31			1.03			1.08	0.36			
Uniform Delay, d1	43.0	12.8			44.0			39.0	29.0			
Progression Factor	0.81	0.46			1.00			1.00	1.00			
Incremental Delay, d2	26.4	0.0			36.6			59.9	0.4			
Delay (s)	61.0	5.9			80.6			98.9	29.4			
Level of Service	E	A			F			F	C			
Approach Delay (s)		30.5			80.6			82.9			0.0	
Approach LOS		C			F			F			A	

Intersection Summary

HCM Average Control Delay	61.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	F
c Critical Lane Group			

APPENDIX B2

INTERSECTION LOS WORKSHEETS:

2030 MITIGATED
TO PROVIDE ACCEPTABLE OPERATIONS

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1757			1855						1777	1583
Flt Permitted		1.00			0.92						0.95	1.00
Satd. Flow (perm)		1757			1719						1777	1583
Volume (vph)	0	435	315	40	460	0	0	0	0	50	2	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	315	40	460	0	0	0	0	50	2	80
Lane Group Flow (vph)	0	750	0	0	500	0	0	0	0	0	52	80
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		44.9			44.9						7.1	7.1
Effective Green, g (s)		44.9			44.9						7.1	7.1
Actuated g/C Ratio		0.75			0.75						0.12	0.12
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1315			1288						210	187
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.29						0.03	0.05
v/c Ratio		0.57			0.39						0.25	0.43
Uniform Delay, d1		3.3			2.7						24.0	24.6
Progression Factor		1.00			0.28						1.00	1.00
Incremental Delay, d2		1.8			0.8						0.6	1.6
Delay (s)		5.1			1.5						24.6	26.1
Level of Service		A			A						C	C
Approach Delay (s)		5.1			1.5			0.0			25.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1810			1770			1775	1583			
Flt Permitted		0.70			1.00			0.95	1.00			
Satd. Flow (perm)		1299			1770			1775	1583			
Volume (vph)	280	205	0	0	145	85	355	4	30	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	205	0	0	145	85	355	4	30	0	0	0
Lane Group Flow (vph)	0	485	0	0	230	0	0	359	30	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		36.5			36.5			15.5	15.5			
Effective Green, g (s)		36.5			36.5			15.5	15.5			
Actuated g/C Ratio		0.61			0.61			0.26	0.26			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		790			1077			459	409			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.37						0.20	0.02			
v/c Ratio		0.61			0.21			0.78	0.07			
Uniform Delay, d1		7.3			5.3			20.7	16.8			
Progression Factor		1.07			1.00			1.00	1.00			
Incremental Delay, d2		3.1			0.5			8.5	0.1			
Delay (s)		11.0			5.7			29.1	16.9			
Level of Service		B			A			C	B			
Approach Delay (s)		11.0			5.7			28.2			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	B

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.87	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1530	1504		1812	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1530	1504		1812	1583
Volume (vph)	0	768	9	81	355	0	29	0	392	66	52	127
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)	0	835	10	88	386	0	32	0	426	72	57	138
Lane Group Flow (vph)	0	835	10	88	386	0	0	235	223	0	129	138
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		39.8	39.8	8.0	51.8			20.2	20.2		13.0	13.0
Effective Green, g (s)		40.8	40.8	8.0	52.8			21.2	21.2		14.0	14.0
Actuated g/C Ratio		0.41	0.41	0.08	0.53			0.21	0.21		0.14	0.14
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1444	645	142	1869			324	319		254	222
v/s Ratio Prot		c0.24		c0.05	0.11			c0.15			0.07	
v/s Ratio Perm			0.01						0.15			0.09
v/c Ratio		0.58	0.02	0.62	0.21			0.73	0.70		0.51	0.62
Uniform Delay, d1		22.9	17.6	44.5	12.5			36.7	36.4		39.8	40.5
Progression Factor		1.00	1.00	0.98	0.58			1.00	1.00		1.00	1.00
Incremental Delay, d2		1.7	0.0	7.1	0.2			7.8	6.6		1.6	5.3
Delay (s)		24.6	17.7	50.6	7.4			44.5	43.0		41.4	45.8
Level of Service		C	B	D	A			D	D		D	D
Approach Delay (s)		24.5			15.4			43.8			43.7	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1584	1504		1826	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1584	1504		1826	1583
Volume (vph)	0	791	106	192	681	0	62	0	252	112	168	371
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)	0	860	115	209	740	0	67	0	274	122	183	403
Lane Group Flow (vph)	0	860	115	209	740	0	0	156	185	0	305	403
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		38.4	38.4	18.0	60.4			20.2	20.2		24.4	24.4
Effective Green, g (s)		39.4	39.4	18.0	61.4			21.2	21.2		25.4	25.4
Actuated g/C Ratio		0.33	0.33	0.15	0.51			0.18	0.18		0.21	0.21
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1162	520	266	1811			280	266		587	335
v/s Ratio Prot		c0.24		c0.12	0.21			0.10			0.17	
v/s Ratio Perm			0.07						0.12			0.25
v/c Ratio		0.74	0.22	0.79	0.41			0.56	0.70		0.79	1.20
Uniform Delay, d1		35.8	29.2	49.1	18.1			45.1	46.4		44.8	47.9
Progression Factor		1.00	1.00	0.65	0.26			1.00	1.00		1.00	1.00
Incremental Delay, d2		4.5	1.0	11.7	0.6			2.4	7.7		10.2	115.3
Delay (s)		40.0	30.2	43.8	5.2			47.5	54.0		54.9	163.6
Level of Service		D	C	D	A			D	D		D	F
Approach Delay (s)		38.9			13.7			51.1			116.8	
Approach LOS		D			B			D			F	

Intersection Summary			
HCM Average Control Delay	50.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1584	1504		1819	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1584	1504		1819	2787
Volume (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	125	685	0	0	292	363	0	370	220
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		43.0	43.0	7.0	54.0			25.0	25.0		26.0	26.0
Effective Green, g (s)		44.0	44.0	7.0	55.0			26.0	26.0		27.0	27.0
Actuated g/C Ratio		0.37	0.37	0.06	0.46			0.22	0.22		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1298	580	200	1622			343	326		409	627
v/s Ratio Prot		c0.35		c0.04	0.19			0.18			c0.20	
v/s Ratio Perm			0.05						0.24			0.08
v/c Ratio		0.95	0.13	0.62	0.42			0.85	1.11		0.90	0.35
Uniform Delay, d1		37.0	25.3	55.2	21.8			45.1	47.0		45.2	39.1
Progression Factor		1.00	1.00	1.10	0.36			1.00	1.00		1.00	1.00
Incremental Delay, d2		15.8	0.5	4.5	0.6			18.0	84.0		22.9	0.3
Delay (s)		52.7	25.7	65.2	8.4			63.1	131.0		68.1	39.5
Level of Service		D	C	E	A			E	F		E	D
Approach Delay (s)		51.2			17.1			100.8			57.4	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	53.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	455	250	0	350	140	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	61.0	84.0			20.0	20.0		26.0	26.0			
Effective Green, g (s)	60.0	85.0			21.0	21.0		27.0	27.0			
Actuated g/C Ratio	0.50	0.71			0.18	0.18		0.22	0.22			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	885	2507			619	277		398	356			
v/s Ratio Prot	c0.44	0.19			0.13							
v/s Ratio Perm						0.16		0.20	0.09			
v/c Ratio	0.88	0.27			0.74	0.90		0.88	0.39			
Uniform Delay, d1	26.8	6.3			46.9	48.5		44.9	39.5			
Progression Factor	0.90	0.50			1.00	1.00		1.00	1.00			
Incremental Delay, d2	7.8	0.2			7.6	33.9		19.3	0.7			
Delay (s)	32.0	3.4			54.5	82.4		64.2	40.3			
Level of Service	C	A			D	F		E	D			
Approach Delay (s)		18.6			64.4			57.4			0.0	
Approach LOS		B			E			E			A	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.93			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1726			1855						1775	1583
Flt Permitted		1.00			0.90						0.95	1.00
Satd. Flow (perm)		1726			1672						1775	1583
Volume (vph)	0	375	445	60	650	0	0	0	0	120	2	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	375	445	60	650	0	0	0	0	120	2	185
Lane Group Flow (vph)	0	820	0	0	710	0	0	0	0	0	122	185
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		42.9			42.9						9.1	9.1
Effective Green, g (s)		42.9			42.9						9.1	9.1
Actuated g/C Ratio		0.71			0.71						0.15	0.15
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1234			1195						269	240
v/s Ratio Prot		c0.48										
v/s Ratio Perm					0.42						0.07	0.12
v/c Ratio		0.66			0.59						0.45	0.77
Uniform Delay, d1		4.6			4.2						26.2	24.4
Progression Factor		1.00			0.75						1.00	1.00
Incremental Delay, d2		2.8			1.7						1.2	14.2
Delay (s)		7.5			4.9						24.4	38.6
Level of Service		A			A						C	D
Approach Delay (s)		7.5			4.9			0.0			33.0	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.3%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			0.95	1.00			
Satd. Flow (prot)		1844			1777			1775	1583			
Flt Permitted		0.88			1.00			0.95	1.00			
Satd. Flow (perm)		1639			1777			1775	1583			
Volume (vph)	100	395	0	0	185	95	525	4	40	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	395	0	0	185	95	525	4	40	0	0	0
Lane Group Flow (vph)	0	495	0	0	280	0	0	529	40	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		31.0			31.0			21.0	21.0			
Effective Green, g (s)		31.0			31.0			21.0	21.0			
Actuated g/C Ratio		0.52			0.52			0.35	0.35			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		847			918			621	554			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.30						0.30	0.03			
v/c Ratio		0.58			0.31			0.85	0.07			
Uniform Delay, d1		10.0			8.3			18.1	13.0			
Progression Factor		0.89			1.00			1.00	1.00			
Incremental Delay, d2		2.5			0.9			10.9	0.1			
Delay (s)		11.4			9.2			28.9	13.1			
Level of Service		B			A			C	B			
Approach Delay (s)		11.4			9.2			27.8			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1670	1504		1826	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.96	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1670	1504		1826	2787
Volume (vph)	0	1260	225	280	1025	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	225	280	1025	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	225	280	1025	0	0	241	304	0	400	590
Turn Type			Perm	Prot			custom		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2				8		8			4
Actuated Green, G (s)		41.8	41.8	10.0	55.8			23.2	23.2		26.0	26.0
Effective Green, g (s)		42.8	42.8	10.0	56.8			24.2	24.2		27.0	27.0
Actuated g/C Ratio		0.36	0.36	0.08	0.47			0.20	0.20		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1262	565	286	1675			337	303		411	627
v/s Ratio Prot		c0.36		c0.08	0.29			0.14			c0.22	
v/s Ratio Perm			0.14						0.20			0.21
v/c Ratio		1.00	0.40	0.98	0.61			0.72	1.00		0.97	0.94
Uniform Delay, d1		38.6	26.9	54.9	23.4			44.7	47.9		46.1	45.7
Progression Factor		1.00	1.00	0.88	0.45			1.00	1.00		1.00	1.00
Incremental Delay, d2		25.0	2.1	31.3	0.8			7.0	52.5		37.1	22.4
Delay (s)		63.5	31.0	79.8	11.3			51.7	100.4		83.3	68.1
Level of Service		E	C	E	B			D	F		F	E
Approach Delay (s)		58.6			26.0			78.9			74.3	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM Average Control Delay	54.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	725	185	0	640	200	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	37.4	66.5			26.1	26.1		43.5	43.5			
Effective Green, g (s)	38.4	67.5			27.1	27.1		44.5	44.5			
Actuated g/C Ratio	0.30	0.56			0.23	0.23		0.37	0.37			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	537	1991			799	357		656	587			
v/s Ratio Prot	c0.30	0.18			c0.20							
v/s Ratio Perm						0.12		0.36	0.13			
v/c Ratio	0.98	0.33			0.91	0.52		0.98	0.34			
Uniform Delay, d1	41.4	14.1			45.2	40.7		37.2	27.2			
Progression Factor	1.67	0.97			1.00	1.00		1.00	1.00			
Incremental Delay, d2	28.8	0.3			16.0	5.3		26.8	0.3			
Delay (s)	94.9	13.9			61.2	46.0		66.0	27.5			
Level of Service	F	B			E	D		E	C			
Approach Delay (s)		50.1			58.1			56.9			0.0	
Approach LOS		D			E			E			A	

Intersection Summary			
HCM Average Control Delay	54.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1757			1855						1770	1583
Flt Permitted		1.00			0.92						0.95	1.00
Satd. Flow (perm)		1757			1719						1770	1583
Volume (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Lane Group Flow (vph)	0	750	0	0	500	0	0	0	0	0	50	80
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		44.9			44.9						7.1	7.1
Effective Green, g (s)		44.9			44.9						7.1	7.1
Actuated g/C Ratio		0.75			0.75						0.12	0.12
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1315			1286						209	187
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.29						0.03	0.05
v/c Ratio		0.57			0.39						0.24	0.43
Uniform Delay, d1		3.3			2.7						24.0	24.6
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		1.8			0.9						0.6	1.6
Delay (s)		5.1			3.6						24.6	26.1
Level of Service		A			A						C	C
Approach Delay (s)		5.1			3.6			0.0			25.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1810			1770			1770	1583			
Flt Permitted		0.70			1.00			0.95	1.00			
Satd. Flow (perm)		1299			1770			1770	1583			
Volume (vph)	280	205	0	0	145	85	355	0	30	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	205	0	0	145	85	355	0	30	0	0	0
Lane Group Flow (vph)	0	485	0	0	230	0	0	355	30	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		36.5			36.5			15.5	15.5			
Effective Green, g (s)		36.5			36.5			15.5	15.5			
Actuated g/C Ratio		0.61			0.61			0.26	0.26			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		790			1077			457	409			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.37						0.20	0.02			
v/c Ratio		0.61			0.21			0.78	0.07			
Uniform Delay, d1		7.3			5.3			20.6	16.8			
Progression Factor		0.81			1.00			1.00	1.00			
Incremental Delay, d2		3.1			0.5			8.1	0.1			
Delay (s)		9.0			5.7			28.7	16.9			
Level of Service		A			A			C	B			
Approach Delay (s)		9.0			5.7			27.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1581	1504		1819	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1581	1504		1819	2787
Volume (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	125	685	0	0	305	350	0	370	220
Turn Type			Perm	Prot			Split		Prot	Split		Perm
Protected Phases		2		1	6		8	6	8	4	4	
Permitted Phases			2									4
Actuated Green, G (s)		44.8	44.8	7.0	55.8			23.9	23.9		25.3	25.3
Effective Green, g (s)		45.8	45.8	7.0	56.8			24.9	24.9		26.3	26.3
Actuated g/C Ratio		0.38	0.38	0.06	0.47			0.21	0.21		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1351	604	200	1675			328	312		399	611
v/s Ratio Prot		c0.35		c0.04	0.19			0.19	c0.23		c0.20	
v/s Ratio Perm			0.05									0.08
v/c Ratio		0.91	0.12	0.62	0.41			0.93	1.12		0.93	0.36
Uniform Delay, d1		35.2	24.1	55.2	20.6			46.7	47.6		45.9	39.7
Progression Factor		1.00	1.00	1.06	0.48			1.00	1.00		1.00	1.00
Incremental Delay, d2		11.0	0.4	4.5	0.6			31.7	87.9		27.3	0.4
Delay (s)		46.3	24.5	63.1	10.5			78.4	135.5		73.3	40.1
Level of Service		D	C	E	B			E	F		E	D
Approach Delay (s)		45.0			18.6			108.9			60.9	
Approach LOS		D			B			F			E	

Intersection Summary

HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	455	250	0	350	140	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	61.0	84.0			20.0	20.0		26.0	26.0			
Effective Green, g (s)	60.0	85.0			21.0	21.0		27.0	27.0			
Actuated g/C Ratio	0.50	0.71			0.18	0.18		0.22	0.22			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	885	2507			619	277		398	356			
v/s Ratio Prot	c0.44	0.19			0.13							
v/s Ratio Perm						0.16		0.20	0.09			
v/c Ratio	0.88	0.27			0.74	0.90		0.88	0.39			
Uniform Delay, d1	26.6	6.3			46.9	48.5		44.9	39.5			
Progression Factor	0.85	0.39			1.00	1.00		1.00	1.00			
Incremental Delay, d2	8.6	0.2			7.6	38.9		19.3	0.7			
Delay (s)	31.4	2.7			54.5	82.4		64.2	40.3			
Level of Service	C	A			D	F		E	D			
Approach Delay (s)		18.0			64.4			57.4			0.0	
Approach LOS		B			E			E			A	

Intersection Summary

HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps 10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.93			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1726			1855						1770	1583
Flt Permitted		1.00			0.90						0.95	1.00
Satd. Flow (perm)		1726			1672						1770	1583
Volume (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Lane Group Flow (vph)	0	820	0	0	710	0	0	0	0	0	120	185
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		42.9			42.9						9.1	9.1
Effective Green, g (s)		42.9			42.9						9.1	9.1
Actuated g/C Ratio		0.71			0.71						0.15	0.15
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1234			1195						268	240
v/s Ratio Prot		c0.48										
v/s Ratio Perm					0.42						0.07	0.12
v/c Ratio		0.66			0.59						0.45	0.77
Uniform Delay, d1		4.6			4.2						23.2	24.4
Progression Factor		1.00			2.33						1.00	1.00
Incremental Delay, d2		2.8			1.7						1.2	14.2
Delay (s)		7.5			11.6						24.4	38.6
Level of Service		A			B						C	D
Approach Delay (s)		7.5			11.6			0.0			33.0	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps 10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			0.95	1.00			
Satd. Flow (prot)		1644			1777			1770	1583			
Flt Permitted		0.88			1.00			0.95	1.00			
Satd. Flow (perm)		1639			1777			1770	1583			
Volume (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Lane Group Flow (vph)	0	495	0	0	280	0	0	525	40	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		31.1			31.1			20.9	20.9			
Effective Green, g (s)		31.1			31.1			20.9	20.9			
Actuated g/C Ratio		0.52			0.52			0.35	0.35			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		850			921			617	551			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.30						0.30	0.03			
v/c Ratio		0.58			0.30			0.85	0.07			
Uniform Delay, d1		10.0			8.3			18.1	13.1			
Progression Factor		0.93			1.00			1.00	1.00			
Incremental Delay, d2		2.5			0.9			10.9	0.1			
Delay (s)		11.8			9.1			29.0	13.1			
Level of Service		B			A			C	B			
Approach Delay (s)		11.8			9.1			27.9			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1679	1504		1826	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1679	1504		1826	2787
Volume (vph)	0	1260	350	280	1025	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	350	280	1025	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	350	280	1025	0	0	228	317	0	400	590
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		43.1	43.1	10.0	57.1			20.9	20.9		27.0	27.0
Effective Green, g (s)		44.1	44.1	10.0	58.1			21.9	21.9		28.0	28.0
Actuated g/C Ratio		0.37	0.37	0.08	0.48			0.18	0.18		0.23	0.23
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1301	582	286	1713			306	274		426	650
v/s Ratio Prot		c0.36		c0.08	0.29			0.14			c0.22	
v/s Ratio Perm			0.22						0.21			0.21
v/c Ratio		0.97	0.60	0.98	0.60			0.75	1.16		0.94	0.91
Uniform Delay, d1		37.3	30.8	54.9	22.5			46.4	49.0		45.2	44.7
Progression Factor		1.00	1.00	1.13	0.22			1.00	1.00		1.00	1.00
Incremental Delay, d2		18.5	4.6	30.5	0.7			9.5	103.6		28.4	16.4
Delay (s)		55.7	35.4	92.5	5.6			55.9	152.7		73.5	61.1
Level of Service		E	D	F	A			E	F		E	E
Approach Delay (s)		51.3			24.2			112.2			66.2	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM Average Control Delay	54.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/10/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	725	185	0	640	200	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	37.0	67.0			27.0	27.0		43.0	43.0			
Effective Green, g (s)	38.0	68.0			28.0	28.0		44.0	44.0			
Actuated g/C Ratio	0.30	0.57			0.23	0.23		0.37	0.37			
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	531	2005			826	369		649	580			
v/s Ratio Prot	c0.30	0.18			c0.20							
v/s Ratio Perm						0.12		0.36	0.13			
v/c Ratio	0.99	0.32			0.88	0.50		0.99	0.34			
Uniform Delay, d1	41.8	13.8			44.3	39.9		37.7	27.6			
Progression Factor	0.79	0.29			1.00	1.00		1.00	1.00			
Incremental Delay, d2	23.3	0.2			12.7	4.8		31.5	0.4			
Delay (s)	56.3	4.2			57.1	44.7		69.2	27.9			
Level of Service	E	A			E	D		E	C			
Approach Delay (s)		27.5			54.6			59.4			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM Average Control Delay	45.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1812			1762			1770	1583			
Flt Permitted		0.73			1.00			0.95	1.00			
Satd. Flow (perm)		1366			1762			1770	1583			
Volume (vph)	150	120	0	0	105	70	310	0	20	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	150	120	0	0	105	70	310	0	20	0	0	0
Lane Group Flow (vph)	0	270	0	0	175	0	0	310	20	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		10.2			10.2			15.5	15.5			
Effective Green, g (s)		10.2			10.2			15.5	15.5			
Actuated g/C Ratio		0.30			0.30			0.46	0.46			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		413			533			814	728			
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.20						0.18	0.01			
v/c Ratio		0.65			0.33			0.38	0.03			
Uniform Delay, d1		10.2			9.1			6.0	5.0			
Progression Factor		1.00			1.00			1.00	1.00			
Incremental Delay, d2		3.7			0.4			0.3	0.0			
Delay (s)		13.9			9.5			6.3	5.0			
Level of Service		B			A			A	A			
Approach Delay (s)		13.9			9.5			6.2			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.92	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1587	1504		1821	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1587	1504		1821	2787
Volume (vph)	0	895	75	115	480	0	125	0	530	160	190	150
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	895	75	115	480	0	125	0	530	160	190	150
Lane Group Flow (vph)	0	895	75	115	480	0	0	282	373	0	350	150
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		40.4	40.4	10.9	55.3			24.5	24.5		25.2	25.2
Effective Green, g (s)		41.4	41.4	10.9	56.3			25.5	25.5		26.2	26.2
Actuated g/C Ratio		0.34	0.34	0.09	0.47			0.21	0.21		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1221	546	161	1660			337	320		398	608
v/s Ratio Prot		c0.25		c0.06	0.14			0.18			c0.19	
v/s Ratio Perm			0.05						0.25			0.05
v/c Ratio		0.73	0.14	0.71	0.29			0.84	1.17		0.88	0.25
Uniform Delay, d1		34.5	27.0	53.0	19.6			45.3	47.2		45.4	38.7
Progression Factor		1.00	1.00	0.73	0.56			1.00	1.00		1.00	1.00
Incremental Delay, d2		3.9	0.5	10.8	0.3			16.3	103.1		19.3	0.2
Delay (s)		38.4	27.5	49.6	11.3			61.6	150.4		64.6	39.0
Level of Service		D	C	D	B			E	F		E	D
Approach Delay (s)		37.5			18.7			112.1			56.9	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	54.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		1.00			1.00			0.95	1.00			
Satd. Flow (prot)		1855			1769			1770	1583			
Flt Permitted		0.96			1.00			0.95	1.00			
Satd. Flow (perm)		1792			1769			1770	1583			
Volume (vph)	30	325	0	0	135	80	465	0	25	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	325	0	0	135	80	465	0	25	0	0	0
Lane Group Flow (vph)	0	355	0	0	215	0	0	465	25	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		12.6			12.6			16.5	16.5			
Effective Green, g (s)		12.6			12.6			16.5	16.5			
Actuated g/C Ratio		0.34			0.34			0.44	0.44			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		609			601			787	704			
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.20						0.26	0.02			
v/c Ratio		0.58			0.36			0.59	0.04			
Uniform Delay, d1		10.1			9.2			7.8	5.8			
Progression Factor		1.00			1.00			1.00	1.00			
Incremental Delay, d2		1.4			0.4			1.2	0.0			
Delay (s)		11.5			9.6			9.0	5.8			
Level of Service		B			A			A	A			
Approach Delay (s)		11.5			9.6			8.8			0.0	
Approach LOS		B			A			A			A	

Intersection Summary

HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	B

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1681	1504		1828	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1681	1504		1828	2787
Volume (vph)	0	895	350	270	805	0	220	0	325	150	240	415
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	895	350	270	805	0	220	0	325	150	240	415
Lane Group Flow (vph)	0	895	350	270	805	0	0	220	325	0	390	415
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		35.3	35.3	19.0	58.3			20.7	20.7		26.0	26.0
Effective Green, g (s)		36.3	36.3	19.0	59.3			21.7	21.7		27.0	27.0
Actuated g/C Ratio		0.30	0.30	0.16	0.49			0.18	0.18		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1071	479	280	1749			304	272		411	627
v/s Ratio Prot		c0.25		c0.15	0.23			0.13			c0.21	
v/s Ratio Perm			0.22						0.22			0.15
v/c Ratio		0.84	0.73	0.96	0.46			0.72	1.19		0.95	0.66
Uniform Delay, d1		39.1	37.5	50.2	19.9			46.3	49.1		45.8	42.3
Progression Factor		1.00	1.00	1.14	0.20			1.00	1.00		1.00	1.00
Incremental Delay, d2		7.7	9.5	31.8	0.5			8.3	117.9		31.2	2.6
Delay (s)		46.8	46.9	88.9	4.5			54.6	167.0		77.0	45.0
Level of Service		D	D	F	A			D	F		E	D
Approach Delay (s)		46.8			25.7			121.6			60.5	
Approach LOS		D			C			F			E	

Intersection Summary

HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	E

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1757			1855						1770	1583
Flt Permitted		1.00			0.92						0.95	1.00
Satd. Flow (perm)		1757			1719						1770	1583
Volume (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Lane Group Flow (vph)	0	750	0	0	500	0	0	0	0	0	50	80
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		44.9			44.9						7.1	7.1
Effective Green, g (s)		44.9			44.9						7.1	7.1
Actuated g/C Ratio		0.75			0.75						0.12	0.12
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1315			1286						209	187
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.29						0.03	0.05
v/c Ratio		0.57			0.39						0.24	0.43
Uniform Delay, d1		3.3			2.7						24.0	24.6
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		1.8			0.9						0.6	1.6
Delay (s)		5.1			3.6						24.6	26.1
Level of Service		A			A						C	C
Approach Delay (s)		5.1			3.6			0.0			25.5	
Approach LOS		A			A			A			C	

Intersection Summary

HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1810			1770			1770	1583			
Flt Permitted		0.70			1.00			0.95	1.00			
Satd. Flow (perm)		1299			1770			1770	1583			
Volume (vph)	280	205	0	0	145	65	355	0	30	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	205	0	0	145	65	355	0	30	0	0	0
Lane Group Flow (vph)	0	485	0	0	230	0	0	355	30	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		36.5			36.5			15.5	15.5			
Effective Green, g (s)		36.5			36.5			15.5	15.5			
Actuated g/C Ratio		0.61			0.61			0.26	0.26			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		790			1077			457	409			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.37						0.20	0.02			
v/c Ratio		0.61			0.21			0.78	0.07			
Uniform Delay, d1		7.3			5.3			20.6	16.8			
Progression Factor		0.81			1.00			1.00	1.00			
Incremental Delay, d2		3.1			0.5			8.1	0.1			
Delay (s)		9.0			5.7			28.7	16.9			
Level of Service		A			A			C	B			
Approach Delay (s)		9.0			5.7			27.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	B

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1579	1504		1819	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1579	1504		1819	2787
Volume (vph)	0	1235	75	115	635	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	115	635	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	115	635	0	0	311	344	0	370	220
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		45.8	45.8	7.8	57.6			25.4	25.4		22.0	22.0
Effective Green, g (s)		46.8	46.8	7.8	58.6			26.4	26.4		23.0	23.0
Actuated g/C Ratio		0.39	0.39	0.06	0.49			0.22	0.22		0.19	0.19
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1380	617	223	1728			347	331		349	534
v/s Ratio Prot		c0.35		c0.03	0.18			0.20			c0.20	
v/s Ratio Perm			0.05						0.23			0.08
v/c Ratio		0.89	0.12	0.52	0.37			0.90	1.04		1.06	0.41
Uniform Delay, d1		34.3	23.4	54.3	19.1			45.5	46.8		45.5	42.6
Progression Factor		1.00	1.00	1.01	0.43			1.00	1.00		1.00	1.00
Incremental Delay, d2		9.6	0.4	0.6	0.2			24.3	60.0		65.0	0.5
Delay (s)		43.6	23.8	55.3	8.4			69.8	106.8		113.5	43.1
Level of Service		D	C	E	A			E	F		F	D
Approach Delay (s)		42.5			15.6			89.2			87.2	
Approach LOS		D			B			F			F	

Intersection Summary			
HCM Average Control Delay	53.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps 10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	780	680	0	0	495	250	380	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	495	250	380	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	495	250	0	380	140	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	56.0	85.0			25.0	25.0		25.0	25.0			
Effective Green, g (s)	56.0	86.0			26.0	26.0		26.0	26.0			
Actuated g/C Ratio	0.47	0.72			0.22	0.22		0.22	0.22			
Clearance Time (s)	4.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	826	2536			767	343		384	343			
v/s Ratio Prot	c0.44	0.19			0.14							
v/s Ratio Perm						0.16		0.21	0.09			
v/c Ratio	0.94	0.27			0.65	0.73		0.99	0.41			
Uniform Delay, d1	30.5	6.0			42.8	43.7		46.9	40.4			
Progression Factor	0.84	0.60			1.00	1.00		1.00	1.00			
Incremental Delay, d2	12.0	0.1			4.2	12.8		42.7	0.8			
Delay (s)	37.7	3.7			47.0	56.5		89.5	41.2			
Level of Service	D	A			D	E		F	D			
Approach Delay (s)		21.9			50.2			76.5			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.93			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1726			1855						1770	1583
Flt Permitted		1.00			0.90						0.95	1.00
Satd. Flow (perm)		1726			1672						1770	1583
Volume (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Lane Group Flow (vph)	0	820	0	0	710	0	0	0	0	0	120	185
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		42.9			42.9						9.1	9.1
Effective Green, g (s)		42.9			42.9						9.1	9.1
Actuated g/C Ratio		0.71			0.71						0.15	0.15
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1234			1195						268	240
v/s Ratio Prot		c0.48										
v/s Ratio Perm					0.42						0.07	0.12
v/c Ratio		0.66			0.59						0.45	0.77
Uniform Delay, d1		4.6			4.2						23.2	24.4
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.8			2.2						1.2	14.2
Delay (s)		7.5			6.4						24.4	38.6
Level of Service		A			A						C	D
Approach Delay (s)		7.5			6.4			0.0			33.0	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			0.95	1.00			
Satd. Flow (prot)		1844			1777			1770	1583			
Flt Permitted		0.88			1.00			0.95	1.00			
Satd. Flow (perm)		1639			1777			1770	1583			
Volume (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Lane Group Flow (vph)	0	495	0	0	280	0	0	525	40	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		31.1			31.1			20.9	20.9			
Effective Green, g (s)		31.1			31.1			20.9	20.9			
Actuated g/C Ratio		0.52			0.52			0.35	0.35			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		850			921			617	551			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.30						0.30	0.03			
v/c Ratio		0.58			0.30			0.85	0.07			
Uniform Delay, d1		10.0			8.3			18.1	13.1			
Progression Factor		0.95			1.00			1.00	1.00			
Incremental Delay, d2		2.5			0.9			10.9	0.1			
Delay (s)		12.0			9.1			29.0	13.1			
Level of Service		B			A			C	B			
Approach Delay (s)		12.0			9.1			27.9			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1680	1504		1826	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1680	1504		1826	2787
Volume (vph)	0	1260	350	270	985	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	350	270	985	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	350	270	985	0	0	227	318	0	400	590
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		42.1	42.1	11.0	57.1			20.9	20.9		27.0	27.0
Effective Green, g (s)		43.1	43.1	11.0	58.1			21.9	21.9		28.0	28.0
Actuated g/C Ratio		0.36	0.36	0.09	0.48			0.18	0.18		0.23	0.23
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1271	569	315	1713			307	274		426	650
v/s Ratio Prot		c0.36		c0.08	0.28			0.14			c0.22	
v/s Ratio Perm			0.22						0.21			0.21
v/c Ratio		0.99	0.62	0.86	0.58			0.74	1.16		0.94	0.91
Uniform Delay, d1		38.3	31.6	53.7	22.1			45.4	49.0		45.2	44.7
Progression Factor		1.00	1.00	1.10	0.20			1.00	1.00		1.00	1.00
Incremental Delay, d2		23.3	4.9	2.3	0.1			9.0	105.0		28.4	16.4
Delay (s)		61.5	36.5	61.2	4.6			55.3	154.0		73.5	61.1
Level of Service		E	D	E	A			E	F		E	E
Approach Delay (s)		56.1			16.8			112.9			66.2	
Approach LOS		E			B			F			E	

Intersection Summary			
HCM Average Control Delay	54.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	525	650	0	0	755	185	670	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	755	185	670	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	755	185	0	670	200	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	37.0	65.0			25.0	25.0		45.0	45.0			
Effective Green, g (s)	36.0	66.0			26.0	26.0		46.0	46.0			
Actuated g/C Ratio	0.30	0.55			0.22	0.22		0.38	0.38			
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	531	1946			767	343		679	607			
v/s Ratio Prot	c0.30	0.18			c0.21							
v/s Ratio Perm						0.12		0.38	0.13			
v/c Ratio	0.99	0.33			0.98	0.54		0.99	0.33			
Uniform Delay, d1	41.8	14.9			46.8	41.7		36.7	26.1			
Progression Factor	0.78	0.30			1.00	1.00		1.00	1.00			
Incremental Delay, d2	22.5	0.2			28.9	6.0		30.9	0.3			
Delay (s)	54.9	4.6			75.7	47.7		67.6	26.4			
Level of Service	D	A			E	D		E	C			
Approach Delay (s)		27.1			70.2			58.1			0.0	
Approach LOS		C			E			E			A	

Intersection Summary			
HCM Average Control Delay	49.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	E
c Critical Lane Group			

APPENDIX B2

INTERSECTION LOS WORKSHEETS:

2030 MITIGATED
TO PROVIDE ACCEPTABLE OPERATIONS

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1757			1855						1777	1583
Flt Permitted		1.00			0.92						0.95	1.00
Satd. Flow (perm)		1757			1719						1777	1583
Volume (vph)	0	435	315	40	460	0	0	0	0	50	2	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	315	40	460	0	0	0	0	50	2	80
Lane Group Flow (vph)	0	750	0	0	500	0	0	0	0	0	52	80
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		44.9			44.9						7.1	7.1
Effective Green, g (s)		44.9			44.9						7.1	7.1
Actuated g/C Ratio		0.75			0.75						0.12	0.12
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1315			1286						210	187
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.29						0.03	0.05
v/c Ratio		0.57			0.39						0.25	0.43
Uniform Delay, d1		3.3			2.7						24.0	24.6
Progression Factor		1.00			0.28						1.00	1.00
Incremental Delay, d2		1.8			0.8						0.6	1.6
Delay (s)		5.1			1.5						24.6	26.1
Level of Service		A			A						C	C
Approach Delay (s)		5.1			1.5			0.0			25.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1810			1770			1775	1583			
Flt Permitted		0.70			1.00			0.95	1.00			
Satd. Flow (perm)		1299			1770			1775	1583			
Volume (vph)	280	205	0	0	145	85	355	4	30	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	205	0	0	145	85	355	4	30	0	0	0
Lane Group Flow (vph)	0	485	0	0	230	0	0	359	30	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		36.5			36.5			15.5	15.5			
Effective Green, g (s)		36.5			36.5			15.5	15.5			
Actuated g/C Ratio		0.61			0.61			0.26	0.26			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		790			1077			459	409			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.37						0.20	0.02			
v/c Ratio		0.61			0.21			0.78	0.07			
Uniform Delay, d1		7.3			5.3			20.7	16.8			
Progression Factor		1.07			1.00			1.00	1.00			
Incremental Delay, d2		3.1			0.5			8.5	0.1			
Delay (s)		11.0			5.7			29.1	16.9			
Level of Service		B			A			C	B			
Approach Delay (s)		11.0			5.7			28.2			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

Movement	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑			✥	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.87	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1530	1504		1812	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1530	1504		1812	1583
Volume (vph)	0	768	9	81	355	0	29	0	392	66	52	127
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)	0	835	10	88	386	0	32	0	426	72	57	138
Lane Group Flow (vph)	0	835	10	88	386	0	0	235	223	0	129	138
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		39.8	39.8	8.0	51.8			20.2	20.2		13.0	13.0
Effective Green, g (s)		40.8	40.8	8.0	52.8			21.2	21.2		14.0	14.0
Actuated g/C Ratio		0.41	0.41	0.08	0.53			0.21	0.21		0.14	0.14
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1444	646	142	1869			324	319		254	222
v/s Ratio Prot		c0.24		c0.05	0.11			c0.15			0.07	
v/s Ratio Perm			0.01						0.15			0.09
v/c Ratio		0.58	0.02	0.62	0.21			0.73	0.70		0.51	0.62
Uniform Delay, d1		22.9	17.6	44.5	12.5			36.7	36.4		39.8	40.5
Progression Factor		1.00	1.00	0.98	0.58			1.00	1.00		1.00	1.00
Incremental Delay, d2		1.7	0.0	7.1	0.2			7.8	6.6		1.6	5.3
Delay (s)		24.6	17.7	50.6	7.4			44.5	43.0		41.4	45.8
Level of Service		C	B	D	A			D	D		D	D
Approach Delay (s)		24.5			15.4			43.8			43.7	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

Movement	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑			✥	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	1.00
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1584	1504		1826	1583
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1584	1504		1826	1583
Volume (vph)	0	791	106	192	681	0	62	0	252	112	168	371
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)	0	860	115	209	740	0	67	0	274	122	183	403
Lane Group Flow (vph)	0	860	115	209	740	0	0	156	185	0	305	403
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		38.4	38.4	18.0	60.4			20.2	20.2		24.4	24.4
Effective Green, g (s)		39.4	39.4	18.0	61.4			21.2	21.2		25.4	25.4
Actuated g/C Ratio		0.33	0.33	0.15	0.51			0.18	0.18		0.21	0.21
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1188	520	266	1811			280	266		387	335
v/s Ratio Prot		c0.24		c0.12	0.21			0.10			0.17	
v/s Ratio Perm			0.07						0.12			0.25
v/c Ratio		0.74	0.22	0.79	0.41			0.56	0.70		0.79	1.20
Uniform Delay, d1		35.8	29.2	49.1	18.1			45.1	46.4		44.8	47.8
Progression Factor		1.00	1.00	0.65	0.26			1.00	1.00		1.00	1.00
Incremental Delay, d2		4.3	1.0	11.7	0.6			2.4	7.7		10.2	116.3
Delay (s)		40.0	30.2	43.8	5.2			47.5	54.0		54.9	163.6
Level of Service		D	C	D	A			D	D		D	F
Approach Delay (s)		38.9			13.7			51.1			116.8	
Approach LOS		D			B			D			F	

Intersection Summary			
HCM Average Control Delay	50.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1584	1504		1819	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1584	1504		1819	2787
Volume (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	125	685	0	0	292	363	0	370	220
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		43.0	43.0	7.0	54.0			25.0	25.0		26.0	26.0
Effective Green, g (s)		44.0	44.0	7.0	55.0			26.0	26.0		27.0	27.0
Actuated g/C Ratio		0.37	0.37	0.06	0.46			0.22	0.22		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1298	580	200	1622			343	326		409	627
v/s Ratio Prot		c0.35		c0.04	0.19			0.18			c0.20	
v/s Ratio Perm			0.05						0.24			0.08
v/c Ratio		0.95	0.13	0.62	0.42			0.85	1.11		0.90	0.35
Uniform Delay, d1		37.0	25.3	55.2	21.8			45.1	47.0		45.2	39.1
Progression Factor		1.00	1.00	1.10	0.36			1.00	1.00		1.00	1.00
Incremental Delay, d2		15.8	0.5	4.5	0.6			18.0	84.0		22.9	0.3
Delay (s)		52.7	25.7	65.2	8.4			63.1	131.0		68.1	39.5
Level of Service		D	C	E	A			E	F		E	D
Approach Delay (s)		51.2			17.1			100.8			57.4	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	53.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	455	250	0	350	140	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	61.0	84.0			20.0	20.0		26.0	26.0			
Effective Green, g (s)	60.0	85.0			21.0	21.0		27.0	27.0			
Actuated g/C Ratio	0.50	0.71			0.18	0.18		0.22	0.22			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	885	2507			619	277		398	356			
v/s Ratio Prot	c0.44	0.19			0.13							
v/s Ratio Perm						0.16		0.20	0.09			
v/c Ratio	0.88	0.27			0.74	0.90		0.88	0.39			
Uniform Delay, d1	26.8	6.3			46.9	48.5		44.9	39.5			
Progression Factor	0.90	0.50			1.00	1.00		1.00	1.00			
Incremental Delay, d2	7.8	0.2			7.6	33.9		19.3	0.7			
Delay (s)	32.0	3.4			54.5	82.4		64.2	40.3			
Level of Service	C	A			D	F		E	D			
Approach Delay (s)		18.6			64.4			57.4			0.0	
Approach LOS		B			E			E			A	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.93			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1726			1855						1775	1583
Flt Permitted		1.00			0.90						0.95	1.00
Satd. Flow (perm)		1726			1672						1775	1583
Volume (vph)	0	375	445	60	650	0	0	0	0	120	2	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	375	445	60	650	0	0	0	0	120	2	185
Lane Group Flow (vph)	0	820	0	0	710	0	0	0	0	0	122	185
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		42.9			42.9						9.1	9.1
Effective Green, g (s)		42.9			42.9						9.1	9.1
Actuated g/C Ratio		0.71			0.71						0.15	0.15
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1234			1195						269	240
v/s Ratio Prot		c0.48										
v/s Ratio Perm					0.42						0.07	0.12
v/c Ratio		0.66			0.59						0.45	0.77
Uniform Delay, d1		4.6			4.2						25.2	24.4
Progression Factor		1.00			0.75						1.00	1.00
Incremental Delay, d2		2.9			1.7						1.2	14.2
Delay (s)		7.5			4.9						24.4	38.6
Level of Service		A			A						C	D
Approach Delay (s)		7.5			4.9			0.0			33.0	
Approach LOS		A			A			A			C	

Intersection Summary

HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.3%	ICU Level of Service	F

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			0.95	1.00			
Satd. Flow (prot)		1844			1777			1775	1583			
Flt Permitted		0.88			1.00			0.95	1.00			
Satd. Flow (perm)		1639			1777			1775	1583			
Volume (vph)	100	395	0	0	185	95	525	4	40	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	395	0	0	185	95	525	4	40	0	0	0
Lane Group Flow (vph)	0	495	0	0	280	0	0	529	40	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		31.0			31.0			21.0	21.0			
Effective Green, g (s)		31.0			31.0			21.0	21.0			
Actuated g/C Ratio		0.52			0.52			0.35	0.35			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		847			918			621	554			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.30						0.30	0.03			
v/c Ratio		0.58			0.31			0.85	0.07			
Uniform Delay, d1		10.0			8.3			18.1	13.0			
Progression Factor		0.89			1.00			1.00	1.00			
Incremental Delay, d2		2.5			0.9			10.9	0.1			
Delay (s)		11.4			9.2			28.9	13.1			
Level of Service		B			A			C	B			
Approach Delay (s)		11.4			9.2			27.8			0.0	
Approach LOS		B			A			C			A	

Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.99	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1670	1504		1826	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.96	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1670	1504		1826	2787
Volume (vph)	0	1260	225	280	1025	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	225	280	1025	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	225	280	1025	0	0	241	304	0	400	590
Turn Type			Perm	Prot			custom		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2				8		8			4
Actuated Green, G (s)		41.8	41.8	10.0	55.8			23.2	23.2		26.0	26.0
Effective Green, g (s)		42.8	42.8	10.0	56.8			24.2	24.2		27.0	27.0
Actuated g/C Ratio		0.36	0.36	0.08	0.47			0.20	0.20		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1262	565	286	1675			337	303		411	627
v/s Ratio Prot		c0.36		c0.08	0.29			0.14			c0.22	
v/s Ratio Perm			0.14						0.20			0.21
v/c Ratio		1.00	0.40	0.98	0.61			0.72	1.00		0.97	0.94
Uniform Delay, d1		38.6	28.9	54.9	23.4			44.7	47.9		46.1	45.7
Progression Factor		1.00	1.00	0.88	0.45			1.00	1.00		1.00	1.00
Incremental Delay, d2		25.0	2.1	31.3	0.8			7.0	52.5		37.1	22.4
Delay (s)		63.5	31.0	79.8	11.3			51.7	100.4		83.3	68.1
Level of Service		E	C	E	B			D	F		F	E
Approach Delay (s)		58.6			26.0			78.9			74.3	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM Average Control Delay	54.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	725	185	0	640	200	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	37.4	66.5			26.1	26.1		43.5	43.5			
Effective Green, g (s)	38.4	67.5			27.1	27.1		44.5	44.5			
Actuated g/C Ratio	0.30	0.56			0.23	0.23		0.37	0.37			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	537	1991			799	357		656	587			
v/s Ratio Prot	c0.30	0.18			c0.20							
v/s Ratio Perm						0.12		0.36	0.13			
v/c Ratio	0.98	0.33			0.91	0.52		0.98	0.34			
Uniform Delay, d1	41.4	14.1			45.2	40.7		37.2	27.2			
Progression Factor	1.67	0.97			1.00	1.00		1.00	1.00			
Incremental Delay, d2	25.8	0.3			16.0	5.3		26.8	0.3			
Delay (s)	94.9	13.9			61.2	46.0		66.0	27.5			
Level of Service	F	B			E	D		E	C			
Approach Delay (s)		50.1			58.1			56.9			0.0	
Approach LOS		D			E			E			A	

Intersection Summary			
HCM Average Control Delay	54.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1757			1855						1770	1583
Flt Permitted		1.00			0.92						0.95	1.00
Satd. Flow (perm)		1757			1719						1770	1583
Volume (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Lane Group Flow (vph)	0	750	0	0	500	0	0	0	0	0	50	80
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		44.9			44.9						7.1	7.1
Effective Green, g (s)		44.9			44.9						7.1	7.1
Actuated g/C Ratio		0.75			0.75						0.12	0.12
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1315			1286						209	187
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.29						0.03	0.05
v/c Ratio		0.57			0.39						0.24	0.43
Uniform Delay, d1		8.3			2.7						24.0	24.6
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		1.8			0.9						0.6	1.6
Delay (s)		5.1			3.6						24.6	26.1
Level of Service		A			A						C	C
Approach Delay (s)		5.1			3.6			0.0			25.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1810			1770			1770	1583			
Flt Permitted		0.70			1.00			0.95	1.00			
Satd. Flow (perm)		1299			1770			1770	1583			
Volume (vph)	280	205	0	0	145	85	355	0	30	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	205	0	0	145	85	355	0	30	0	0	0
Lane Group Flow (vph)	0	485	0	0	230	0	0	355	30	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		36.5			36.5			15.5	15.5			
Effective Green, g (s)		36.5			36.5			15.5	15.5			
Actuated g/C Ratio		0.61			0.61			0.26	0.26			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		790			1077			457	409			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.37						0.20	0.02			
v/c Ratio		0.61			0.21			0.78	0.07			
Uniform Delay, d1		7.3			5.3			20.6	16.8			
Progression Factor		0.81			1.00			1.00	1.00			
Incremental Delay, d2		3.1			0.5			8.1	0.1			
Delay (s)		9.0			5.7			28.7	16.9			
Level of Service		A			A			C	B			
Approach Delay (s)		9.0			5.7			27.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1581	1504		1819	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1581	1504		1819	2787
Volume (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	125	685	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	125	685	0	0	305	350	0	370	220
Turn Type			Perm	Prot			Split		Prot	Split		Perm
Protected Phases		2		1	6		8	8	8	4	4	
Permitted Phases			2									4
Actuated Green, G (s)		44.8	44.8	7.0	55.8			23.9	23.9		25.3	25.3
Effective Green, g (s)		45.8	45.8	7.0	56.8			24.9	24.9		26.3	26.3
Actuated g/C Ratio		0.38	0.38	0.06	0.47			0.21	0.21		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1351	604	200	1675			328	312		399	611
v/s Ratio Prot		c0.35		c0.04	0.19			0.19	c0.23		c0.20	
v/s Ratio Perm			0.05									0.08
v/c Ratio		0.91	0.12	0.62	0.41			0.93	1.12		0.93	0.36
Uniform Delay, d1		35.2	24.1	55.2	20.6			46.7	47.6		45.9	39.7
Progression Factor		1.00	1.00	1.06	0.48			1.00	1.00		1.00	1.00
Incremental Delay, d2		11.0	0.4	4.5	0.6			31.7	87.9		27.3	0.4
Delay (s)		46.3	24.5	63.1	10.5			78.4	135.5		73.3	40.1
Level of Service		D	C	E	B			E	F		E	D
Approach Delay (s)		45.0			18.6			108.9			60.9	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps 10/8/2003

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	0.95	0.95			0.95	1.00		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	455	250	350	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	455	250	0	350	140	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	61.0	84.0			20.0	20.0		26.0	26.0			
Effective Green, g (s)	60.0	85.0			21.0	21.0		27.0	27.0			
Actuated g/C Ratio	0.50	0.71			0.18	0.18		0.22	0.22			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	885	2507			619	277		398	356			
v/s Ratio Prot	c0.44	0.19			0.13							
v/s Ratio Perm						0.16		0.20	0.09			
v/c Ratio	0.88	0.27			0.74	0.90		0.88	0.39			
Uniform Delay, d1	26.8	6.3			46.9	48.5		44.9	39.5			
Progression Factor	0.85	0.39			1.00	1.00		1.00	1.00			
Incremental Delay, d2	8.6	0.2			7.5	36.9		19.3	0.7			
Delay (s)	31.4	2.7			54.5	82.4		64.2	40.3			
Level of Service	C	A			D	F		E	D			
Approach Delay (s)		18.0			64.4			57.4			0.0	
Approach LOS		B			E			E			A	

Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.93			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1726			1855						1770	1583
Flt Permitted		1.00			0.90						0.95	1.00
Satd. Flow (perm)		1726			1672						1770	1583
Volume (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Lane Group Flow (vph)	0	820	0	0	710	0	0	0	0	0	120	185
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		42.9			42.9						9.1	9.1
Effective Green, g (s)		42.9			42.9						9.1	9.1
Actuated g/C Ratio		0.71			0.71						0.15	0.15
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1234			1195						268	240
v/s Ratio Prot		c0.48										
v/s Ratio Perm					0.42						0.07	0.12
v/c Ratio		0.66			0.59						0.45	0.77
Uniform Delay, d1		4.6			4.2						23.2	24.4
Progression Factor		1.00			2.33						1.00	1.00
Incremental Delay, d2		2.8			1.7						1.2	14.2
Delay (s)		7.5			11.6						24.4	38.6
Level of Service		A			B						C	D
Approach Delay (s)		7.5			11.6			0.0			33.0	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	F

c Critical Lane Group

FEHRPESAL7-FF51

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			0.95	1.00			
Satd. Flow (prot)		1844			1777			1770	1583			
Flt Permitted		0.88			1.00			0.95	1.00			
Satd. Flow (perm)		1639			1777			1770	1583			
Volume (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Lane Group Flow (vph)	0	495	0	0	280	0	0	525	40	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		31.1			31.1			20.9	20.9			
Effective Green, g (s)		31.1			31.1			20.9	20.9			
Actuated g/C Ratio		0.52			0.52			0.35	0.35			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		850			921			617	551			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.30						0.30	0.03			
v/c Ratio		0.58			0.30			0.85	0.07			
Uniform Delay, d1		10.0			8.3			18.1	13.1			
Progression Factor		0.93			1.00			1.00	1.00			
Incremental Delay, d2		2.5			0.9			10.9	0.1			
Delay (s)		11.8			9.1			29.0	13.1			
Level of Service		B			A			C	B			
Approach Delay (s)		11.8			9.1			27.9			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp 10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1679	1504		1826	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1679	1504		1826	2787
Volume (vph)	0	1260	350	280	1025	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	350	280	1025	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	350	280	1025	0	0	228	317	0	400	590
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		43.1	43.1	10.0	57.1			20.9	20.9		27.0	27.0
Effective Green, g (s)		44.1	44.1	10.0	58.1			21.9	21.9		28.0	28.0
Actuated g/C Ratio		0.37	0.37	0.08	0.48			0.18	0.18		0.23	0.23
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1301	582	286	1713			306	274		426	650
v/s Ratio Prot		c0.36		c0.08	0.29			0.14			c0.22	
v/s Ratio Perm			0.22						0.21			0.21
v/c Ratio		0.97	0.60	0.98	0.60			0.75	1.16		0.94	0.91
Uniform Delay, d1		37.3	30.8	54.9	22.5			46.4	49.0		45.2	44.7
Progression Factor		1.00	1.00	1.13	0.22			1.00	1.00		1.00	1.00
Incremental Delay, d2		18.5	4.6	30.5	0.7			9.5	103.6		28.4	16.4
Delay (s)		55.7	35.4	92.5	5.6			55.9	152.7		73.5	61.1
Level of Service		E	D	F	A			E	F		E	E
Approach Delay (s)		51.3			24.2			112.2			66.2	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM Average Control Delay	54.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps 10/10/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	725	185	640	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	725	185	0	640	200	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	37.0	67.0			27.0	27.0		43.0	43.0			
Effective Green, g (s)	36.0	68.0			28.0	28.0		44.0	44.0			
Actuated g/C Ratio	0.30	0.57			0.23	0.23		0.37	0.37			
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	531	2005			826	369		649	580			
v/s Ratio Prot	c0.30	0.18			c0.20							
v/s Ratio Perm						0.12		0.36	0.13			
v/c Ratio	0.99	0.32			0.88	0.50		0.99	0.34			
Uniform Delay, d1	41.8	13.8			44.3	39.9		37.7	27.6			
Progression Factor	0.79	0.29			1.00	1.00		1.00	1.00			
Incremental Delay, d2	23.3	0.2			12.7	4.8		31.5	0.4			
Delay (s)	56.3	4.2			57.1	44.7		69.2	27.9			
Level of Service	E	A			E	D		E	C			
Approach Delay (s)		27.5			54.6			59.4			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM Average Control Delay	45.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1812			1762			1770	1583			
Flt Permitted		0.73			1.00			0.95	1.00			
Satd. Flow (perm)		1366			1762			1770	1583			
Volume (vph)	150	120	0	0	105	70	310	0	20	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	150	120	0	0	105	70	310	0	20	0	0	0
Lane Group Flow (vph)	0	270	0	0	175	0	0	310	20	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		10.2			10.2			15.5	15.5			
Effective Green, g (s)		10.2			10.2			15.5	15.5			
Actuated g/C Ratio		0.30			0.30			0.46	0.46			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		413			533			814	728			
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.20						0.18	0.01			
v/c Ratio		0.65			0.33			0.38	0.03			
Uniform Delay, d1		10.2			9.1			6.0	5.0			
Progression Factor		1.00			1.00			1.00	1.00			
Incremental Delay, d2		3.7			0.4			0.3	0.0			
Delay (s)		13.9			9.5			6.3	5.0			
Level of Service		B			A			A	A			
Approach Delay (s)		13.9			9.5			6.2			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.92	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1587	1504		1821	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1587	1504		1821	2787
Volume (vph)	0	895	75	115	480	0	125	0	530	160	190	150
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	895	75	115	480	0	125	0	530	160	190	150
Lane Group Flow (vph)	0	895	75	115	480	0	0	282	373	0	350	150
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		40.4	40.4	10.9	55.3			24.5	24.5		25.2	25.2
Effective Green, g (s)		41.4	41.4	10.9	56.3			25.5	25.5		26.2	26.2
Actuated g/C Ratio		0.34	0.34	0.09	0.47			0.21	0.21		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1221	546	161	1660			337	320		398	608
v/s Ratio Prot		c0.25		c0.06	0.14			0.18			c0.19	
v/s Ratio Perm			0.05						0.25			0.05
v/c Ratio		0.73	0.14	0.71	0.29			0.84	1.17		0.88	0.25
Uniform Delay, d1		34.6	27.0	53.0	19.6			45.3	47.2		45.4	38.7
Progression Factor		1.00	1.00	0.73	0.56			1.00	1.00		1.00	1.00
Incremental Delay, d2		3.9	0.5	10.8	0.3			16.3	103.1		19.3	0.2
Delay (s)		38.4	27.5	49.6	11.3			61.6	150.4		64.6	39.0
Level of Service		D	C	D	B			E	F		E	D
Approach Delay (s)		37.5			18.7			112.1			56.9	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	54.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		1.00			1.00			0.95	1.00			
Satd. Flow (prot)		1855			1769			1770	1583			
Flt Permitted		0.96			1.00			0.95	1.00			
Satd. Flow (perm)		1792			1769			1770	1583			
Volume (vph)	30	325	0	0	135	80	465	0	25	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	325	0	0	135	80	465	0	25	0	0	0
Lane Group Flow (vph)	0	355	0	0	215	0	0	465	25	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		12.6			12.6			16.5	16.5			
Effective Green, g (s)		12.6			12.6			16.5	16.5			
Actuated g/C Ratio		0.34			0.34			0.44	0.44			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		609			601			787	704			
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.20						0.26	0.02			
v/c Ratio		0.58			0.36			0.59	0.04			
Uniform Delay, d1		10.1			9.2			7.8	5.8			
Progression Factor		1.00			1.00			1.00	1.00			
Incremental Delay, d2		1.4			0.4			1.2	0.0			
Delay (s)		11.5			9.6			9.0	5.8			
Level of Service		B			A			A	A			
Approach Delay (s)		11.5			9.6			8.8			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	B

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	1.00	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	1770	3539			1681	1504		1828	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	1770	3539			1681	1504		1828	2787
Volume (vph)	0	895	350	270	805	0	220	0	325	150	240	415
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	895	350	270	805	0	220	0	325	150	240	415
Lane Group Flow (vph)	0	895	350	270	805	0	0	220	325	0	390	415
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		35.3	35.3	19.0	58.3			20.7	20.7		26.0	26.0
Effective Green, g (s)		36.3	36.3	19.0	59.3			21.7	21.7		27.0	27.0
Actuated g/C Ratio		0.30	0.30	0.16	0.49			0.18	0.18		0.22	0.22
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1071	479	280	1749			304	272		411	627
v/s Ratio Prot		c0.25		c0.15	0.23			0.13			c0.21	
v/s Ratio Perm			0.22						0.22			0.15
v/c Ratio		0.84	0.73	0.96	0.46			0.72	1.19		0.95	0.66
Uniform Delay, d1		39.1	37.5	50.2	19.9			46.3	49.1		45.8	42.3
Progression Factor		1.00	1.00	1.14	0.20			1.00	1.00		1.00	1.00
Incremental Delay, d2		7.7	9.5	31.8	0.5			8.3	117.9		31.2	2.6
Delay (s)		46.8	46.9	88.9	4.5			54.6	167.0		77.0	45.0
Level of Service		D	D	F	A			D	F		E	D
Approach Delay (s)		46.8			25.7			121.6			60.5	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	E

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.98	1.00
Satd. Flow (prot)		1757			1855						1770	1583
Flt Permitted		1.00			0.92						0.95	1.00
Satd. Flow (perm)		1757			1719						1770	1583
Volume (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	315	40	460	0	0	0	0	50	0	80
Lane Group Flow (vph)	0	750	0	0	500	0	0	0	0	0	50	80
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		44.9			44.9						7.1	7.1
Effective Green, g (s)		44.9			44.9						7.1	7.1
Actuated g/C Ratio		0.75			0.75						0.12	0.12
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1315			1286						209	187
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.29						0.03	0.05
v/c Ratio		0.57			0.39						0.24	0.43
Uniform Delay, d1		3.3			2.7						24.0	24.6
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		1.8			0.9						0.6	1.6
Delay (s)		5.1			3.6						24.6	26.1
Level of Service		A			A						C	C
Approach Delay (s)		5.1			3.6			0.0			25.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.97			1.00			0.95	1.00			
Satd. Flow (prot)		1810			1770			1770	1583			
Flt Permitted		0.70			1.00			0.95	1.00			
Satd. Flow (perm)		1299			1770			1770	1583			
Volume (vph)	280	205	0	0	145	85	355	0	30	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	205	0	0	145	85	355	0	30	0	0	0
Lane Group Flow (vph)	0	485	0	0	230	0	0	355	30	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		36.5			36.5			15.5	15.5			
Effective Green, g (s)		36.5			36.5			15.5	15.5			
Actuated g/C Ratio		0.61			0.61			0.26	0.26			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		790			1077			457	409			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.37						0.20	0.02			
v/c Ratio		0.61			0.21			0.78	0.07			
Uniform Delay, d1		7.3			5.3			20.6	16.8			
Progression Factor		0.81			1.00			1.00	1.00			
Incremental Delay, d2		3.1			0.5			8.1	0.1			
Delay (s)		9.0			5.7			28.7	16.9			
Level of Service		A			A			C	B			
Approach Delay (s)		9.0			5.7			27.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			0.91	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1579	1504		1819	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1579	1504		1819	2787
Volume (vph)	0	1235	75	115	635	0	125	0	530	180	190	220
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	75	115	635	0	125	0	530	180	190	220
Lane Group Flow (vph)	0	1235	75	115	635	0	0	311	344	0	370	220
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		45.8	45.8	7.8	57.6			25.4	25.4		22.0	22.0
Effective Green, g (s)		46.8	46.8	7.8	58.6			26.4	26.4		23.0	23.0
Actuated g/C Ratio		0.39	0.39	0.06	0.49			0.22	0.22		0.19	0.19
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1380	617	223	1728			347	331		349	534
v/s Ratio Prot		c0.35		c0.03	0.18			0.20			c0.20	
v/s Ratio Perm			0.05						0.23			0.08
v/c Ratio		0.89	0.12	0.52	0.37			0.90	1.04		1.06	0.41
Uniform Delay, d1		34.3	23.4	54.3	19.1			45.5	45.8		48.5	42.6
Progression Factor		1.00	1.00	1.01	0.43			1.00	1.00		1.00	1.00
Incremental Delay, d2		9.3	0.4	0.6	0.2			24.3	60.0		65.0	0.5
Delay (s)		43.6	23.8	55.3	8.4			69.8	106.8		113.5	43.1
Level of Service		D	C	E	A			E	F		F	D
Approach Delay (s)		42.5			15.6			89.2			87.2	
Approach LOS		D			B			F			F	

Intersection Summary			
HCM Average Control Delay	53.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	780	680	0	0	495	250	380	0	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	780	680	0	0	495	250	380	0	140	0	0	0
Lane Group Flow (vph)	780	680	0	0	495	250	0	380	140	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	56.0	85.0			25.0	25.0		25.0	25.0			
Effective Green, g (s)	56.0	86.0			26.0	26.0		26.0	26.0			
Actuated g/C Ratio	0.47	0.72			0.22	0.22		0.22	0.22			
Clearance Time (s)	4.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	826	2536			767	343		384	343			
v/s Ratio Prot	c0.44	0.19			0.14							
v/s Ratio Perm						0.16		0.21	0.09			
v/c Ratio	0.94	0.27			0.65	0.73		0.99	0.41			
Uniform Delay, d1	30.5	6.0			42.8	43.7		46.9	40.4			
Progression Factor	0.84	0.60			1.00	1.00		1.00	1.00			
Incremental Delay, d2	12.0	0.1			4.2	12.8		42.7	0.8			
Delay (s)	37.7	3.7			47.0	56.5		89.5	41.2			
Level of Service	D	A			D	E		F	D			
Approach Delay (s)		21.9			50.2			76.5			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Los Berros Rd. & 101 SB Ramps

10/8/2003

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
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		0.93			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1726			1855						1770	1583
Flt Permitted		1.00			0.90						0.95	1.00
Satd. Flow (perm)		1726			1672						1770	1583
Volume (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	375	445	60	650	0	0	0	0	120	0	185
Lane Group Flow (vph)	0	820	0	0	710	0	0	0	0	0	120	185
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		42.9			42.9						9.1	9.1
Effective Green, g (s)		42.9			42.9						9.1	9.1
Actuated g/C Ratio		0.71			0.71						0.15	0.15
Clearance Time (s)		4.0			4.0						4.0	4.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1234			1195						268	240
v/s Ratio Prot		c0.48										
v/s Ratio Perm					0.42						0.07	0.12
v/c Ratio		0.66			0.59						0.45	0.77
Uniform Delay, d1		4.6			4.2						23.2	24.4
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.8			2.2						1.2	14.2
Delay (s)		7.5			6.4						24.4	38.6
Level of Service		A			A						C	D
Approach Delay (s)		7.5			6.4			0.0			33.0	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Los Berros Rd. & 101 NB Ramps

10/8/2003

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			
Lane Util. Factor		1.00			1.00			1.00	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			0.95	1.00			
Satd. Flow (prot)		1844			1777			1770	1583			
Flt Permitted		0.88			1.00			0.95	1.00			
Satd. Flow (perm)		1639			1777			1770	1583			
Volume (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	395	0	0	185	95	525	0	40	0	0	0
Lane Group Flow (vph)	0	495	0	0	280	0	0	525	40	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		31.1			31.1			20.9	20.9			
Effective Green, g (s)		31.1			31.1			20.9	20.9			
Actuated g/C Ratio		0.52			0.52			0.35	0.35			
Clearance Time (s)		4.0			4.0			4.0	4.0			
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)		850			921			617	551			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.30						0.30	0.03			
v/c Ratio		0.58			0.30			0.85	0.07			
Uniform Delay, d1		10.0			8.3			18.1	13.1			
Progression Factor		0.95			1.00			1.00	1.00			
Incremental Delay, d2		2.5			0.9			10.9	0.1			
Delay (s)		12.0			9.1			29.0	13.1			
Level of Service		B			A			C	B			
Approach Delay (s)		12.0			9.1			27.9			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Teft St. & 101 SB Off-Ramp

10/8/2003

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		0.95	1.00	0.97	0.95			0.95	0.95		1.00	0.88
Frt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)		3539	1583	3433	3539			1680	1504		1826	2787
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)		3539	1583	3433	3539			1680	1504		1826	2787
Volume (vph)	0	1260	350	270	985	0	220	0	325	160	240	590
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1260	350	270	985	0	220	0	325	160	240	590
Lane Group Flow (vph)	0	1260	350	270	985	0	0	227	318	0	400	590
Turn Type			Perm	Prot			Split		Perm	Split		Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)		42.1	42.1	11.0	57.1			20.9	20.9		27.0	27.0
Effective Green, g (s)		43.1	43.1	11.0	58.1			21.9	21.9		28.0	28.0
Actuated g/C Ratio		0.36	0.36	0.09	0.48			0.18	0.18		0.23	0.23
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1271	569	315	1713			307	274		426	650
v/s Ratio Prot		c0.36		c0.08	0.28			0.14			c0.22	
v/s Ratio Perm			0.22						0.21			0.21
v/c Ratio		0.99	0.62	0.86	0.58			0.74	1.16		0.94	0.91
Uniform Delay, d1		38.3	31.6	53.7	22.1			46.4	49.0		45.2	44.7
Progression Factor		1.00	1.00	1.10	0.20			1.00	1.00		1.00	1.00
Incremental Delay, d2		23.3	4.9	2.3	0.1			9.0	105.0		28.4	16.4
Delay (s)		61.5	36.5	61.2	4.6			55.3	154.0		73.5	61.1
Level of Service		E	D	E	A			E	F		E	E
Approach Delay (s)		56.1			16.8			112.9			66.2	
Approach LOS		E			B			F			E	

Intersection Summary			
HCM Average Control Delay	54.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Teft St. & 101 NB Ramps

10/8/2003

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		1.00	1.00			
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)	1770	3539			3539	1583		1770	1583			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583		1770	1583			
Volume (vph)	525	650	0	0	755	185	670	0	200	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	650	0	0	755	185	670	0	200	0	0	0
Lane Group Flow (vph)	525	650	0	0	755	185	0	670	200	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Actuated Green, G (s)	37.0	65.0			25.0	25.0		45.0	45.0			
Effective Green, g (s)	36.0	66.0			26.0	26.0		46.0	46.0			
Actuated g/C Ratio	0.30	0.55			0.22	0.22		0.38	0.38			
Clearance Time (s)	3.0	5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	531	1946			767	343		679	607			
v/s Ratio Prot	c0.30	0.18			c0.21							
v/s Ratio Perm						0.12		0.38	0.13			
v/c Ratio	0.99	0.33			0.98	0.54		0.99	0.33			
Uniform Delay, d1	41.8	14.9			46.8	41.7		36.7	26.1			
Progression Factor	0.78	0.30			1.00	1.00		1.00	1.00			
Incremental Delay, d2	22.5	0.2			28.9	6.0		30.9	0.3			
Delay (s)	54.9	4.6			75.7	47.7		67.6	26.4			
Level of Service	D	A			E	D		E	C			
Approach Delay (s)		27.1			70.2			58.1			0.0	
Approach LOS		C			E			E			A	

Intersection Summary			
HCM Average Control Delay	49.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	E
c Critical Lane Group			

APPENDIX C

FREEWAY RAMP JUNCTION CALCULATION WORKSHEETS

APPENDIX C1

FREEWAY RAMP JUNCTION WORKSHEETS:

EXISTING CONDITIONS

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2054	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	417	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	245	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2054	417	245	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	558	113	67	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2322	458	269	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2322 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2780	4700	No
v_{R12}	2780	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.8 pc/mi

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.349	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.0	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2299	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	417	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2299	245	417	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	625	67	113	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	2599		269		458	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2599 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2599	4700	No
v_{12}	2599	4400	No
$v_{FO} = v_F - v_R$	2330	4700	No
v_R	269	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.1 pc/mi/

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.452

Space mean speed in ramp influence area, S_R = 55 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 54.6 mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

ıalyst:	Chris Mitchell
ɟency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	Existing AM Peak Hour
:eeway/dir or travel:	US 101 Southbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
ɜscription:	Willow Road / US 101 Interchange

Freeway Data

'pe of analysis	Merge	
ımber of lanes in freeway	2	
'ee-flow speed on freeway	65.0	mph
·lume on freeway	2076	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	223	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	68	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2076	223	68	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	564	61	18	v
ıcks and buses	8	2	2	%
ɔreational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2347	245	75	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2347 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2592	4700	No
v_{R12}	2592	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.4 pc/mi

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.338	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 57.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2144	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	68	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	223	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2144		68		223		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	583		18		61		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
ow rate, vp	2424		75		245	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2424 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2424	4700	No
v_{12}	2424	4400	No
$v_{FO} = v_F - v_R$	2349	4700	No
v_R	75	2000	No

Level of Service Determination (if not F)

nsity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.6 pc/mi/

vel of service for ramp-freeway junction areas of influence C

Speed Estimation

termediate speed variable,	D_S = 0.435	
ace mean speed in ramp influence area,	S_R = 55	mph
ace mean speed in outer lanes,	S_O = N/A	mph
ace mean speed for all vehicles,	S = 55.0	mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2175	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	676	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	268	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2175	676	268	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	591	184	73	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2459	742	294	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2459 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3201	4700	No
v_{R12}	3201	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.0 pc/mi

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.382	
Space mean speed in ramp influence area,	S_R = 56.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2443	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	268	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	676	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2443		268		676		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	664		73		184		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	2762		294		742	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2762 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2762	4700	No
v_{12}	2762	4400	No
$v_{FO} = v_F - v_R$	2468	4700	No
v_R	294	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.5 pc/mi/:

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.454

Space mean speed in ramp influence area, S_R = 55 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 54.5 mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

ıalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	Existing AM Peak Hour
eeway/dir or travel:	US 101 Northbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Merge	
mber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	2663	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	229	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	188	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

ıction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2663	229	188	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	724	62	51	v
ıcks and buses	8	2	2	%
creational vehicles	0	0	0	%
rain type:	Level	Level	Level	
Grade				
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3010	251	206	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3010 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3261	4700	No
v_{R12}	3261	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.7 pc/mi

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.388	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.1	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2851	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	188	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	229	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2851		188		229	vp
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	775		51		62	v
Trucks and buses	8		2		2	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%

Length	0.00	mi	0.00	mi	0.00	mi
ucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
avy vehicle adjustment, fHV	0.962		0.990		0.990	
iver population factor, fP	1.00		1.00		1.00	
ow rate, vp	3223		206		251	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3223 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3223	4700	No
v_{12}	3223	4400	No
$v_{FO} = v_F - v_R$	3017	4700	No
v_R	206	2000	No

Level of Service Determination (if not F)

nsity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.5 pc/mi/

vel of service for ramp-freeway junction areas of influence C

Speed Estimation

termediate speed variable, D_S = 0.447

ace mean speed in ramp influence area, S_R = 55 mph

ace mean speed in outer lanes, S_0 = N/A mph

ace mean speed for all vehicles, S = 54.7 mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2612	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	443	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	651	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2612	443	651	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	710	120	177	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2953	486	715	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2953 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3439	4700	No
v_{R12}	3439	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.408	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 55.6	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3263	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	651	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	443	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3263	651	443	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	887	177	120	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	3689		715		486	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3689 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3689	4700	No
v_{12}	3689	4400	No
$v_{FO} = v_F - v_R$	2974	4700	No
v_R	715	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.5 pc/mi/l

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.492	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.7	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

ıalyst:	Chris Mitchell
ɟency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	Existing PM Peak Hour
:eeway/dir or travel:	US 101 Southbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
:scription:	Willow Road / US 101 Interchange

Freeway Data

·pe of analysis	Merge	
ımber of lanes in freeway	2	
·ee-flow speed on freeway	65.0	mph
·lume on freeway	2993	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
·ee-flow speed on ramp	35.0	mph
lume on ramp	270	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	249	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2993	270	249	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	813	73	68	v
ıcks and buses	8	2	2	%
:reational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade				
Length		mi	mi	mi
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	0.962	0.990	0.990	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, vp	3383	296	273	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3383 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3679	4700	No
v_{R12}	3679	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.440	
Space mean speed in ramp influence area,	S_R = 54.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.9	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3242	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	249	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	270	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3242	249	270	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	881	68	73	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length		0.00	mi	0.00	mi	0.00	mi
ucks and buses PCE, ET		1.5		1.5		1.5	
ecreational vehicle PCE,	ER	1.2		1.2		1.2	
eavy vehicle adjustment,	fHV	0.962		0.990		0.990	
iver population factor,	fP	1.00		1.00		1.00	
ow rate, vp		3665		273		296	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3665 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3665	4700	No
v_{12}	3665	4400	No
$v_{FO} = v_F - v_R$	3392	4700	No
v_R	273	2000	No

Level of Service Determination (if not F)

nsity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.3 pc/mi/

vel of service for ramp-freeway junction areas of influence D

Speed Estimation

termediate speed variable,	D_S = 0.453	
ace mean speed in ramp influence area,	S_R = 55	mph
ace mean speed in outer lanes,	S_O = N/A	mph
ace mean speed for all vehicles,	S = 54.6	mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2003	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	349	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	593	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2003	349	593	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	544	95	161	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2264	383	651	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2264 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2647	4700	No
v_{R12}	2647	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.8 pc/mi

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.341	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2596	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	593	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	349	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2596	593	349	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	705	161	95	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	[illegible]	[illegible]	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	2935		651		383	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2935 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2935	4700	No
v_{12}	2935	4400	No
$v_{FO} = v_F - v_R$	2284	4700	No
v_R	651	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.0 pc/mi/l

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.487	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

ıalyst:	Chris Mitchell
ɪency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	Existing PM Peak Hour
:eeway/dir or travel:	US 101 Northbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
ıscription:	Willow Road / US 101 Interchange

Freeway Data

·pe of analysis	Merge	
ımber of lanes in freeway	2	
·ee-flow speed on freeway	65.0	mph
·lume on freeway	2102	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	146	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	250	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2102	146	250	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	571	40	68	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2376	160	274	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2376 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2536	4700	No
v_{R12}	2536	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.0 pc/mi

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.335	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.3	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Existing PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2352	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	146	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2352	250	146	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	639	68	40	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
ucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
avy vehicle adjustment, fHV	0.962		0.990		0.990	
iver population factor, fP	1.00		1.00		1.00	
ow rate, vp	2659		274		160	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2659 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2659	4700	No
v_{12}	2659	4400	No
$v_{FO} = v_F - v_R$	2385	4700	No
v_R	274	2000	No

Level of Service Determination (if not F)

nsity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.6 pc/mi/

vel of service for ramp-freeway junction areas of influence C

Speed Estimation

termediate speed variable,	D_S = 0.453	
ace mean speed in ramp influence area,	S_R = 55	mph
ace mean speed in outer lanes,	S_O = N/A	mph
ace mean speed for all vehicles,	S = 54.6	mph

APPENDIX C2

FREEWAY RAMP JUNCTION WORKSHEETS:

2030 NO PROJECT CONDITIONS

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2687	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	590	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2687	610	590	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	730	166	160	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3037	670	648	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3037 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3707	4700	No
v_{R12}	3707	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.445	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

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Diverge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	2030 No Project AM Peak Hour
reeway/dir or travel:	US 101 Southbound
unction:	Tefft Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Diverge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3277	vph

Off Ramp Data

.de of freeway	Right	
umber of lanes in ramp	1	
ree-Flow speed on ramp	35.0	mph
olume on ramp	590	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
olume on adjacent ramp	610	vph
sition of adjacent ramp	Downstream	
pe of adjacent ramp	On	
stance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	3277	590	610	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	890	160	166	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3704	648	670	pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3704 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3704	4700	No
v_{12}	3704	4400	No
$v_{FO} = v_F - v_R$	3056	4700	No
v_R	648	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.8	mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2922	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	355	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	130	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2922	355	130	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	794	96	35	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	
'rucks and buses PCE, ET	1.5	1.5	1.5	
:ecreational vehicle PCE, ER	1.2	1.2	1.2	
leavy vehicle adjustment, fHV	0.962	0.990	0.990	
)river population factor, fP	1.00	1.00	1.00	
'low rate, vp	3303	390	143	pcpl

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3303 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3693	4700	No
v_{R12}	3693	4600	No

Level of Service Determination (if not F)

ensity, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.0 pc/mi,

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	M_S = 0.443	
pace mean speed in ramp influence area,	S_R = 54.8	mph
pace mean speed in outer lanes,	S_0 = N/A	mph
pace mean speed for all vehicles,	S = 54.8	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3052	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	130	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	355	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3052	130	355	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	829	35	96	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3450	143	390	pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3450 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3450	4700	No
v_{12}	3450	4400	No
$v_{FO} = v_F - v_R$	3307	4700	No
v_R	143	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.4 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.441	
Space mean speed in ramp influence area,	S_R = 55	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.9	mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2601	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1030	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	490	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2601	1030	490	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	707	280	133	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2940	1131	538	pcpl

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2940 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4071	4700	No
v_{R12}	4071	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.6 pc/mi,

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.515

Space mean speed in ramp influence area, S_R = 53.2 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 53.2 mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3246	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	365	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	385	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3246	365	385	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	882	99	105	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	mi
rucks and buses PCE, ET	1.5	1.5	1.5	
ecreational vehicle PCE, ER	1.2	1.2	1.2	
eavy vehicle adjustment, fHV	0.962	0.990	0.990	
river population factor, fP	1.00	1.00	1.00	
low rate, vp	3669	401	423	pcpl

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3669 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4070	4700	No
v_{R12}	4070	4600	No

Level of Service Determination (if not F)

ensity, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.9 pc/mi/

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	M_S = 0.514	
pace mean speed in ramp influence area,	S_R = 53.2	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 53.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3631	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	365	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3631		385		365		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	987		105		99		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.990		0.990		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4105		423		401		pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4105 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4105	4700	No
v_{12}	4105	4400	No
$v_{FO} = v_F - v_R$	3682	4700	No
v_R	423	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.1 pc/mi/

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.466	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.3	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2439	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	740	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	990	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2439	740	990	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	663	201	269	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2757	812	1087	pcpl

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3569	4700	No
v_{R12}	3569	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.8 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.424	
Space mean speed in ramp influence area,	S_R = 55.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

alyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
alysis time period:	2030 No Project PM Peak Hour
reeway/dir or travel:	US 101 Southbound
nction:	Tefft Road
risdiction:	San Luis Obispo County
alysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Diverge	
mber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	3429	vph

Off Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-Flow speed on ramp	35.0	mph
lume on ramp	990	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent ramp	740	vph
sition of adjacent ramp	Downstream	
pe of adjacent ramp	On	
stance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	3429	990	740	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	932	269	201	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3876	1087	812	pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3876 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3876	4700	No
v_{12}	3876	4400	No
$v_{FO} = v_F - v_R$	2789	4700	No
v_R	1087	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.1 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.526	
Space mean speed in ramp influence area,	S_R = 53	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.9	mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2924	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	505	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	305	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2924	505	305	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	795	137	83	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	
rucks and buses PCE, ET	1.5	1.5	1.5	
ecreational vehicle PCE, ER	1.2	1.2	1.2	
eavy vehicle adjustment, fHV	0.962	0.990	0.990	
river population factor, fP	1.00	1.00	1.00	
low rate, vp	3305	554	335	pcpl

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3305 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3859	4700	No
v_{R12}	3859	4600	No

Level of Service Determination (if not F)

ensity, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.2 pc/mi,

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	M_S = 0.471	
pace mean speed in ramp influence area,	S_R = 54.2	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.2	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3229	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	505	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3229	305	505	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	877	83	137	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3650	335	554	pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3650 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3650	4700	No
v_{12}	3650	4400	No
$v_{FO} = v_F - v_R$	3315	4700	No
v_R	335	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.1 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.458	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2999	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	840	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2999	710	840	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	815	193	228	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3390	779	922	pcph

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3390 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4169	4700	No
v_{R12}	4169	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.5 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.538	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	2030 No Project PM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Tefft Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Diverge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3839	vph

Off Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-Flow speed on ramp	35.0	mph
olume on ramp	840	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent ramp	710	vph
osition of adjacent ramp	Downstream	
ype of adjacent ramp	On	
istance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3839	840	710	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	1043	228	193	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4340	922	779	pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4340 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4340	4700	No
v_{12}	4340	4400	No
$v_{FO} = v_F - v_R$	3418	4700	No
v_R	922	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.1 pc/mi/

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.511	
Space mean speed in ramp influence area,	S_R = 53	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3144	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	565	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3144	195	565	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	854	53	154	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	

Length	mi	mi	mi	
rucks and buses PCE, ET	1.5	1.5	1.5	
ecreational vehicle PCE, ER	1.2	1.2	1.2	
eavy vehicle adjustment, fHV	0.962	0.990	0.990	
river population factor, fP	1.00	1.00	1.00	
low rate, vp	3554	214	620	pcpl

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3554 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3768	4700	No
v_{R12}	3768	4600	No

Level of Service Determination (if not F)

ensity, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi,

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ıtermediate speed variable,	M_S = 0.455	
ɔace mean speed in ramp influence area,	S_R = 54.5	mph
ɔace mean speed in outer lanes,	S_0 = N/A	mph
ɔace mean speed for all vehicles,	S = 54.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 No Project PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3709	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3709	565	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1008	154	53	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4193	620	214	pcp

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4193 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4193	4700	No
v_{12}	4193	4400	No
$v_{FO} = v_F - v_R$	3573	4700	No
v_R	620	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.8 pc/mi/

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.484	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

APPENDIX C3

FREEWAY RAMP JUNCTION WORKSHEETS:

2030 CEQA BASELINE ALTERNATIVE

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2687	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	590	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2687	610	590	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	730	166	160	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3037	670	648	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3037 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3707	4700	No
v_{R12}	3707	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.445	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3277	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	590	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	610	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3277	590	610	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	890	160	166	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	3704		648		670	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3704 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3704	4700	No
v_{12}	3704	4400	No
$v_{FO} = v_F - v_R$	3056	4700	No
v_R	648	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/l

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.8	mph

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Merge Analysis

alyst:	Chris Mitchell
ency/Co.:	Fehr & Peers
te performed:	10/8/2003
alysis time period:	2030 Baseline AM Peak Hour
eeway/dir or travel:	US 101 Southbound
nction:	Los Berros Road
risdiction:	San Luis Obispo County
alysis Year:	2003
scription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Merge	
nber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	2922	vph

On Ramp Data

de of freeway	Right	
nber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	355	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
ume on adjacent Ramp	130	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
ume, V (vph)	2922	355	130	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	794	96	35	v
ucks and buses	8	2	2	%
reational vehicles	0	0	0	%
rain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3303	390	143	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3303 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3693	4700	No
v_{R12}	3693	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.0 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.443	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3052	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	130	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	355	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3052	130	355	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	829	35	96	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3450		143		390	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3450 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3450	4700	No
v_{12}	3450	4400	No
$v_{FO} = v_F - v_R$	3307	4700	No
v_R	143	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.4 pc/mi/l

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.441	
pace mean speed in ramp influence area,	S_R = 55	mph
pace mean speed in outer lanes,	S_0 = N/A	mph
pace mean speed for all vehicles,	S = 54.9	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2601	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1030	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2601	490	1030	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	707	133	280	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2940	538	1131	pc

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2940 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3478	4700	No
v_{R12}	3478	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.2 pc/m

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.412	
Space mean speed in ramp influence area,	S_R = 55.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 55.5	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3091	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1030	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3091		490		1030		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	840		133		280		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	3494		538		1131	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3494 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3494	4700	No
v_{12}	3494	4400	No
$v_{FO} = v_F - v_R$	2956	4700	No
v_R	538	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.8 pc/mi/

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.476	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.0	mph

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Merge Analysis

ıalyst:	Chris Mitchell
'ency/Co.:	Fehr & Peers
.te performed:	10/8/2003
ıalysis time period:	2030 Baseline AM Peak Hour
'eeway/dir or travel:	US 101 Northbound
ınction:	Los Berros Road
.risdiction:	San Luis Obispo County
.alysis Year:	2003
scription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Merge	
mber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	3246	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	365	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	385	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	3246	365	385	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	882	99	105	v
ıcks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3669	401	423	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3669 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4070	4700	No
v_{R12}	4070	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.514	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3631	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	365	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3631		385		365		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	987		105		99		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	4105		423		401	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4105 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4105	4700	No
v_{12}	4105	4400	No
$v_{FO} = v_F - v_R$	3682	4700	No
v_R	423	2000	No

Level of Service Determination (if not F)

nsity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.1 pc/mi/l

vel of service for ramp-freeway junction areas of influence E

Speed Estimation

termediate speed variable,	D_S = 0.466	
ace mean speed in ramp influence area,	S_R = 54	mph
ace mean speed in outer lanes,	S_O = N/A	mph
ace mean speed for all vehicles,	S = 54.3	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2439	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	740	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	990	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2439	740	990	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	663	201	269	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2757	812	1087	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3569	4700	No
v_{R12}	3569	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.8 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.424	
Space mean speed in ramp influence area,	S_R = 55.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3429	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	740	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3429		990		740		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	932		269		201		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	3876		1087		812	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3876 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3876	4700	No
v_{12}	3876	4400	No
$v_{FO} = v_F - v_R$	2789	4700	No
v_R	1087	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.1 pc/mi/l

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.526

Space mean speed in ramp influence area, S_R = 53 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 52.9 mph

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Merge Analysis

ıalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	2030 Baseline PM Peak Hour
reeway/dir or travel:	US 101 Southbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
ımber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2924	vph

On Ramp Data

.de of freeway	Right	
ımber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	505	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	305	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2924	505	305	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	795	137	83	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3305	554	335	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3305 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3859	4700	No
v_{R12}	3859	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.2 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.471	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3229	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	505	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3229	305	505	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	877	83	137	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3650		335		554	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3650 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3650	4700	No
v_{12}	3650	4400	No
$v_{FO} = v_F - v_R$	3315	4700	No
v_R	335	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.1 pc/mi/

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.458	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.5	mph

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Merge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Street
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2999	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	840	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2999	710	840	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	815	193	228	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3390	779	922	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3390 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4169	4700	No
v_{R12}	4169	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.5 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.538	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3839	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	840	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	710	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3839	840	710	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1043	228	193	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	4340		922		779	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4340 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4340	4700	No
v_{12}	4340	4400	No
$v_{FO} = v_F - v_R$	3418	4700	No
v_R	922	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.1 pc/mi/

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 53 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 53.2 mph

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Merge Analysis

alyst:	Chris Mitchell
ency/Co.:	Fehr & Peers
te performed:	10/8/2003
alysis time period:	2030 Baseline PM Peak Hour
eeway/dir or travel:	US 101 Northbound
nction:	Los Berros Road
risdiction:	San Luis Obispo County
alysis Year:	2003
scription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Merge	
mber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	3144	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	195	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	565	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	3144	195	565	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	854	53	154	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3554	214	620	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3554 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3768	4700	No
v_{R12}	3768	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.455	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	2030 Baseline PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3709	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3709	565	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1008	154	53	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
ucks and buses PCE, ET	1.5		1.5		1.5	
creational vehicle PCE, ER	1.2		1.2		1.2	
avy vehicle adjustment, fHV	0.962		0.990		0.990	
iver population factor, fP	1.00		1.00		1.00	
ow rate, vp	4193		620		214	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4193 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4193	4700	No
v_{12}	4193	4400	No
$v_{FO} = v_F - v_R$	3573	4700	No
v_R	620	2000	No

Level of Service Determination (if not F)

ısity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.8 pc/mi/l

vel of service for ramp-freeway junction areas of influence E

Speed Estimation

ermediate speed variable,	D_S = 0.484	
ıce mean speed in ramp influence area,	S_R = 54	mph
ıce mean speed in outer lanes,	S_O = N/A	mph
ıce mean speed for all vehicles,	S = 53.9	mph

APPENDIX C4

FREEWAY RAMP JUNCTION WORKSHEETS:

2030 ALTERNATIVE 1 (PREFERRED PROJECT)

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Merge Analysis

.nalyst:	Chris Mitchell
.gency/Co.:	Fehr & Peers
)ate performed:	10/8/2003
.nalysis time period:	Alternative 1 AM Peak Hour
'reeway/dir or travel:	US 101 Southbound
'unction:	Willow Road
urisdiction:	San Luis Obispo County
.nalysis Year:	2003
'escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3162	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	70	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	140	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	3200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3162	70	140	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	859	19	38	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	0.962	0.990	0.990	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, vp	3574	77	154	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3574 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3651	4700	No
v_{R12}	3651	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.8 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.436
Space mean speed in ramp influence area,	S_R = 55.0 mph
Space mean speed in outer lanes,	S_O = N/A mph
Space mean speed for all vehicles,	S = 55.0 mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Willow Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3302	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	140	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	70	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3302	140	70	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	897	38	19	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	3733		154		77	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3733 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3733	4700	No
v_{12}	3733	4400	No
$v_{FO} = v_F - v_R$	3579	4700	No
v_R	154	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.9 pc/mi/:

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.442	
Space mean speed in ramp influence area,	S_R = 55	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 AM Peak Hour
reeway/dir or travel:	US 101 Southbound
unction:	Tefft Street
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2732	vph

On Ramp Data

de of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	575	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
olume on adjacent Ramp	500	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2732	575	500	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	742	156	136	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3088	631	549	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3088 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3719	4700	No
v_{R12}	3719	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.1 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.447	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.7	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3232	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	500	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	575	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3232	500	575	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	878	136	156	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
'rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
'river population factor, fP	1.00		1.00		1.00	
low rate, vp	3654		549		631	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3654 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3654	4700	No
v_{12}	3654	4400	No
$v_{FO} = v_F - v_R$	3105	4700	No
v_R	549	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.2 pc/mi/:

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ıtermediate speed variable,	D_S = 0.477	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.0	mph

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 AM Peak Hour
reeway/dir or travel:	US 101 Southbound
unction:	Los Berros Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2972	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	330	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	80	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2972	330	80	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	808	90	22	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3360	362	88	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3360 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3722	4700	No
v_{R12}	3722	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.2 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.447	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.7	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3052	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	80	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	330	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3052	80	330	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	829	22	90	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade				

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3450		88		362	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3450 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3450	4700	No
v_{12}	3450	4400	No
$v_{FO} = v_F - v_R$	3362	4700	No
v_R	88	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.4 pc/mi/:

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable, D_S = 0.436

pace mean speed in ramp influence area, S_R = 55 mph

pace mean speed in outer lanes, S_O = N/A mph

pace mean speed for all vehicles, S = 55.0 mph

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Merge Analysis

Analyst: Eric Bollich
Agency/Co.: Fehr & Peers
Date performed: 12/6/04
Analysis time period: Alternative 1 AM Peak Hour
Freeway/dir or travel: US 101 Northbound
Junction: Willow Road
Jurisdiction: San Luis Obispo County
Analysis Year: 2003
Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	54.2	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3308	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	543	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	160	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3308	415	160	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	899	113	43	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3739	456	176	pcph

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3739 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4195	4700	No
v_{R12}	4195	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.542

Space mean speed in ramp influence area, S_R = 52.5 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 52.5 mph

HCS2000: Ramps and Ramp Junctions Release 4.1

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Diverge Analysis

Analyst: Eric Bollich
Agency/Co.: Fehr & Peers
Date performed: 12/6/04
Analysis time period: Alternative 1 AM Peak Hour
Freeway/dir or travel: US 101 Northbound
Junction: Willow Road
Jurisdiction: San Luis Obispo County
Analysis Year: 2003
Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3468	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	160	vph
Length of first accel/decel lane	624	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	415	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3468	160	415	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	942	43	113	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3920	176	456	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3920 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3920	4700	No
v_{12}	3920	4400	No
$v_{FO} = v_F - v_R$	3744	4700	No
v_R	176	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.444

Space mean speed in ramp influence area, S_R = 55 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 54.8 mph

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 AM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Tefft Street
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2706	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	760	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	385	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2706	760	385	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	735	207	105	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3059	834	423	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3059 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3893	4700	No
v_{R12}	3893	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.3 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.477	
Space mean speed in ramp influence area,	S_R = 54.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.0	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3091	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	760	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3091	385	760	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	840	105	207	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
'rucks and buses PCE, ET	1.5		1.5		1.5	
:ecreational vehicle PCE, ER	1.2		1.2		1.2	
:eavy vehicle adjustment, fHV	0.962		0.990		0.990	
:river population factor, fP	1.00		1.00		1.00	
'low rate, vp	3494		423		834	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3494 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3494	4700	No
v_{12}	3494	4400	No
$v_{FO} = v_F - v_R$	3071	4700	No
v_R	423	2000	No

Level of Service Determination (if not F)

'ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.8 pc/mi/:

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.466	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.3	mph

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 AM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Los Berros Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3393	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	220	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	330	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3393	220	330	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	922	60	90	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3836	242	362	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3836 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4078	4700	No
v_{R12}	4078	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.0 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.516	
Space mean speed in ramp influence area,	S_R = 53.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.1	mph

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Diverge Analysis

ıalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
ıalysis time period:	Alternative 1 AM Peak Hour
reeway/dir or travel:	US 101 Northbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Diverge	
ımber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3723	vph

Off Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-Flow speed on ramp	35.0	mph
olume on ramp	330	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent ramp	220	vph
osition of adjacent ramp	Downstream	
ype of adjacent ramp	On	
istance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3723	330	220	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	1012	90	60	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
'errain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4209	362	242	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4209 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4209	4700	No
v_{12}	4209	4400	No
$v_{FO} = v_F - v_R$	3847	4700	No
v_R	362	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.9 pc/mi/

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.461	
Space mean speed in ramp influence area,	S_R = 54	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Merge Analysis

Analyst: Eric Bollich
Agency/Co.: Fehr & Peers
Date performed: 12/6/04
Analysis time period: Alternative 1 PM Peak Hour
Freeway/dir or travel: US 101 Northbound
Junction: Willow Road
Jurisdiction: San Luis Obispo County
Analysis Year: 2003
Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	54.6	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3510	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	543	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	230	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3510	245	230	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	954	67	62	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3968	269	252	pcph

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3968 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4237	4700	No
v_{R12}	4237	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.553

Space mean speed in ramp influence area, S_R = 52.3 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 52.3 mph

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Diverge Analysis

Analyst: Eric Bollich
Agency/Co.: Fehr & Peers
Date performed: 12/6/04
Analysis time period: Alternative 1 PM Peak Hour
Freeway/dir or travel: US 101 Northbound
Junction: Willow Road
Jurisdiction: San Luis Obispo County
Analysis Year: 2003
Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3740	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	624	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	245	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent	
Volume, V (vph)	3740	230	245	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1016	62	67	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4228	252	269	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4228 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4228	4700	No
v_{12}	4228	4400	No
$v_{FO} = v_F - v_R$	3976	4700	No
v_R	252	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.451

Space mean speed in ramp influence area, S_R = 55 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 54.6 mph

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Merge Analysis

ıalyst:	Chris Mitchell
ɟency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	Alternative 1 PM Peak Hour
·eeway/dir or travel:	US 101 Southbound
.nction:	Tefft Street
.risdiction:	San Luis Obispo County
ıalysis Year:	2003
·scription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Merge	
mber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	2634	vph

On Ramp Data

de of freeway	Right	
mber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	545	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	805	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

ıction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	2634	545	805	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	716	148	219	v
ıcks and buses	8	2	2	%
:reational vehicles	0	0	0	%
:rain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2978	598	884	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2978 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3576	4700	No
v_{R12}	3576	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.0 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.425	
Space mean speed in ramp influence area,	S_R = 55.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.2	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3439	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	805	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	545	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3439		805		545		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	935		219		148		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
'rucks and buses PCE, ET	1.5		1.5		1.5	
.ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
ıriver population factor, fP	1.00		1.00		1.00	
'low rate, vp	3888		884		598	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3888 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3888	4700	No
v_{12}	3888	4400	No
$v_{FO} = v_F - v_R$	3004	4700	No
v_R	884	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.2 pc/mi/:

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ıtermediate speed variable,	D_S = 0.508	
pace mean speed in ramp influence area,	S_R = 53	mph
pace mean speed in outer lanes,	S_0 = N/A	mph
pace mean speed for all vehicles,	S = 53.3	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

ıalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
ıalysis time period:	Alternative 1 PM Peak Hour
reeway/dir or travel:	US 101 Southbound
ınction:	Los Berros Road
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

/pe of analysis	Merge	
ımber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3026	vph

On Ramp Data

ıde of freeway	Right	
ımber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	405	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	200	vph
osition of adjacent Ramp	Upstream	
/pe of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

ınction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3026	405	200	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	822	110	54	v
ucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3421	445	220	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3421 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3866	4700	No
v_{R12}	3866	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.3 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.472	
Space mean speed in ramp influence area,	S_R = 54.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.1	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3226	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	200	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	405	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3226	200	405	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	877	54	110	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3647		220		445	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3647 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3647	4700	No
v_{12}	3647	4400	No
$v_{FO} = v_F - v_R$	3427	4700	No
v_R	220	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.1 pc/mi/l

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.448	
pace mean speed in ramp influence area,	S_R = 55	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.7	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 PM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Willow Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3510	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	245	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
olume on adjacent Ramp	230	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	3200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3510	245	230	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	954	67	62	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3968	269	252	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3968 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4237	4700	No
v_{R12}	4237	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.3 pc/mi

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.556	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Willow Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3740	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	245	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3740	230	245	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1016	62	67	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi	
rucks and buses PCE, ET	1.5*		1.5		1.5		
ecreational vehicle PCE, ER	1.2		1.2		1.2		
eavy vehicle adjustment, fHV	0.962		0.990		0.990		
river population factor, fP	1.00		1.00		1.00		
low rate, vp	4228		252		269		pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4228 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4228	4700	No
v_{12}	4228	4400	No
$v_{FO} = v_F - v_R$	3976	4700	No
v_R	252	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.1 pc/mi/

evel of service for ramp-freeway junction areas of influence E

Speed Estimation

ntermediate speed variable,	D_S = 0.451	
pace mean speed in ramp influence area,	S_R = 55	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.6	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 PM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Tefft Street
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3154	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	550	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	685	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3154	550	685	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	857	149	186	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	0.962	0.990	0.990	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, v_p	3565	604	752	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3565 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4169	4700	No
v_{R12}	4169	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.6 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.538	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3839	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	685	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	550	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3839		685		550		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1043		186		149		v
Trucks and buses	8		2		2		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	4340		752		604	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4340 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4340	4700	No
v_{12}	4340	4400	No
$v_{FO} = v_F - v_R$	3588	4700	No
v_R	752	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.1 pc/mi/:

evel of service for ramp-freeway junction areas of influence E

Speed Estimation

ntermediate speed variable, D_S = 0.496

pace mean speed in ramp influence area, S_R = 54 mph

pace mean speed in outer lanes, S_0 = N/A mph

pace mean speed for all vehicles, S = 53.6 mph

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 1 PM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Los Berros Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3266	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	110	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	490	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3266	110	490	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	887	30	133	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3692	121	538	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3692 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3813	4700	No
v_{R12}	3813	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.0 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.463	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 1 PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3756	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	110	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3756	490	110	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1021	133	30	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi	
rucks and buses PCE, ET	1.5		1.5		1.5		
ecreational vehicle PCE, ER	1.2		1.2		1.2		
eavy vehicle adjustment, fHV	0.962		0.990		0.990		
river population factor, fP	1.00		1.00		1.00		
low rate, vp	4246		538		121		pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4246 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4246	4700	No
v_{12}	4246	4400	No
$v_{FO} = v_F - v_R$	3708	4700	No
v_R	538	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.3 pc/mi/:

evel of service for ramp-freeway junction areas of influence E

Speed Estimation

ntermediate speed variable,	D_S = 0.476	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.0	mph

APPENDIX C5

FREEWAY RAMP JUNCTION WORKSHEETS:

2030 ALTERNATIVE 2 (FRONTAGE ROAD ONLY)

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Merge Analysis

ıalyst:	Chris Mitchell
ɟency/Co.:	Fehr & Peers
ıte performed:	10/8/2003
ıalysis time period:	Alternative 2 AM Peak Hour
:eeway/dir or travel:	US 101 Southbound
ınction:	Tefft Street
ırisdiction:	San Luis Obispo County
ıalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ʏpe of analysis	Merge	
ımber of lanes in freeway	2	
:ee-flow speed on freeway	65.0	mph
olume on freeway	2687	vph

On Ramp Data

ıde of freeway	Right	
ımber of lanes in ramp	1	
:ee-flow speed on ramp	35.0	mph
olume on ramp	610	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	590	vph
osition of adjacent Ramp	Upstream	
ʏpe of adjacent Ramp	Off	
istance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

ınction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2687	610	590	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	730	166	160	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3037	670	648	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3037 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3707	4700	No
v_{R12}	3707	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.445	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3277	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	590	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	610	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3277	590	610	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	890	160	166	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5*		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3704		648		670	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3704 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3704	4700	No
v_{12}	3704	4400	No
$v_{FO} = v_F - v_R$	3056	4700	No
v_R	648	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/l

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.486	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 53.8	mph

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 2 AM Peak Hour
reeway/dir or travel:	US 101 Southbound
unction:	Los Berros Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2922	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	355	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	130	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2922	355	130	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	794	96	35	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3303	390	143	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3303 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3693	4700	No
v_{R12}	3693	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.0 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.443	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 AM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3052	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	130	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	355	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3052	130	355	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	829	35	96	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3450		143		390	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3450 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3450	4700	No
v_{12}	3450	4400	No
$v_{FO} = v_F - v_R$	3307	4700	No
v_R	143	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.4 pc/mi/

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable, D_S = 0.441

pace mean speed in ramp influence area, S_R = 55 mph

pace mean speed in outer lanes, S_O = N/A mph

pace mean speed for all vehicles, S = 54.9 mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 2 AM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Tefft Street
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2601	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	1030	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	490	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2601	1030	490	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	707	280	133	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2940	1131	538	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2940 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4071	4700	No
v_{R12}	4071	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.6 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.515	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 53.2	mph

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 AM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3091	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1030	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3091	490	1030	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	840	133	280	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 2 AM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Los Berros Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	3246	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	365	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	385	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	3246	365	385	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	882	99	105	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3669	401	423	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3669 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4070	4700	No
v_{R12}	4070	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.9 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.514	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.2	mph

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	4105		423		401	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4105 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4105	4700	No
v_{12}	4105	4400	No
$v_{FO} = v_F - v_R$	3682	4700	No
v_R	423	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.1 pc/mi/:

evel of service for ramp-freeway junction areas of influence E

Speed Estimation

ntermediate speed variable,	D_S = 0.466	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 54.3	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 2 PM Peak Hour
reeway/dir or travel:	US 101 Southbound
unction:	Tefft Street
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2439	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	740	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	990	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2439	740	990	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	663	201	269	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2757	812	1087	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3569	4700	No
v_{R12}	3569	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.8 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.424	
Space mean speed in ramp influence area,	S_R = 55.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3429	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	740	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3429	990	740	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	932	269	201	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
rucks and buses PCE, ET	1.5		1.5		1.5	
ecreational vehicle PCE, ER	1.2		1.2		1.2	
eavy vehicle adjustment, fHV	0.962		0.990		0.990	
river population factor, fP	1.00		1.00		1.00	
low rate, vp	3876		1087		812	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3876 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3876	4700	No
v_{12}	3876	4400	No
$v_{FO} = v_F - v_R$	2789	4700	No
v_R	1087	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.1 pc/mi/:

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.526	
pace mean speed in ramp influence area,	S_R = 53	mph
pace mean speed in outer lanes,	S_O = N/A	mph
pace mean speed for all vehicles,	S = 52.9	mph

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 2 PM Peak Hour
reeway/dir or travel:	US 101 Southbound
unction:	Los Berros Road
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2924	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	505	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	305	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2924	505	305	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	795	137	83	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3305	554	335	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3305 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3859	4700	No
v_{R12}	3859	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.2 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.471	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 PM Peak Hour
Freeway/dir or travel:	US 101 Southbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003
Description:	Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3229	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	505	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3229	305	505	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	877	83	137	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
'rucks and buses PCE, ET	1.5		1.5		1.5	
.ecreational vehicle PCE, ER	1.2		1.2		1.2	
:eavy vehicle adjustment, fHV	0.962		0.990		0.990	
›river population factor, fP	1.00		1.00		1.00	
'low rate, vp	3650		335		554	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3650 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3650	4700	No
v_{12}	3650	4400	No
$v_{FO} = v_F - v_R$	3315	4700	No
v_R	335	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.1 pc/mi/:

evel of service for ramp-freeway junction areas of influence D

Speed Estimation

ntermediate speed variable,	D_S = 0.458	
pace mean speed in ramp influence area,	S_R = 54	mph
pace mean speed in outer lanes,	S_0 = N/A	mph
pace mean speed for all vehicles,	S = 54.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

nalyst:	Chris Mitchell
gency/Co.:	Fehr & Peers
ate performed:	10/8/2003
nalysis time period:	Alternative 2 PM Peak Hour
reeway/dir or travel:	US 101 Northbound
unction:	Tefft Street
urisdiction:	San Luis Obispo County
nalysis Year:	2003
escription:	Willow Road / US 101 Interchange

Freeway Data

ype of analysis	Merge	
umber of lanes in freeway	2	
ree-flow speed on freeway	65.0	mph
olume on freeway	2999	vph

On Ramp Data

ide of freeway	Right	
umber of lanes in ramp	1	
ree-flow speed on ramp	35.0	mph
olume on ramp	710	vph
ength of first accel/decel lane	500	ft
ength of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

oes adjacent ramp exist?	Yes	
olume on adjacent Ramp	840	vph
osition of adjacent Ramp	Upstream	
ype of adjacent Ramp	Off	
istance to adjacent Ramp	1200	ft

Conversion to pc/h Under Base Conditions

unction Components	Freeway	Ramp	Adjacent Ramp	
olume, V (vph)	2999	710	840	vph
eak-hour factor, PHF	0.92	0.92	0.92	
eak 15-min volume, v15	815	193	228	v
rucks and buses	8	2	2	%
ecreational vehicles	0	0	0	%
errain type:	Level	Level	Level	
Grade	%	%	%	
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3390	779	922	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3390 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4169	4700	No
v_{R12}	4169	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.5 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.538	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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E-mail: c.mitchell@fehrandpeers.com

Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Tefft Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3839	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	840	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	710	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3839	840	710	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1043	228	193	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Merge Analysis

alyst:	Chris Mitchell
ency/Co.:	Fehr & Peers
te performed:	10/8/2003
alysis time period:	Alternative 2 PM Peak Hour
eeway/dir or travel:	US 101 Northbound
nction:	Los Berros Road
risdiction:	San Luis Obispo County
alysis Year:	2003
scription:	Willow Road / US 101 Interchange

Freeway Data

pe of analysis	Merge	
nber of lanes in freeway	2	
ee-flow speed on freeway	65.0	mph
lume on freeway	3144	vph

On Ramp Data

de of freeway	Right	
nber of lanes in ramp	1	
ee-flow speed on ramp	35.0	mph
lume on ramp	195	vph
ngth of first accel/decel lane	500	ft
ngth of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

es adjacent ramp exist?	Yes	
lume on adjacent Ramp	565	vph
sition of adjacent Ramp	Upstream	
pe of adjacent Ramp	Off	
stance to adjacent Ramp	2200	ft

Conversion to pc/h Under Base Conditions

nction Components	Freeway	Ramp	Adjacent Ramp	
lume, V (vph)	3144	195	565	vph
ak-hour factor, PHF	0.92	0.92	0.92	
ak 15-min volume, v15	854	53	154	v
ucks and buses	8	2	2	%
creational vehicles	0	0	0	%
rrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3554	214	620	pcp

Estimation of V12 Merge Areas

L_{EQ} = 0.00 (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3554 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3768	4700	No
v_{R12}	3768	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.455	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.962		0.990		0.990	
Driver population factor, fP	1.00		1.00		1.00	
Flow rate, vp	4340		922		779	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4340 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4340	4700	No
v_{12}	4340	4400	No
$v_{FO} = v_F - v_R$	3418	4700	No
v_R	922	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.1 pc/mi/

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.511	
Space mean speed in ramp influence area,	S_R = 53	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1a

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Diverge Analysis

Analyst:	Chris Mitchell
Agency/Co.:	Fehr & Peers
Date performed:	10/8/2003
Analysis time period:	Alternative 2 PM Peak Hour
Freeway/dir or travel:	US 101 Northbound
Junction:	Los Berros Road
Jurisdiction:	San Luis Obispo County
Analysis Year:	2003

Description: Willow Road / US 101 Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3709	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2200	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3709	565	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1008	154	53	v
Trucks and buses	8	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	

Length	0.00	mi	0.00	mi	0.00	mi
'rucks and buses PCE, ET	1.5		1.5		1.5	
:ecreational vehicle PCE, ER	1.2		1.2		1.2	
(eavy vehicle adjustment, fHV	0.962		0.990		0.990	
'river population factor, fP	1.00		1.00		1.00	
'low rate, vp	4193		620		214	pcpl

Estimation of V12 Diverge Areas

L_{EQ} = 0.00 (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4193 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4193	4700	No
v_{12}	4193	4400	No
$v_{FO} = v_F - v_R$	3573	4700	No
v_R	620	2000	No

Level of Service Determination (if not F)

ensity, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.8 pc/mi/:

evel of service for ramp-freeway junction areas of influence E

Speed Estimation

ıtermediate speed variable,	D_S = 0.484	
ɔace mean speed in ramp influence area,	S_R = 54	mph
ɔace mean speed in outer lanes,	S_O = N/A	mph
ɔace mean speed for all vehicles,	S = 53.9	mph

APPENDIX D

SIGNAL WARRANT ANALYSIS WORKSHEETS

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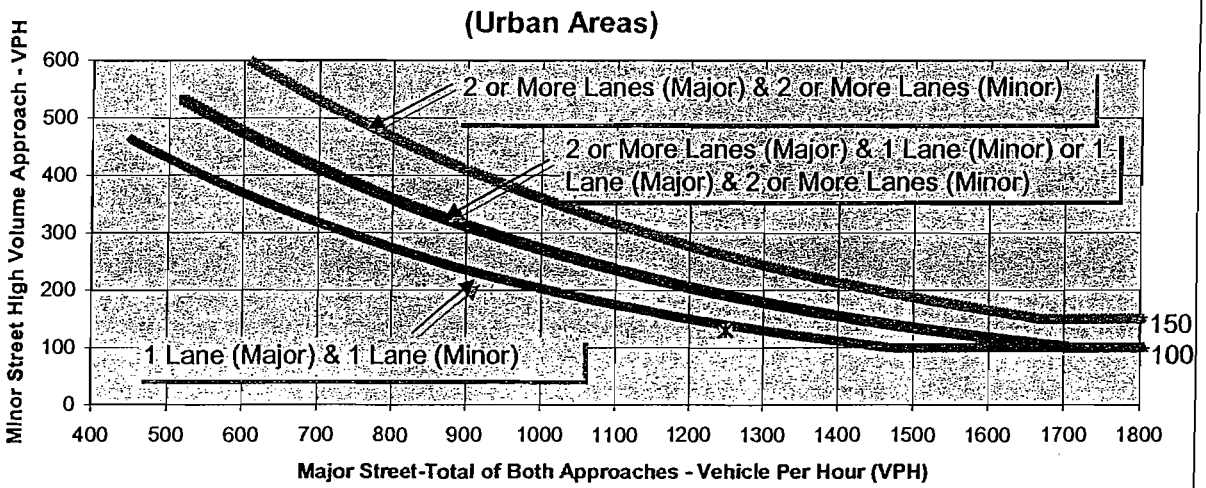
Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*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.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1250	130	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

LB SB NoProj AM

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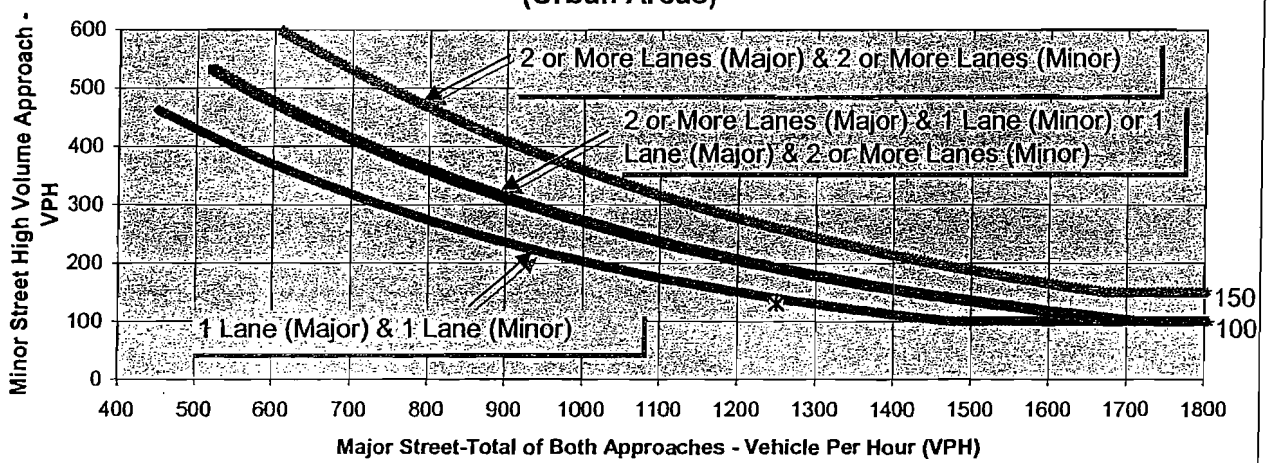

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1250	130	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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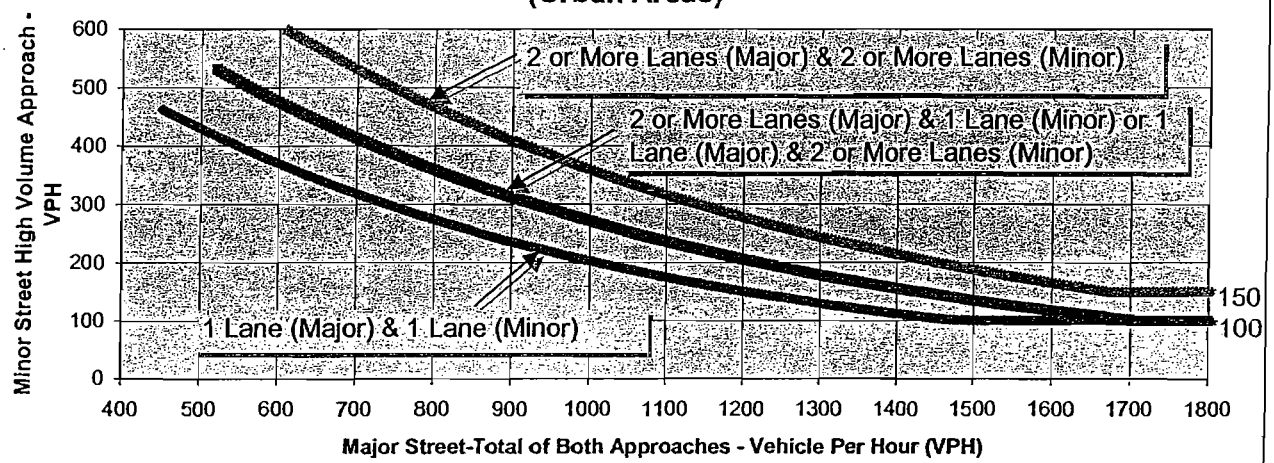

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		945	80	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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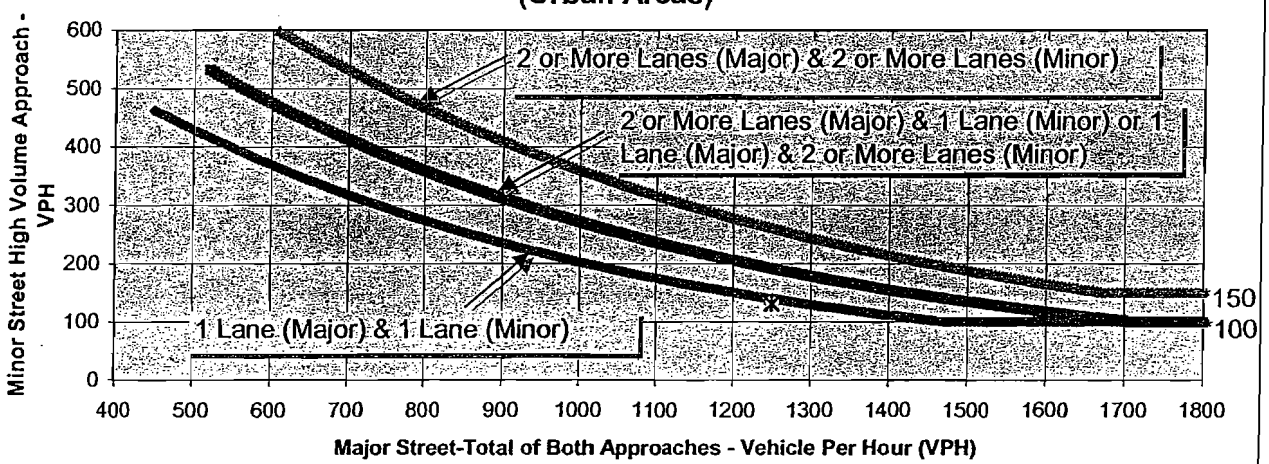

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1250	130	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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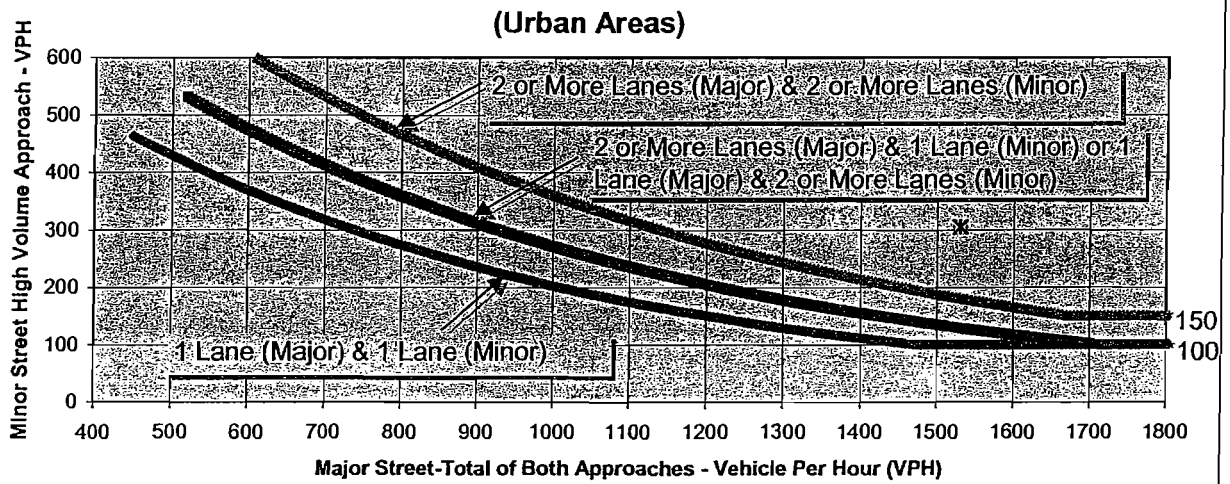

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	YES
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1530	305	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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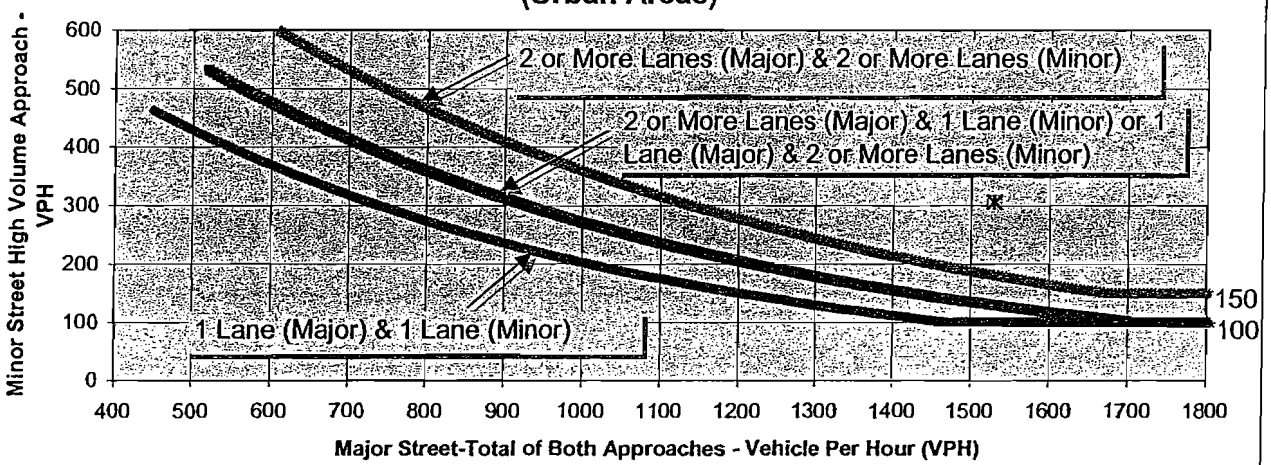

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	YES
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1530	305	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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Figure 9-8
PEAK HOUR VOLUME WARRANT
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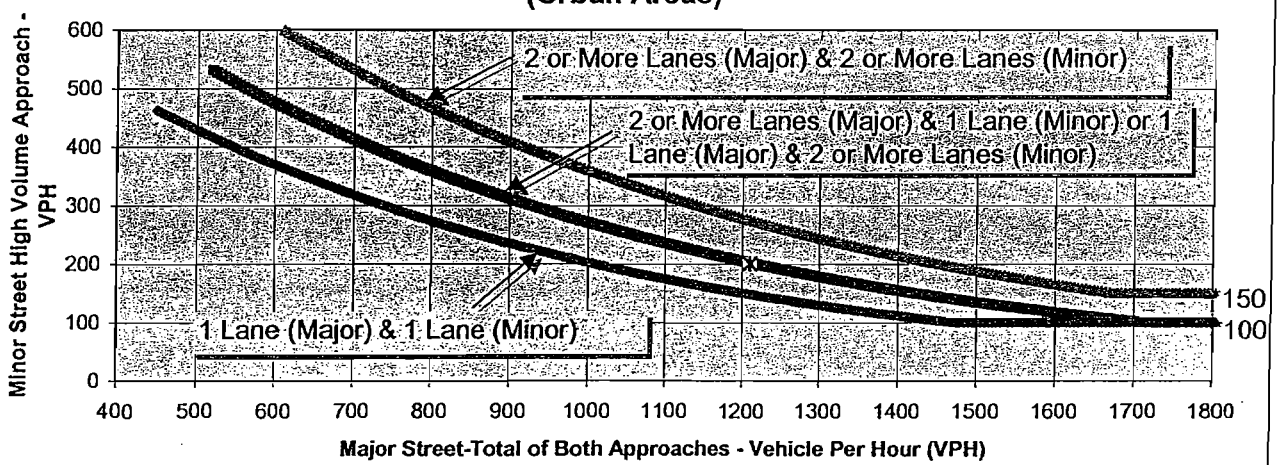

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1210	200	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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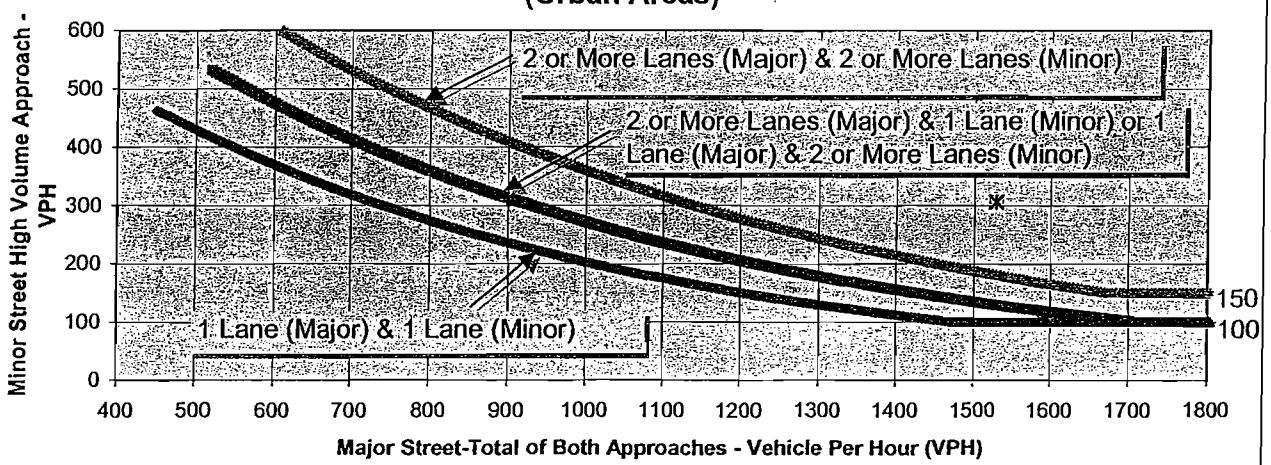
Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*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.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	YES
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		1530	305	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

LB SB Alt 2 PM

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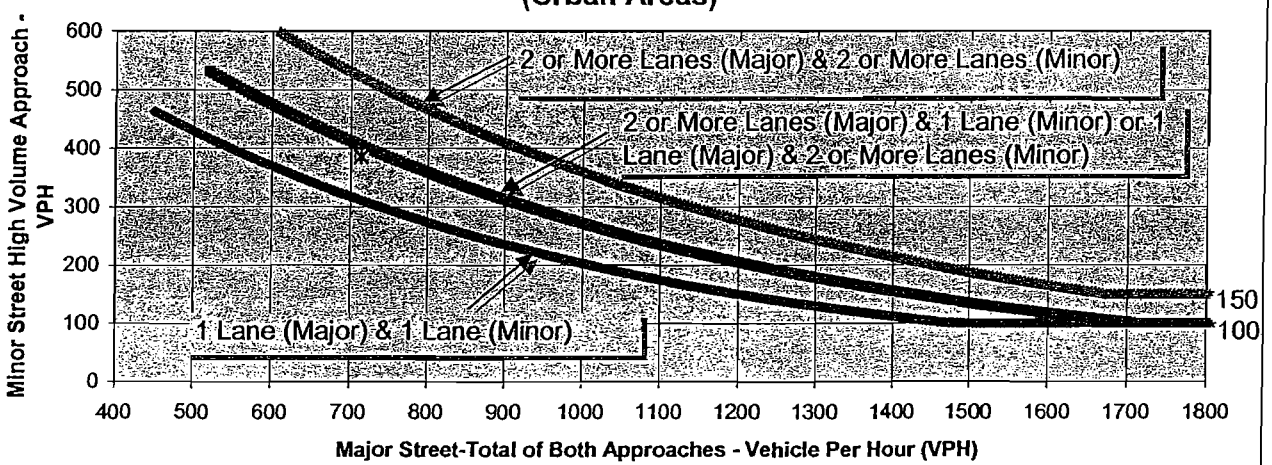
Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*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.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		715	385	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

LB NB NoProj AM

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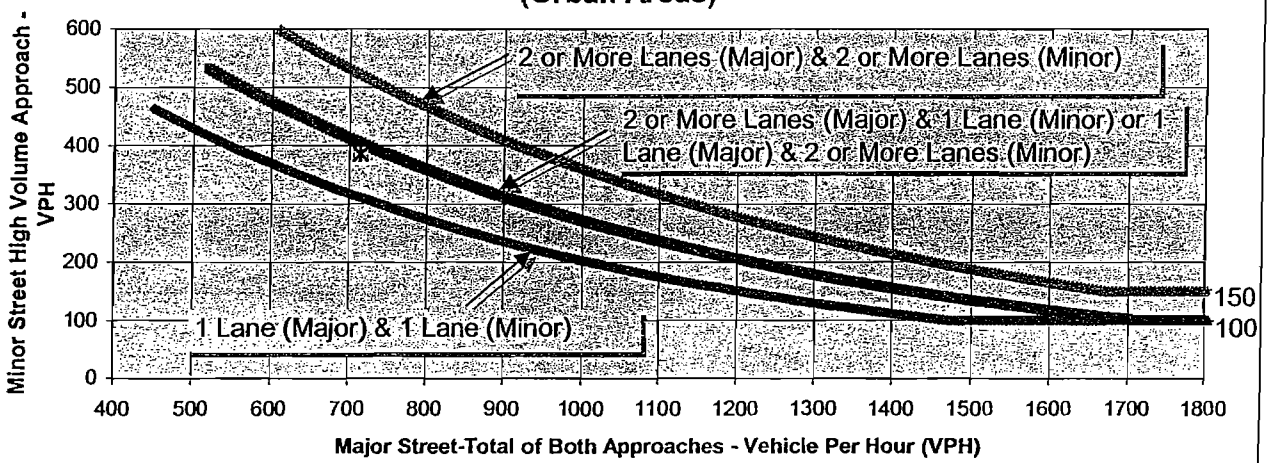
Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*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.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	NO
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		715	385	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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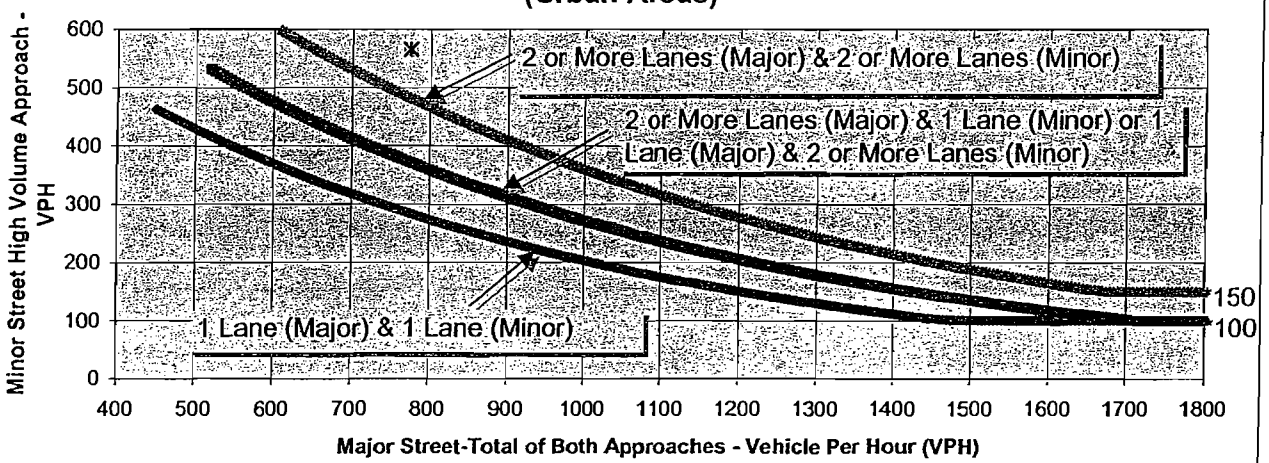

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	YES
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		775	565	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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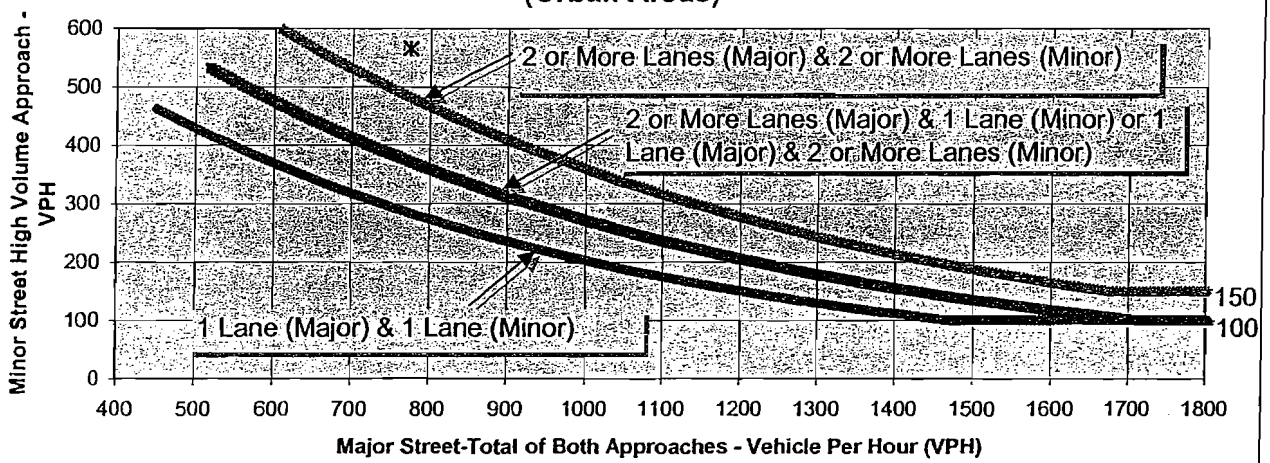

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	y	YES
	One Lane (Y/N)	y	n	
Traffic Volume (VPH) *		775	565	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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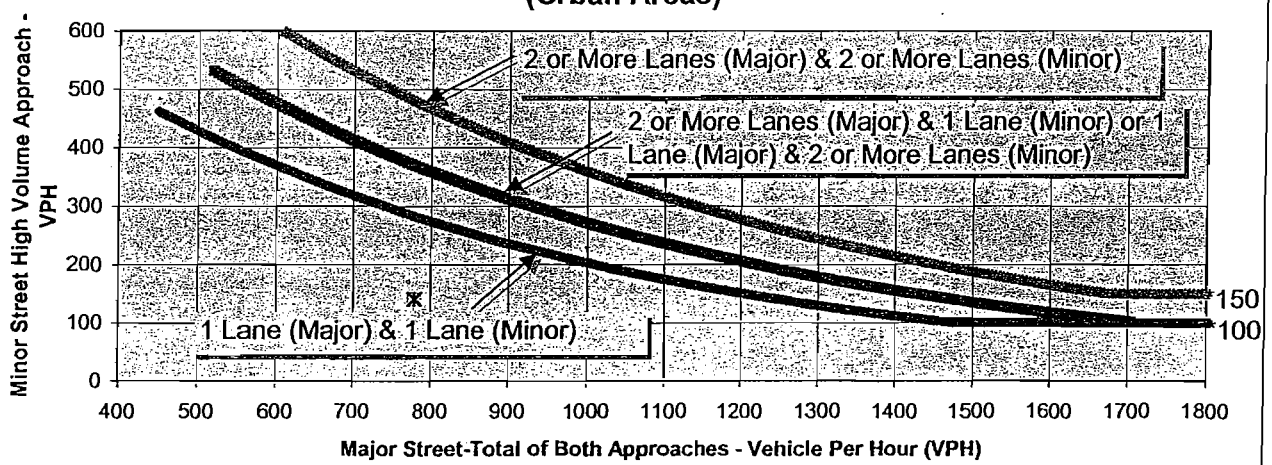

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	y	NO
	One Lane (Y/N)	n	n	
Traffic Volume (VPH) *		780	140	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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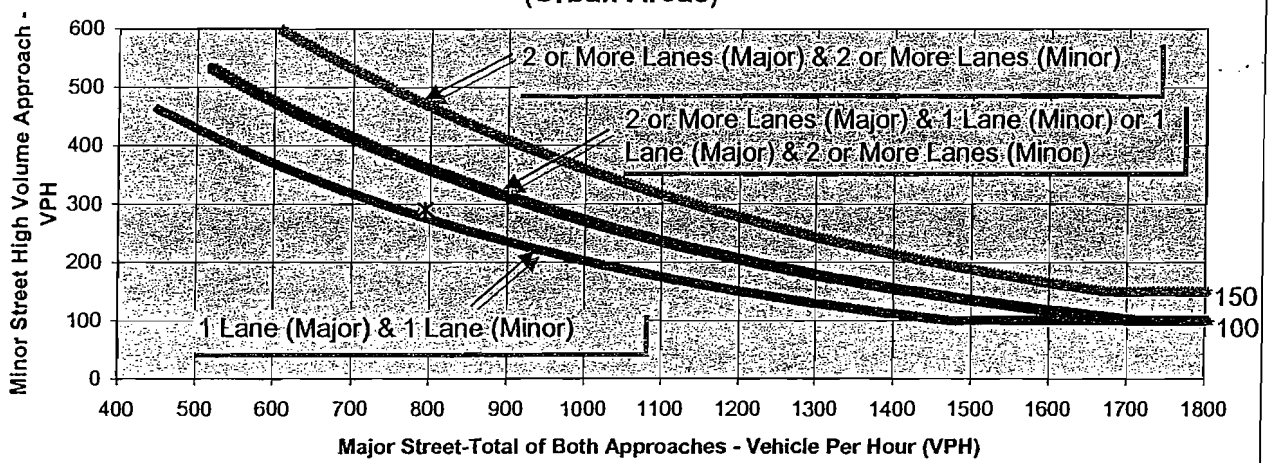

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Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	y	NO
	One Lane (Y/N)	n	n	
Traffic Volume (VPH) *		795	290	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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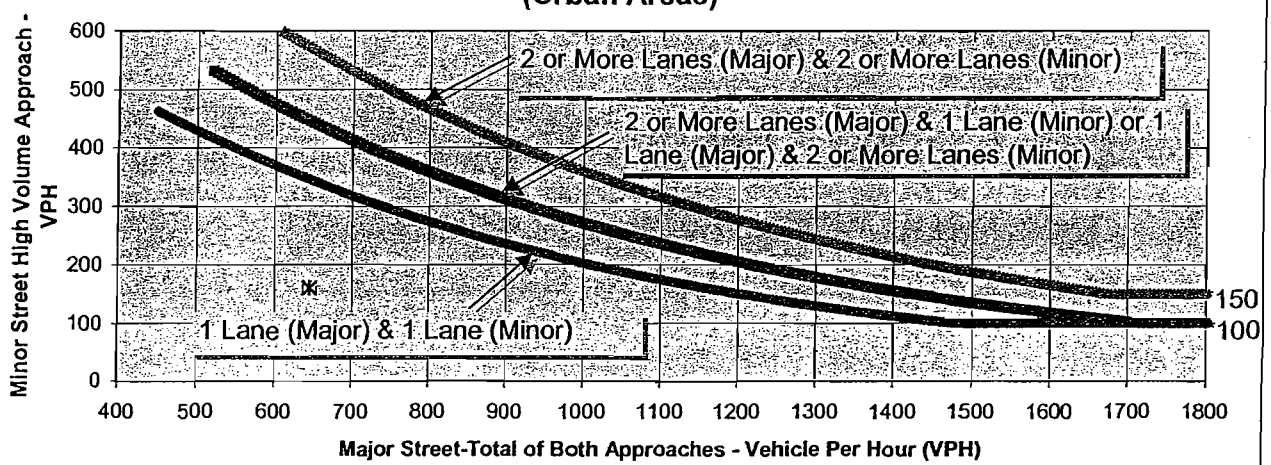

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	y	NO
	One Lane (Y/N)	n	n	
Traffic Volume (VPH) *		645	160	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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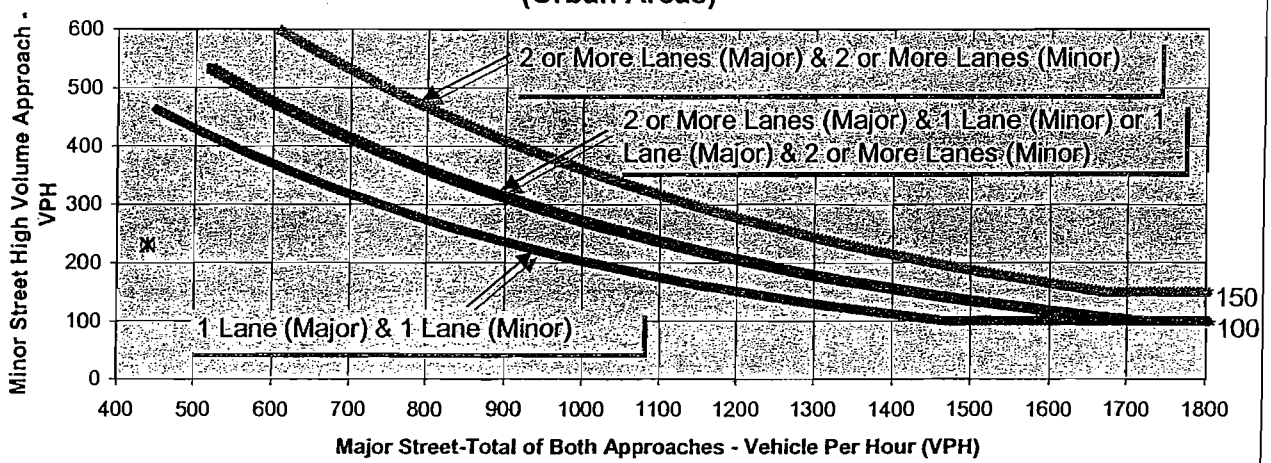

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	y	NO
	One Lane (Y/N)	n	n	
Traffic Volume (VPH) *		440	230	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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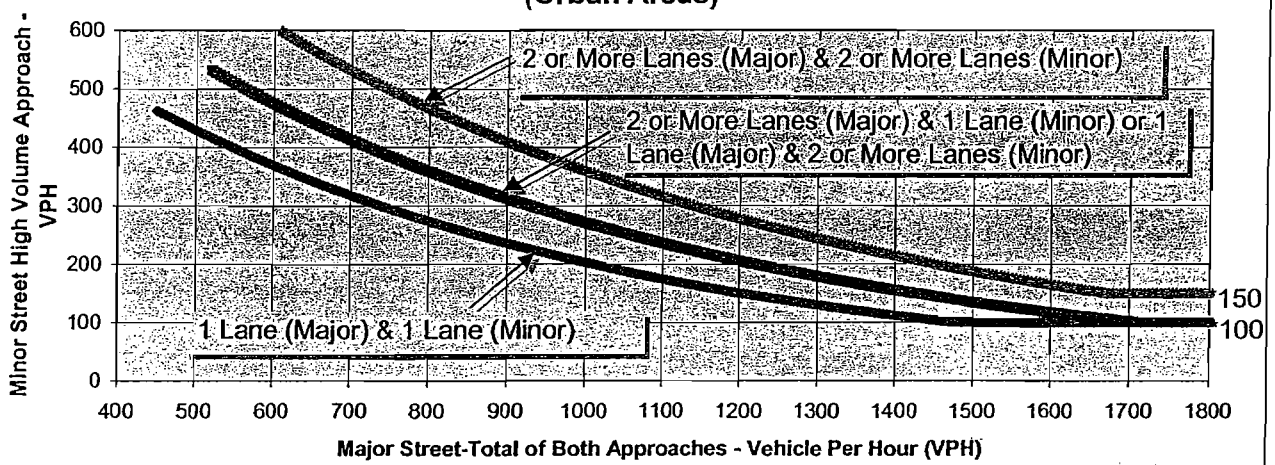

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		395	160	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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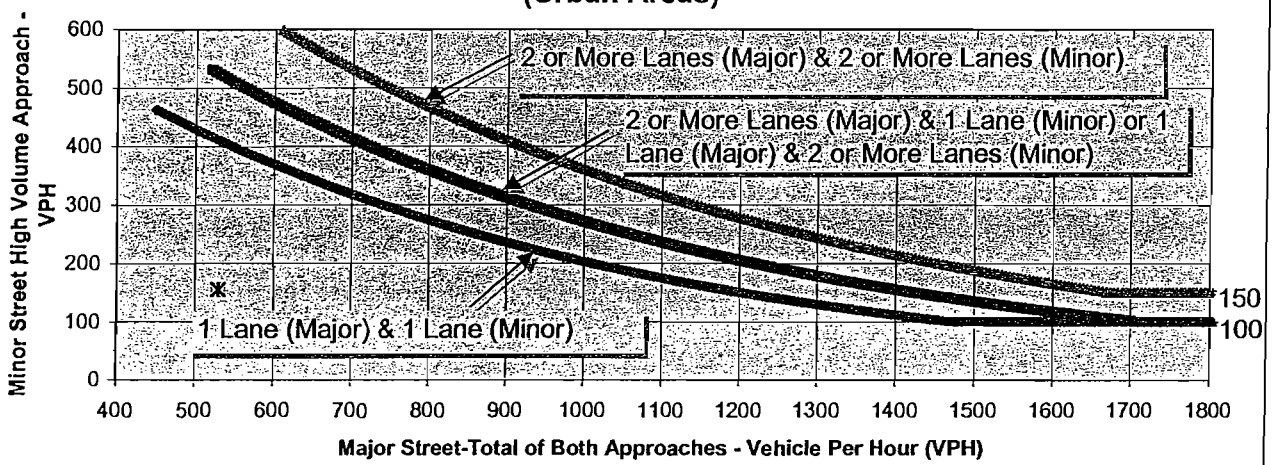

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		530	155	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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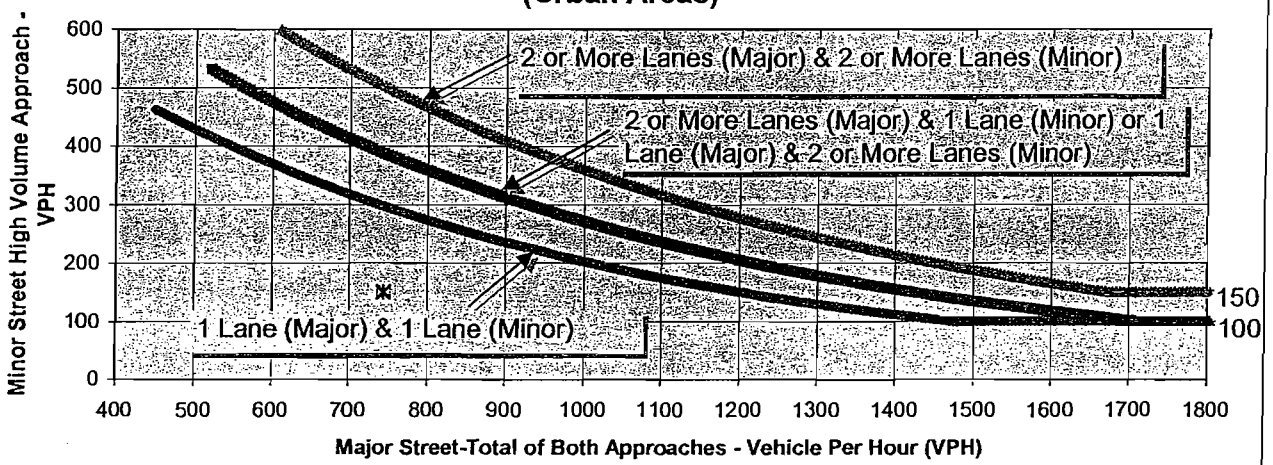

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		745	150	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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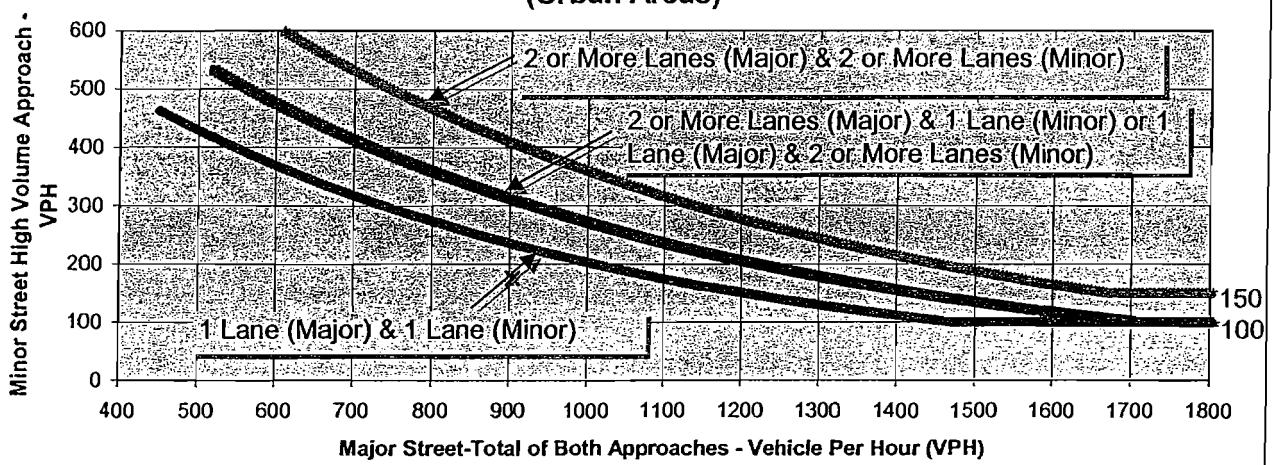

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Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		905	175	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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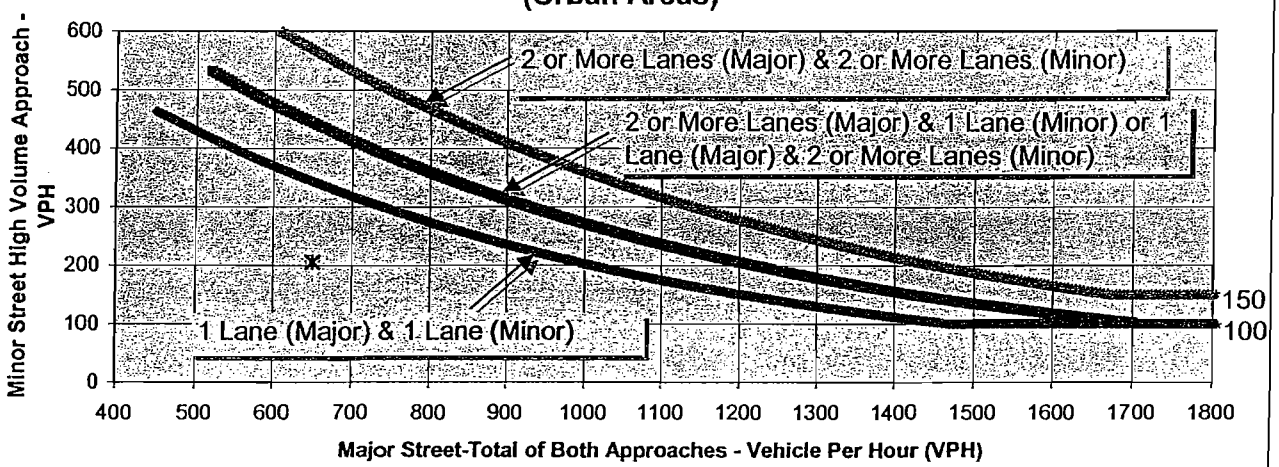

*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		650	205	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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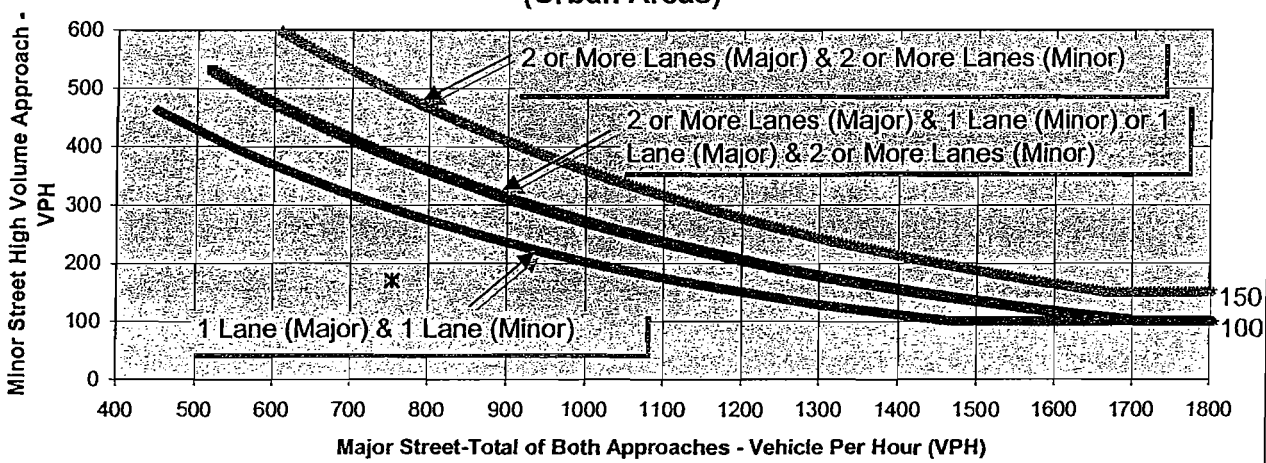

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Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		755	170	

*Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions