Final Transportation Impact Analysis

Golden Hill Retail Center

TRANSPORTATION

IMPACT ANALYSIS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

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June 14, 2007

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EXECUTIVE SUMMARY

This report presents the results of the transportation impact analysis (TIA) for the proposed Golden Hill Retail Center (GHRC) located in Paso Robles, California. The site is located on the west side of Golden Hill Road between SR 46 East and Dallons Road. The proposed 290,732-square foot shopping center includes a home improvement superstore, various retail stores, a drugstore, and restaurants. Although the current site plan has slightly changed with two retail pads replacing the drugstore, this traffic study analyzes the original project description that contains more square footage and generates a higher number of trips.

The purpose of the analysis is to identify potential transportation impacts of the proposed project on the surrounding roadway system, and recommend appropriate improvements to mitigate impacts considered significant in comparison to set thresholds. The roadway system was evaluated under Existing, Existing Plus Project, Near-Term, and Year 2030 Conditions for typical weekday AM and PM peak hours plus the Friday PM peak hour. The impacts of the project were also evaluated for alternate modes of travel including bicycle, pedestrian, and transit.

PROJECT TRAFFIC ESTIMATES

The proposed retail development is estimated to generate approximately 12,400 net new daily trips, 720 net new AM peak-hour trips, and 1,020 net new PM peak-hour trips. The project site is assumed to generate the same number of trips during the Friday PM peak-hour as the typical weekday PM peak-hour.

KEY TECHNICAL ASSUMPTIONS

Analysis Periods

The traffic study includes an evaluation of the Friday peak-hour conditions in addition to typical weekday (Tuesday to Thursday) commute conditions. In general, traffic operations on SR 46 are more congested during Friday PM peak-hour because of weekend traffic traveling to and from the Central Valley. The inclusion of Friday PM peak-hour traffic operations was requested by Caltrans. The analysis for the City's General Plan Circulation Element analyzed typical weekday conditions and not recreational weekend peak travel (Friday PM peak-hour).

Level of Service Standards

The City of Paso Robles maintains level of service (LOS) D as the minimum acceptable level of service for intersections (i.e., LOS E and F are considered unacceptable operations). Caltrans has more stringent standards than the City of Paso Robles and strives to maintain operations at the LOS C/D threshold on state-operated facilities in the study area, which include US 101 and SR 46. Therefore, LOS C or better is considered acceptable on Caltrans facilities.

Regional Growth

For the Near-term Cumulative (Year 2010) and Cumulative (Year 2030) scenarios, Caltrans requested that an annual growth rate of 4.1 percent per year (based on 13 years of historical counts) be applied to the existing volumes in the SR 46 corridor to account for growth. While this growth rate is not typically sustained over a 20- to 30-year period, its use results in a conservative estimate of traffic, where the existing volumes are projected to increase by 20 percent for Near-term Cumulative and 100 percent for Cumulative conditions, Growth includes some traffic from other development in Paso Robles, and substantial regional traffic that has origins and destinations outside the City.

Under the Cumulative (Year 2030) volumes, project traffic generally represents five (5) percent or less of the total volumes at intersections on SR 46 west and east of Golden Hill Road. In addition, the Cumulative scenario analyzed for this study reflects a five-year horizon beyond what was evaluated in the City's Circulation Element (Year 2025).

IMPACTS AND MITIGATION MEASURES

Intersections

Significant impacts are anticipated at all study intersections under near-term or long-term conditions with the proposed project in place. For Existing Plus Project Conditions, the following will mitigate significant impacts:

- planned improvements (second westbound left-turn at the US 101/SR 46 interchange, widening of SR 46, east of Airport Road, to four lanes, and roundabout at Golden Hill Road/Union Road),
- widening of SR 46/Golden Hill Road intersection, and
- prohibition of northbound left-turns at SR 46/Union Road.

These improvements will substantially improve the level of service ratings at SR 46/Golden Hill Road (LOS F to LOS D) and Golden Hill Road/Union Road (LOS E/F to LOS A).

Under Near-Term Conditions, representing traffic growth to Year 2010 which accounts for buildout of the project, construction of one pending and all approved projects near the site, and future growth in the SR 46 corridor, capacity improvements were identified at all locations including a grade-separation at SR 46/Airport Road. An assessment district fee will be collected to secure funding for the SR 46/Airport Road interchange. The project applicant required participation in this program will constitute its fair share towards the SR 46/Airport Road improvements.

Under Cumulative (Year 2030) Conditions, the removal of at-grade crossings on SR 46 (via an upgrade to an expressway or freeway) would provide improved corridor operations. Closure of Buena Vista Drive, Union Road, and Mill Road would likely be required to meet Caltrans requirements for spacing of grade-separated interchanges. Grade-separation of intersections is anticipated at Golden Hill Road, Airport Road, and Jardine Road. However, substantial right-of-way acquisition is required. To mitigate near-term and cumulative impacts, the project applicant has agreed to provide a 30-foot easement to the City of Paso Robles along the southern project frontage to provide sufficient right-of-way to accommodate future improvements to SR 46. According to Caltrans District 5 staff, the easement would allow for a future upgrade of SR 46 to provide additional capacity. Caltrans staff has indicated that this easement in addition to the proposed Existing Plus Project improvements would constitute "fair-share" contribution towards near-term and cumulative impacts on SR 46. As noted in the previous section, the project traffic represents a small percentage of the total intersections volumes on SR 46 under Cumulative Conditions.

We strongly recommend that a comprehensive SR 46 corridor study be conducted to evaluate the potential for modification or removal of at-grade crossings and to address all design issues, including right-of-way concerns and appropriate locations for on- and off-ramps.

Roadway Segments

A planning level analysis was conducted to determine if the study roadway segments are operating below or over capacity. Because this type of analysis is general in nature and does not take into account delays and other factors affecting capacity, impacts usually defer to a more detailed operational analysis (intersection and freeway ramp levels of service).

Based on the results of the planning analysis, widening of SR 46 (to four lanes), east of Airport, and Golden Hill Road, north of SR 46, will provide acceptable operations under Existing Plus Project Conditions. The analysis indicates a grade-separated facility on SR 46 will be required under Cumulative (Year 2030) Conditions to provide sufficient capacity.

The City of Paso Robles is contemplating an extension of Dallons Road east from Golden Hill Road to Airport Road to provide an alternate parallel facility to US 101. This roadway extension would provide an alternate route to SR 46 between Buena Vista Drive and Airport Road, improve local circulation and reduce the need for local traffic to use SR 46. The extension of Dallons Drive would serve as an interim facility until additional capacity on SR 46 is provided.

Pedestrian, Bicycle, and Transit Facilities

Pedestrian sidewalks are proposed along the perimeter of the site and pedestrian crosswalks provide connections between the parking aisles and the buildings. Plans to widen Dallons Road and Golden Hill Road shall not preclude construction of future bicycle facilities. Bike lanes are to be provided along the east side of Golden Hill Road north of SR 46, and along the west side of Golden Hill Road between Dallons Road and the project driveway. As directed by the City of Paso Robles staff, the 10-foot wide sidewalk on the west side of Golden Hill Road between the project driveway and SR 46 is to be maintained, and the bike lane will transition to a signed bike route (Class III facility).

The project sponsor shall coordinate with San Luis Obispo Regional Transit Authority (RTA) and the City of Paso Robles to provide transit service to the site (i.e. modify North County Shuttle route). With the above recommendations, the project's impacts are mitigated to a less-than-significant level.

SITE ACCESS AND ON-SITE CIRCULATION

The number of proposed driveways is sufficient to accommodate the total number of trips generated by the project land uses. Roadway improvement plans were prepared to determine the ultimate width and the required traffic control measures on Golden Hill Road and Dallons Road adjacent to the project site. The Golden Hill Road plans call for a traffic signal at the project driveway with a raised median located from the signal to SR 46. The Dallons Road plans call for one lane of travel in each direction with an eastbound bike lane and a center two-way left-turn lane. The project applicant will be responsible for implementation and construction of these improvements.

The original site plan was modified to include the following improvements recommended by Fehr & Peers (site plan dated March 8, 2007):

1. Parking was eliminated in front of Majors 3 and 4 so that vehicles entering or exiting will not conflict with traffic on the main aisle.

2. An all-way stop at the internal intersection located southeast of the Garden Center was provided.

1. INTRODUCTION

This report presents the results of the transportation impact analysis (TIA) for the proposed Golden Hill Retail Center (GHRC) located on the west side of Golden Hill Road between SR 46 East and Dallons Road in Paso Robles, California. The proposed project includes a 290,732 square foot shopping center with a home improvement superstore, general shopping center, drugstore, and restaurants. Although the current site plan has slightly changed with two retail pads replacing the drugstore, this traffic study analyzes the original project description that contains more square footage and generates a higher number of trips.

The analysis was conducted to identify potential transportation impacts of the proposed development on the surrounding roadway system and to recommend appropriate improvements to mitigate significant impacts. Figure 1 presents a map of the project location. Figure 2 shows the proposed GHRC site plan.

Existing and future conditions were evaluated with level of service (LOS) calculations for the key intersections and roadway segments near the project site. Significant impacts were determined following guidelines from the City of Paso Robles and the California Department of Transportation (Caltrans).

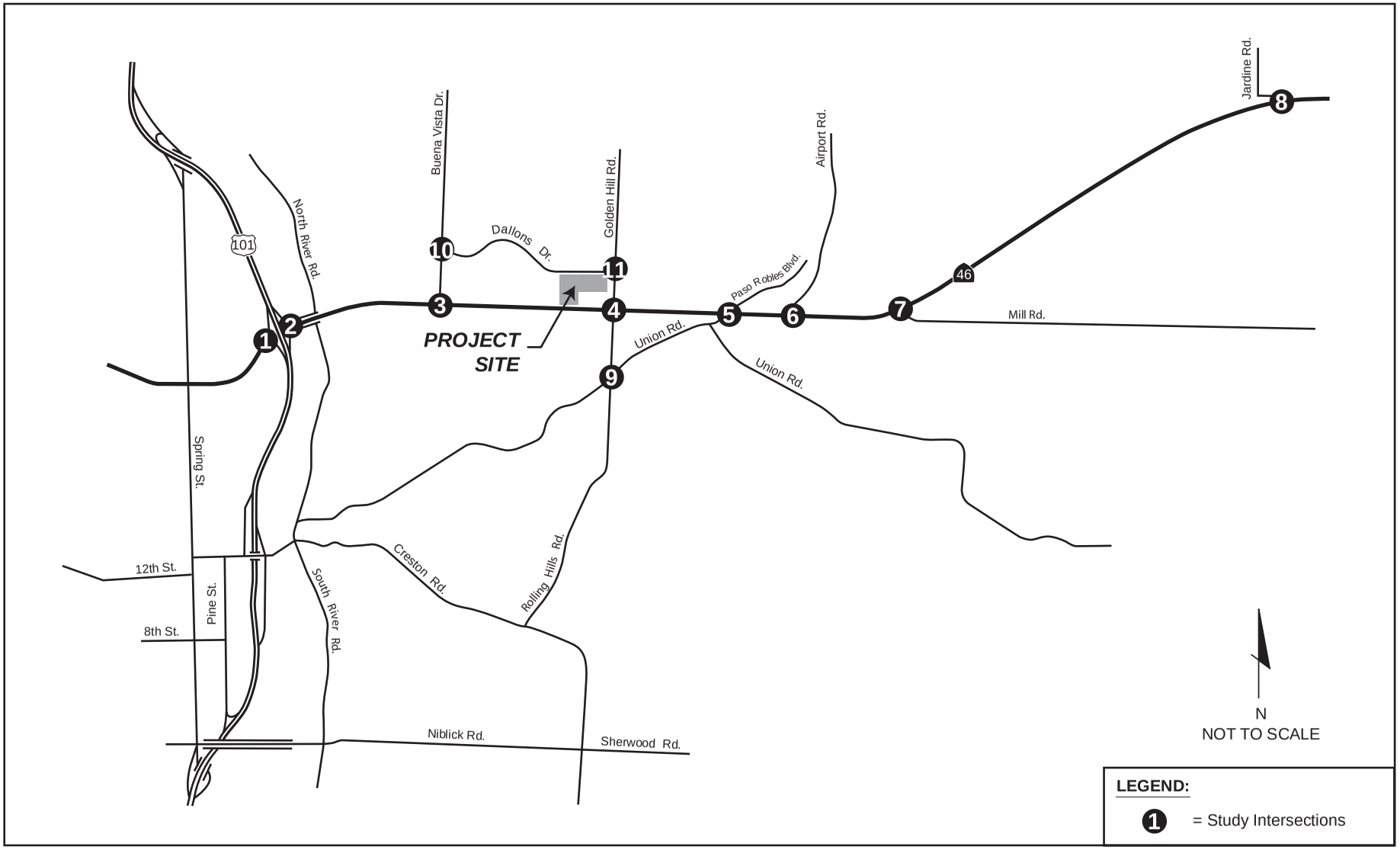
The analysis evaluated the operations of the following key intersections, roadway segments, and freeway ramp junctions:

Study Intersections

1. SR 46E/US 101 SB Ramps
2. SR 46E/US 101 NB Ramps
3. SR 46E/Buena Vista Drive
4. SR 46E/Golden Hill Road
5. SR 46E/Union Road
6. SR 46E/Airport Road
7. SR 46E/Mill Road
8. SR 46E/Jardine Road
9. Union Road/Golden Hill Road
10. Dallons Road/Buena Vista Drive
11. Dallons Road/Golden Hill Road

Study Roadway and Freeway Segments

1. SR 46E, between US 101 and east of Jardine Road
2. US 101, north of SR 46E to south of SR 46W
3. Golden Hill Road, between Dallons Road and SR 46
4. Dallons Road, west of Golden Hill Road



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PROJECT LOCATION

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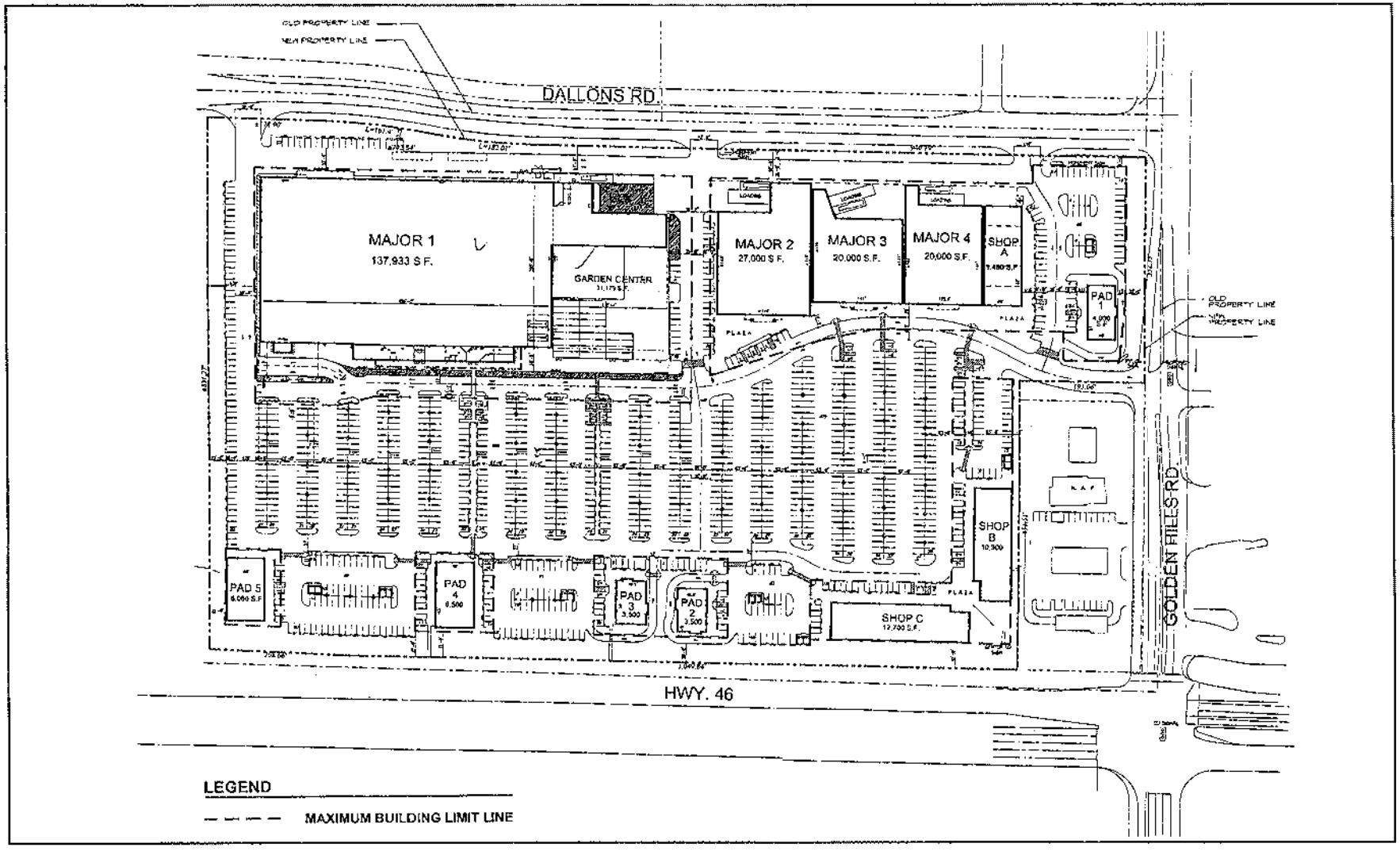
FIGURE 1



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SJ07-914

Golden Hill Retail Center

SITE PLAN

FIGURE 2

Study Freeway Ramps

1. US 101 NB Off-Ramp to SR 46E
2. US 101 NB On-Ramp from SR 46E
3. US 101 SB Off-Ramp to SR 46E
4. US 101 SB On-Ramp from SR 46E

The operations of the study intersections, roadway and freeway segments, and freeway ramp junctions were evaluated during the summertime morning (AM), summertime evening (PM), and summertime Friday evening (Friday PM) peak periods for the following four scenarios:

Scenario 1: *Existing Conditions* – Existing volumes obtained from counts or previous recent traffic studies.

Scenario 2: *Existing Plus Project Conditions* – Existing volumes plus new traffic generated by the proposed retail center.

Scenario 3: *Near-Term Cumulative Plus Project Conditions* – Scenario 2 volumes plus 4.1% annual interregional growth on SR 46 to Year 2010 plus traffic generated by approved and pending developments.

Scenario 4: *Year 2030 Cumulative Conditions* – Scenario 3 volumes with 4.1% annual interregional growth on SR 46 through volume plus 1% annual growth on side-streets to Year 2030, plus traffic generated by the Chandler Ranch Area Specific Plan and Cuesta College expansion.

This remainder of this report is divided into four chapters. The existing transportation system serving the site and the current operating conditions of the study intersections and roadway segments are described in Chapter 2. Chapter 3 describes the method used to estimate the traffic added to the surrounding roadways by the proposed project and its impacts on the transportation system. This chapter also includes a discussion of site access and on-site circulation. Chapter 4 presents the results of Near-term Cumulative Conditions, and Year 2030 Cumulative Conditions are described in Chapter 5.

2. EXISTING CONDITIONS

This chapter describes the existing conditions of the roadway facilities, pedestrian and bicycle facilities, transit service, traffic volumes, and intersection operations. This chapter also includes a discussion of the methodology used to calculate levels of service (LOS) and the corresponding results.

EXISTING ROADWAY NETWORK

The project location and the surrounding roadway network are presented on Figure 1. Regional access is provided by US 101 and State Route 46 (SR 46). Golden Hill Road, Union Road, Airport Road, Buena Vista Drive, River Road, and Dallons Road provide local access. Descriptions of these roadways are provided below.

US Highway 101 is a regional facility that traverses through San Luis Obispo County, continuing north to San Francisco and south to Los Angeles. Within the study area, US 101 is a four-lane freeway with an interchange at SR 46E.

State Route 46 is an east-west, four-lane highway between US 101 and Airport Road. East of Airport Road, SR 46 contains two travel lanes. SR 46 provides an east-west regional connection to I-5 in the Central Valley and to Bakersfield and Fresno (via SR 41). Between Jardine Road and US 101, two signalized intersections are located at Buena Vista Drive and Golden Hill Road. During the peak summer months, this corridor is highly congested in the westbound direction on Friday evenings and eastbound on Sunday afternoons.

View of westbound SR 46 approaching Golden Hill Road

View of northbound Golden Hill Road looking towards site

Golden Hill Road is a two-lane north-south arterial roadway located east of the project site. North of SR 46, Golden Hill Road is eighty (80) feet wide and narrows to approximately 32 feet north of the proposed Golden Hill main driveway. South of SR 46, Golden Hill Road continues past Union Road and terminates at its intersection with Creston Road.

Union Road is a two-lane arterial roadway that begins at River Road and continues in a north-east direction, crossing Golden Hill Road, and connecting to SR 46 East.

Airport Road is a north-south arterial roadway extending from SR 46 East past the Paso Robles Municipal Airport.

River Road is a two-lane roadway that runs parallel to US 101 on the east side of Salinas River. According to the City of Paso Roble's Circulation Element Map, River Road is designated as a collector street north of Navajo Avenue. South of Navajo Avenue, River Road is designated as a an arterial road with four travel lanes.

Buena Vista Drive is a north-south arterial roadway that transitions east (north of Circle B Road) and connects to Airport Road. Vehicles exiting the project site onto Dallons Road can travel west to Buena Vista Drive or head east to Golden Hill Road.

Buena Vista Drive looking south at Dallons Road

Golden Hill Road looking south at Dallons Road

Dallons Road is a two- to four-lane collector roadway that runs parallel to SR 46E between Golden Hill Road and North River Road. West of Buena Vista Drive, Dallons Road is designated as River Oaks Drive.

PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian facilities include sidewalks, crosswalks, and pedestrian signals at signalized intersections. Sidewalks are not provided along SR 46E. At the intersection of SR 46E-24th Street/US 101 Southbound Ramps, sidewalks are currently under construction to allow travel across the highway. Pedestrians signals are provided at the SR 46/Golden Hill Road intersection to allow pedestrians to cross SR 46. Sidewalks are not provided on SR 46, Jardine Road, Dry Creek Road, or Beacon Road.

Bicycle facilities include bike paths, bike lanes, and bike routes. Bike paths (Class I facilities) are paved pathways for use by bicycles that are separated from roadways. Bike lanes (Class II facilities) are lanes on roadways designated for use by bicycles with special lane markings, pavement legends, and signage. Bike routes (Class III facilities) are designated with signs only. Bike facilities are not provided on any of the surrounding roadways or streets around the project site.

TRANSIT SERVICE

The North County Shuttle (NCS) provides bus service to Paso Robles, Templeton, and Atascadero. Paso Robles City Area Transit System (PRCATS) provides bus service within the City of Paso Robles. The San Luis Obispo Regional Transit Authority (RTA) operates intercity bus service in San Luis Obispo County. There is no direct transit service provided to the project site. Transit service in the City of Paso Robles is described below.

North County Shuttle provides bus service between Paso Robles, Templeton, and Atascadero. The NCS provides hourly service Monday through Friday 7:00 AM to 7:15 PM. Saturday service operates hourly from 10:35 AM to 4:35 PM. The NCS does not operate Sunday service. A bus stop is located at the northeast corner of the Buena Vista Drive/Dallons Road intersection.

RTA Route 9 provides intercity fixed-route service between San Luis Obispo, Santa Margarita, Atascadero, Templeton, and Paso Robles, with limited service to San Miguel. Service to Paso Robles operates Monday through Friday from 5:50 AM to 9:40 PM with sixteen trips in each direction. Service operates on Saturdays and Sundays from 7:31 AM to 6:31 PM with three trips in each direction.

PRCATS provides fixed-route bus service along two designated routes within the City of Paso Robles. Service operates from 7:00 AM to 6:00 PM Monday through Saturday. PRCATS does not provide Sunday service. In addition, PRCATS operates a Dial-A-Ride service within the city limits Monday through Friday only from 7:00 AM to 8:00 PM.

Runabout provides countywide ADA paratransit service for qualified individuals within ¾ mile of the fixed-route bus service. Runabout service hours are the same as the fixed-route services.

Amtrak provides intercity rail and bus service at the station located at 8th Street and Pine Street in Paso Robles, approximately 8 miles southwest of the project site. The Coast Starlight line makes two stops daily on weekdays, one southbound at 1:38 PM and one northbound at 4:45 PM. The Pacific Surfliner bus service provides four additional trips daily to San Luis Obispo, Santa Barbara, and south, and five additional trips daily to San Jose and San Francisco. The San Joaquin bus service provides one trip daily from the Paso Robles station north to Hanford and south to Santa Maria. The Capitol Corridor bus service provides one trip daily from the station north to San Jose and Oakland and south to Santa Barbara.

EXISTING VOLUMES AND LANE CONFIGURATIONS

Year 2005 summertime weekday morning (AM), weekday evening (PM), and Friday evening (Friday PM) peak-hour traffic volumes at the SR 46 study intersections were obtained from the *Final SR 46E/Airport Road PSR*. The volumes on SR 46 represent unconstrained volumes on SR 46 provided that sufficient capacity is available at Highway 101/SR 46 interchange and traffic does not divert from SR 46 to the side streets.

The peak hour represents the highest one-hour volumes during the weekday commute peak periods (7:00-9:00 AM and 4:00-6:00 PM). Summertime Friday evening peak-hour traffic volumes are typically higher than weekday evening peak-hour volumes due to regional traffic from I-5 east of Paso Robles.

The inclusion of Friday PM peak-hour traffic operations was requested by Caltrans. The analysis for the City's General Plan Circulation Element analyzed typical weekday conditions and not recreational weekend peak travel (Friday PM peak-hour).

New intersection counts were conducted or provided by Caltrans staff at the following locations to supplement the 2005 counts:

- Buena Vista Drive/Dallons Road (September 2006);
- Golden Hill Road/Dallons Road (September 2006);
- SR 46/Airport Road (January 2007); and
- SR 46/Golden Hill Road (March 2007).

The Year 2005 volumes turning to/from SR 46 to Golden Hill and Airport Road were adjusted to reflect the more recent traffic counts that were higher. Similarly, adjustments were made at the Buena Vista Drive/Dallons Road and Golden Hill Road/Dallons Road intersections. Although the 2007 volumes show a decrease in through volumes on SR 46 at Golden Hill Road, those lower volumes were not used in the analysis.

Figure 3 presents the existing AM, PM, and Friday PM peak-hour turning movement volumes at the study intersections. Figure 4 presents the existing lane configurations and traffic control devices at each intersection.

Year 2005 freeway mainline counts for US 101 and SR 46 were provided by Caltrans. New 72-hour (3-day) machine counts were conducted for local roadways in April 2006. Figure 5 presents the average daily traffic volumes for the study roadway segments. The new intersection and roadway counts are located in Appendix A.

LEVEL OF SERVICE METHODOLOGY

The quality of roadway facility operations are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined, from LOS A with the best operating conditions to LOS F with the worst operating conditions. LOS E represents "at-capacity" operations. Two methodologies were used to evaluate the study intersections: one method for the signalized intersections and another method for the unsignalized intersections.

Intersection Level of Service Criteria

The City of Paso Robles maintains LOS D as the minimum acceptable level of service for intersections (i.e., LOS E and F are considered unacceptable operations). Caltrans has more stringent standards than the City of Paso Robles and strives to maintain operations at the LOS C/D threshold on state-operated facilities in the study area, which include US 101 and SR 46. Therefore, LOS C or better is considered acceptable on Caltrans facilities.

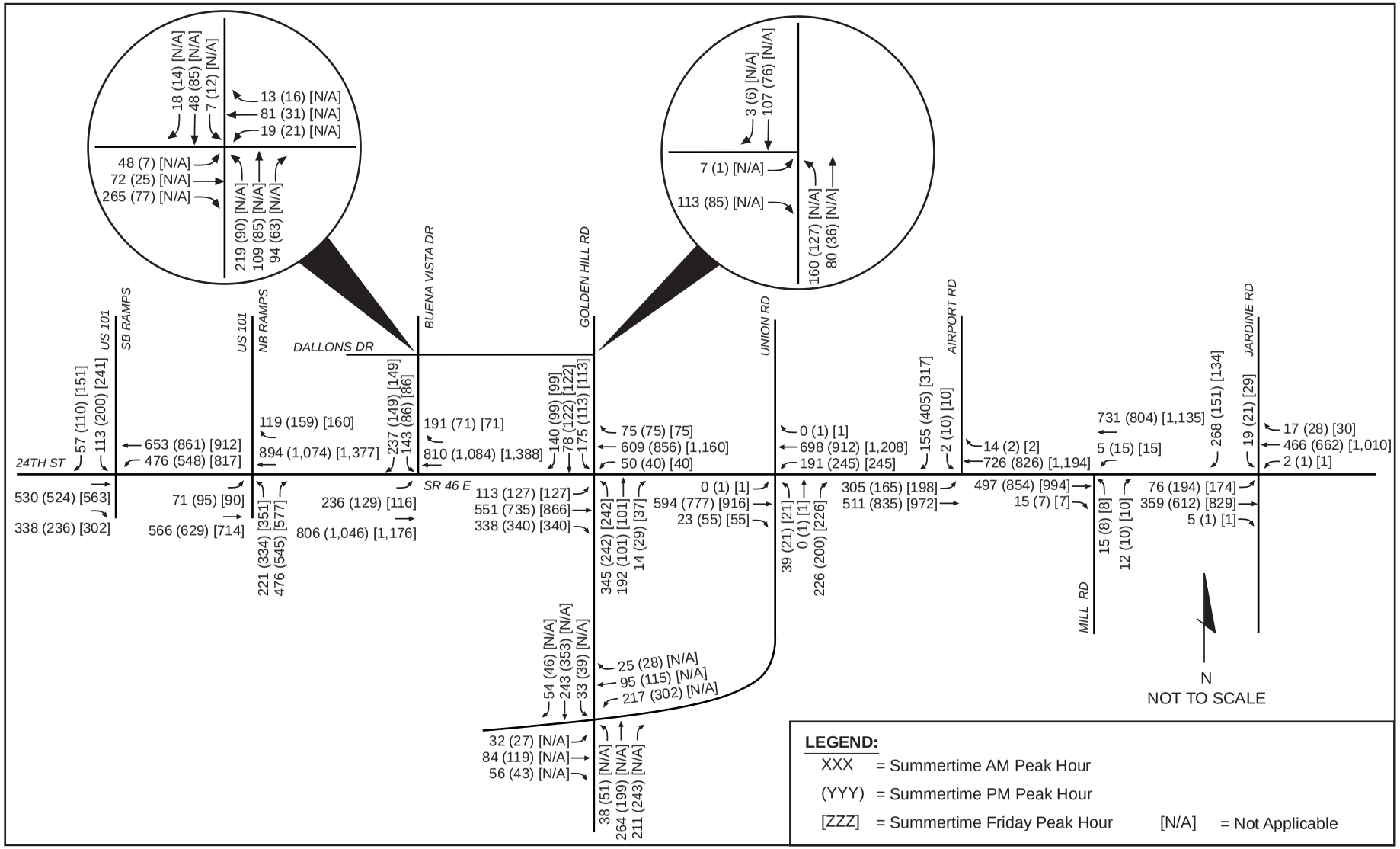
Signalized Intersections

For signalized intersections, the LOS methodology described in Chapter 16 of the 2000 *Highway Capacity Manual (HCM)* published by the Transportation Research Board was applied. This methodology evaluates a signalized intersection's operations based on average control delay. Control delay represents delay caused by signal operation but does not account for delays caused by on-street parking, driveways, pedestrians, and other friction factors. The average control delay for signalized intersections is calculated using the SYNCHRO analysis software and is correlated to a LOS designation as shown in Table 1.

TABLE 1
SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

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



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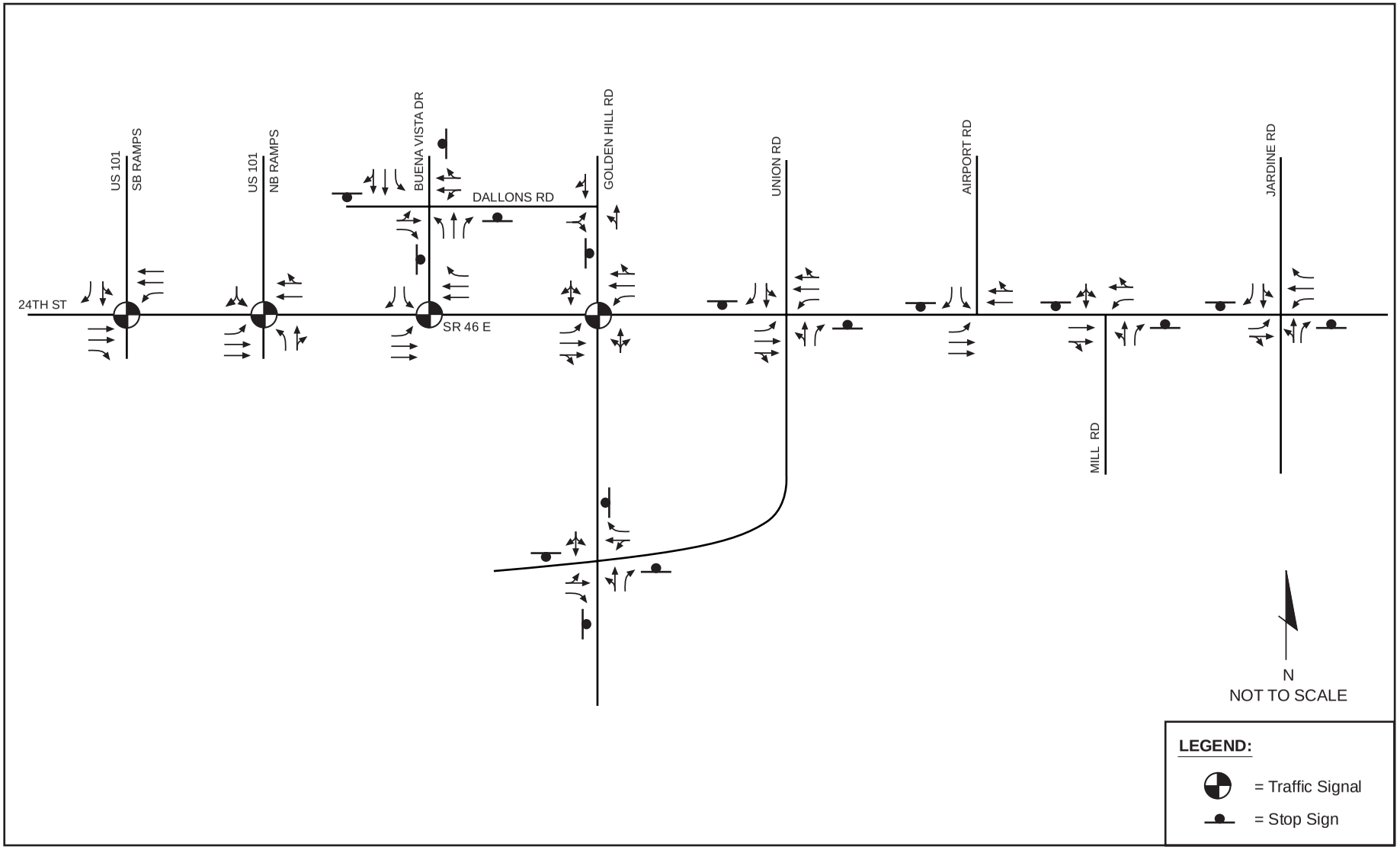
Golden Hill Retail Center

EXISTING PEAK-HOUR TRAFFIC VOLUMES

FIGURE 3



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EXISTING LANE CONFIGURATIONS

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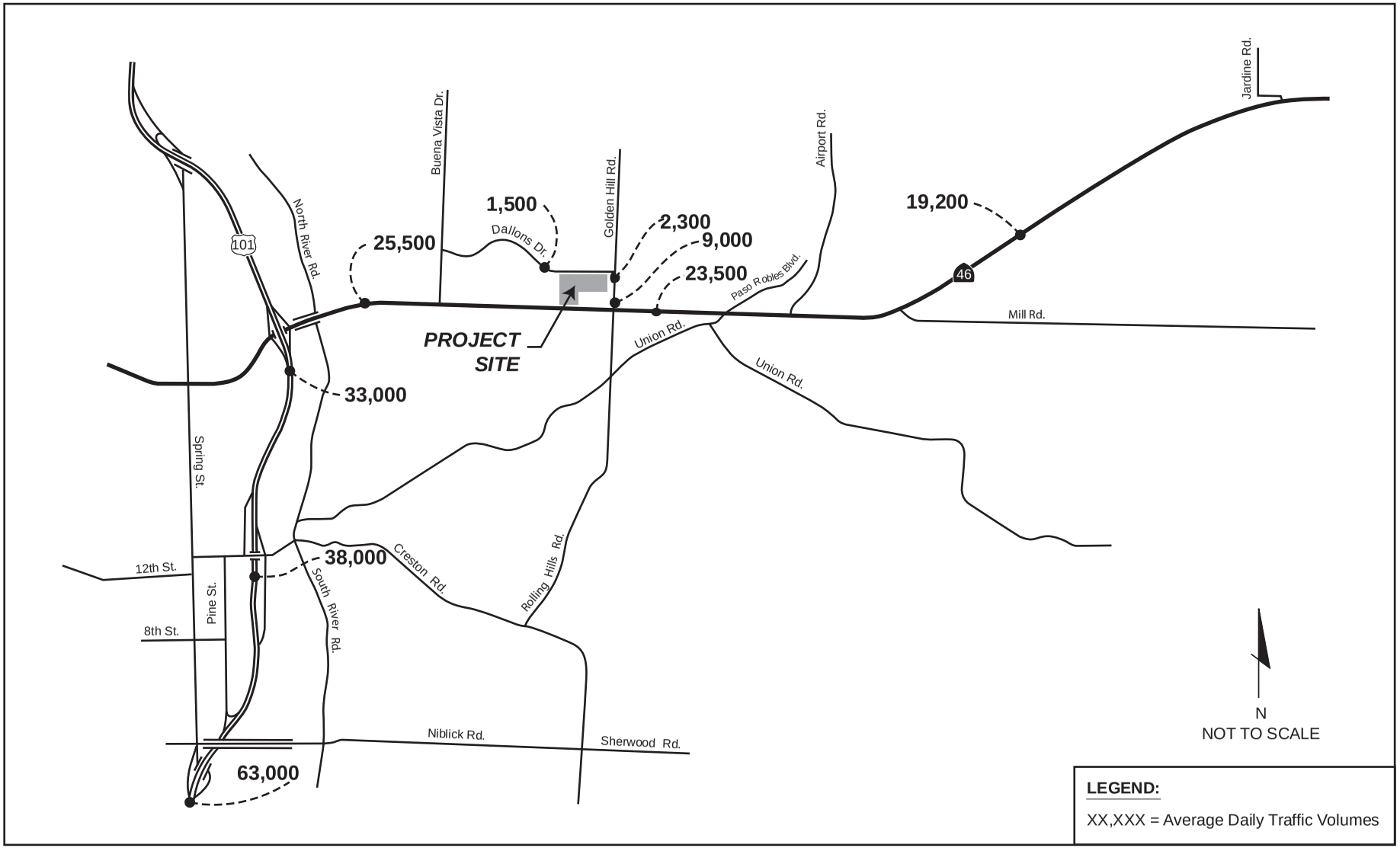
FIGURE 4



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EXISTING AVERAGE DAILY TRAFFIC VOLUMES

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FIGURE 5

Unsignalized Intersections

Operations of the unsignalized study intersections (e.g., stop-sign controlled) were evaluated using the methodology contained in Chapter 17 of the 2000 *HCM* and the TRAFFIX analysis software program. LOS ratings for stop-sign controlled intersections are based on the average control delay expressed in seconds per vehicle. At two-way or side street-controlled intersections, the control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. For all-way stop-controlled locations, a weighted average delay for the entire intersection is presented. Table 2 summarizes the relationship between delay and LOS for unsignalized intersections.

TABLE 2
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS
USING AVERAGE CONTROL DELAY

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delays.	10.1 to 15.0
C	Average traffic delays.	15.1 to 25.0
D	Long traffic delays.	25.1 to 35.0
E	Very long traffic delays.	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

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

Roadway Segments

Levels of service (LOS) for the roadway segments were evaluated by comparing the measured average daily traffic (ADT) volume to volume thresholds presented in the *City of Paso Robles Circulation Element* (General Plan, 2003) and to volume thresholds presented in *Quality/Level of Service Handbook* (Florida Department of Transportation, 2002). Table 3 presents threshold volumes for various roadway types. These threshold volumes include adjustments for divided and undivided facilities and for roadways with left-turn lanes.

This planning level analysis determines if the study roadway segments are operating below or over capacity. Because this type of analysis is general in nature and does not take into account delays and other factors affecting capacity, impacts usually defer to a more detailed operational analysis (intersection and freeway ramp levels of service).

The study roadway segments are classified as follows:

- SR 46E, between US 101 and west of Airport Road – four-lane divided arterial;
- SR 46E, east of Airport Road – two lane highway;
- US 101, north of SR 46E to south of SR 46W – a four-lane divided freeway;

- Golden Hill Road, between Dallons Road and Union Road – two-lane collector with no left-turn lane;
- Dallons Road, west of Golden Hill Road – two-lane collector with no left-turn lane.

The segment of Golden Hill Road is classified as an arterial roadway according to the City's Circulation Element. Since a volume threshold is not provided for a two-lane arterial road, the volume thresholds for a two-lane collector road was applied to the Golden Hill Road segment.

TABLE 3
LEVEL OF SERVICE (LOS) DEFINITIONS FOR URBAN/SUBURBAN ROADWAYS

Roadway Type	Total Daily Vehicles in Both Directions (ADT)				
	LOS A	LOS B	LOS C	LOS D	LOS E
4-Lane Divided Freeway[1]	28,000	43,200	61,600	74,400	80,000
6-Lane Divided Arterial (with left-turn lane)[1]	32,000	38,000	43,000	49,000	54,000
4-Lane Divided Arterial (with left-turn lane)[1]	22,000	25,000	29,000	32,500	36,000
4-Lane Undivided Arterial (no left-turn lane)[1]	18,000	21,000	24,000	27,000	30,000
2-Lane Undivided Highway[2]	2,000	7,000	13,800	19,600	27,000
2-Lane Collector (with left-turn lane)[1]	11,000	12,500	14,500	16,000	18,000
2-Lane Collector (no left-turn lane)[1]	8,000	9,500	10,500	12,000	13,500

Source: [1] *City of Paso Robles Circulation Element* (Rincon Consultants, December 2003).
[2] *Quality/Level of Service Handbook*, Table 4-1, Florida Department of Transportation, 2002.

Freeway Ramp Junctions

Ramp junction operations were evaluated using the methodology contained in Chapter 21 of the 2000 *HCM*. The density is calculated using the HCS+ analysis software and is correlated to a LOS designation for ramp junctions as shown in Table 4. Density, measured in vehicles per mile per lane, is an measure of the proximity of vehicles to one another and the motorist's ability to maneuver in on the roadway segment.

TABLE 4
DENSITY-BASED RAMP LEVEL OF SERVICE DEFINITIONS

Level of Service	Ramp Junction Density (vehicles/mile/lane)
A	≤ 10.0
B	10.1 to 20.0
C	20.1 to 28.0
D	28.1 to 35.0
E	> 35.0
F	Demand exceeds capacity.

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

EXISTING LEVELS OF SERVICE

Intersections

Existing intersection lane configurations and peak-hour turning movement volumes were used to calculate the LOS for the study intersections during AM, PM, and Friday PM peak-hours. The results of the LOS analysis for existing conditions are presented in Table 5. The corresponding calculation sheets are contained in Appendix B.

The US 101/SR 46 E ramps intersections are operating at LOS C during the weekday AM and PM peak hours and LOS E or F during the Friday PM peak hour. The SR 46E/Golden Hill Road intersection is operating at LOS F during all peak hours. The side-street movement or approaches for the unsignalized intersection on SR 46 (at Union Road, Airport Road, Mill Road, and Jardine Road) are operating at LOS F for at least one peak hour. The Golden Hill Road/Union Road intersection is operating at LOS F during the PM peak hour.

TABLE 5
EXISTING INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour[1]	Intersection Control	Delay[2]	LOS[3]
1. SR 46 E/US 101 SB Ramps	AM PM Friday PM	Signal	23.4 30.5 119.8	C C F
2. SR 46 E/US 101 NB Ramps	AM PM Friday PM	Signal	31.1 31.3 72.7	C C E
3. SR 46E/Buena Vista Drive	AM PM Friday PM	Signal	18.1 14.6 15.8	B B B

TABLE 5
EXISTING INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour[1]	Intersection Control	Delay[2]	LOS[3]
4. SR 46 E/Golden Hill Road	AM PM Friday PM	Signal	>150 90.3 >150	F F F
5. SR 46 E/Union Road	AM PM Friday PM	Side-Street Stop	71.9 >150 >150	F F F
6. SR 46E/Airport Road	AM PM Friday PM	Side-Street Stop	14.3 74.8 >150	B F F
7. SR 46 E/Mill Road	AM PM Friday PM	Side-Street Stop	29.0 53.6 120.9	D F F
8. SR 46 E/Jardine Road	AM PM Friday PM	Side-Street Stop	28.4 78.5 >150	D F F
9. Golden Hill Road/Union Road[4]	AM PM Friday PM	All-Way Stop	23.4 64.7 N/A	C F N/A
10. Dallons Road/Buena Vista Drive	AM PM Friday PM	All-Way Stop	18.7 9.4 N/A	C A N/A
11. Dallons Road/Golden Hill Road	AM PM Friday PM	Side-Street Stop	9.8 9.1 N/A	A A N/A

Notes:
[1] AM = morning peak hour, PM = afternoon peak hour.
[2] Whole intersection weighted average control delay expressed in seconds per vehicle using methodology described in the *2000 HCM*. For side street stop controlled intersections, total control delay for the worst movement is presented.
[3] LOS = Level of service. LOS calculations conducted using the TRAFFIX software for unsignalized (stop-controlled) intersections and the SYNCHRO software for signalized intersections.
[4] The analysis of Friday PM peak-hour is to evaluate the effects of regional through traffic for intersections on SR 46. Local city intersections were not evaluated for Friday PM conditions.

Roadway Segments

The results of the LOS analysis for existing roadway segment operations are presented in Table 6. The LOS calculations indicated that all study roadways currently operate at acceptable levels of service (LOS D or better).

TABLE 6
EXISTING ROADWAY LEVELS OF SERVICE

Roadway Segment	Jurisdiction	Roadway Type	Volume[1]	LOS[2]
1. SR 46 E, between US 101 and Airport Road	Caltrans	4-Lane Divided Arterial	25,500	C
2. SR 46 E, east of Airport Road	Caltrans	2-Lane Undivided Highway	19,200	D
3. US 101, north of SR 46 E to south of SR 46 W	Caltrans	4-Lane Divided Freeway	63,000	D
4. Golden Hill Road, between Dallons Road and SR 46[3]	City of Paso Robles	2-Lane Collector (no left turn lane)	9,000	B
5. Dallons Road, west of Golden Hill Road	City of Paso Robles	2-Lane Collector (no left turn lane)	1,500	A

Notes:

1 Average daily traffic. Note volume reported is the maximum volume on the given roadway segment within the project study area.

2 LOS = Level of service.

3 Two-lane arterial volume thresholds are not provided in the City's Circulation Element. Thus, the threshold for a two-lane collector was applied.

Freeway Ramp Junctions

The AM, PM, and Friday PM peak-hour operations of the US 101 freeway ramp junctions at SR 46 were analyzed under Existing Conditions. The ramp volumes used in the merge/diverge analysis were obtained from the counts conducted at the ramp intersections in 2005.

The results of the LOS analysis for existing ramp junctions are presented in Table 7. The corresponding calculation sheets are contained in Appendix C. The LOS calculations indicate that all ramp junctions currently operate at acceptable levels of service (LOS D or better) during the AM, PM, and Friday PM peak-hours.

TABLE 7
EXISTING US 101/SR 46 E RAMP JUNCTION LEVELS OF SERVICE

Merge/Diverge	Peak Hour	Density[1]	Level of Service
Diverge (Northbound Off-ramp)	AM	13.6	B
	PM	18.8	B
	Friday PM	21.5	C
Merge (Northbound On-ramp)	AM	7.4	A
	PM	11.2	B
	Friday PM	13.2	B
Diverge (Southbound Off-ramp)	AM	9.2	A
	PM	13.6	B
	Friday PM	16.1	B
Merge (Southbound On-ramp)	AM	13.0	B
	PM	15.6	B
	Friday PM	19.8	B

Notes:
1 Measured in vehicles per mile per lane.

FIELD OBSERVATIONS

Weekday AM and PM peak-hour field observations were completed in October 2006. Available traffic data was provided to Fehr & Peers after the traffic counts had been completed. Thus, observations during the traffic count collection period was not possible. Operations and queuing at the signalized and unsignalized intersections were observed. The study intersections were generally observed to operate at the calculated levels of service shown in Table 5.

During the PM peak-hour, queuing in the westbound direction at SR 46 E-24th Street/US 101 SB Ramps was observed to occur through the SR 46 E/US 101 NB Ramp intersection.

At the SR 46 E/Golden Hill Road intersection, queues of greater than 10 vehicles were observed north and southbound during the AM and PM peak-hours.

Delays at the unsignalized intersections were typically less than 35 seconds/vehicle. Queuing at the unsignalized intersections was minimal, typically under 3 vehicles. Due to the low demand on the side streets and platooning effects from the upstream traffic signals, these intersections were typically observed to operate at acceptable levels of service. As noted above, the observations were conducted in Fall 2006 and not during Summer 2005 when traffic volumes are typically higher and during the period when the traffic counts were conducted.

3. EXISTING PLUS PROJECT CONDITIONS

The impacts of the proposed Golden Hill Retail Center (GHRC) project on the surrounding transportation system under Existing Plus Project Conditions are discussed in this chapter. Existing Plus Project Conditions are defined as Existing Conditions plus traffic generated by the proposed GHRC project. First, the methodology used to estimate the amount of traffic generated by the project is described. Then, the results of the level of service (LOS) calculations for Existing Plus Project are presented. A comparison of roadway operations under Existing and Existing Plus Project Conditions is presented and the impacts of the project on the study intersections and roadway segments are discussed. Site access, on-site circulations, and potential impacts to non-automobile modes are also discussed in this chapter.

PROJECT TRAFFIC ESTIMATES

The amount of traffic added to the roadway system by the proposed development is estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. The first step estimates the amount of traffic added to the roadway network. The second step estimates the direction of travel to and from the development area. The trips are assigned to specific street segments and intersection turning movements during the third step. The results of this process are described in the following sections.

Trip Generation

The amount of traffic added to the surrounding roadway system by the proposed GHRC project was estimated by applying land use trip generation rates published in *Trip Generation* (Institute of Transportation Engineers, 7th Edition) to the size of the project.

A passby and diverted trip reduction of 25 percent was applied to the retail center (50 percent reduction was applied to the fast-food restaurants) to account for vehicles that are already traveling on the roadway network (primarily on SR 46E and Golden Hill Road) and will be expected to divert to the new shopping center. These passby and diverted trips are not considered new external trips to the study area because they are already traveling on the roadway network past the project site and these trips are already included in the existing traffic counts.

A ten (10) percent reduction was also applied to account to internal trips between the retail uses. These internal trips account for consumers that shop at the general retail stores and then stop at the fast-food restaurants.

The weekday peak-hour trip generation rates and trip estimates are presented in Tables 8 and 9, respectively. The GHRC project is estimate to generate approximately 12,400 net new daily trips, 720 net new AM peak-hour trips, and 1,020 net new PM peak-hour trips. The project site is assumed to generate the same number of trips during the Friday PM peak-hour as the typical weekday PM peak-hour.

TABLE 8
PROJECT TRIP GENERATION RATES

ITE Land Use (Code)[1]	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Home Improvement Superstore (862)	29.80	0.65	0.55	1.20	1.15	1.30	2.45
Shopping Center (820)	72.24	1.03	0.65	1.68	3.19	3.46	6.65
Pharmacy with Drive-Thru (881)	88.16	1.52	1.14	2.66	4.22	4.40	8.62
Fast-Food Restaurant with Drive-Thru (934)	496.12	27.09	26.02	53.11	18.01	16.63	34.64
High-Turnover Restaurant (932)	127.15	5.99	5.53	11.52	6.66	4.26	10.92

Notes: [1]Trips per 1,000 square feet (ksf).
Source: *Trip Generation*, 7th Edition (ITE).

TABLE 9
PROJECT TRIP GENERATION ESTIMATES

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Home Improvement Superstore (169.112 ksf)	5,040	110	93	203	195	219	414
Shopping Center (83.8 ksf)	6,054	86	55	141	267	290	557
Pharmacy with Drive-Thru (14.82 ksf)	1,307	22	17	39	63	65	128
Fast-Food Restaurants with Drive-Thru (12.5 ksf)	6,202	339	325	664	225	208	433
High-Turnover Restaurants (10.5 ksf)	1,335	63	58	121	70	45	115
Subtotal Gross	*19,938*	*620*	*548*	*1,168*	*820*	*827*	*1,647*
10% Internalization Reduction	(1,994)	(59)	(58)	(117)	(83)	(82)	(165)
13% Pass-by Reduction	(2,592)	(76)	(76)	(152)	(107)	(107)	(214)
15% Diverted Trip Reduction	(2,991)	(88)	(87)	(175)	(124)	(123)	(247)
Total Net New Trips	**12,362**	**397**	**327**	**724**	**506**	**515**	**1,021**

Source: *Trip Generation*, 7th Edition (ITE).

Trip Distribution

The directions of approach and departure for project traffic were estimated based on the existing travel patterns in the area, previous studies, and the relative locations of complementary land uses such as residential areas. Figure 6 illustrates the major directions of approach and departure.

Trip Assignment

The project trips were assigned to the roadway network based on the directions of approach and departure discussed above. Figure 7 shows the project trips assigned to each turning movement at the study intersections. These project trips were added to the existing traffic volumes to establish intersection volumes for Existing Plus Project Conditions shown on Figure 8. Daily project trips were added to the existing average daily traffic (ADT) for each of the study roadway segments as shown on Figure 9.

EXISTING PLUS PROJECT LEVELS OF SERVICE

Intersections

Intersection levels of service were calculated with the Existing Plus Project volumes to evaluate the operating conditions of the intersections. The results of the intersection level of service calculations for Existing and Existing Plus Project Conditions are presented in Table 9. The LOS calculation sheets are included in Appendix B.

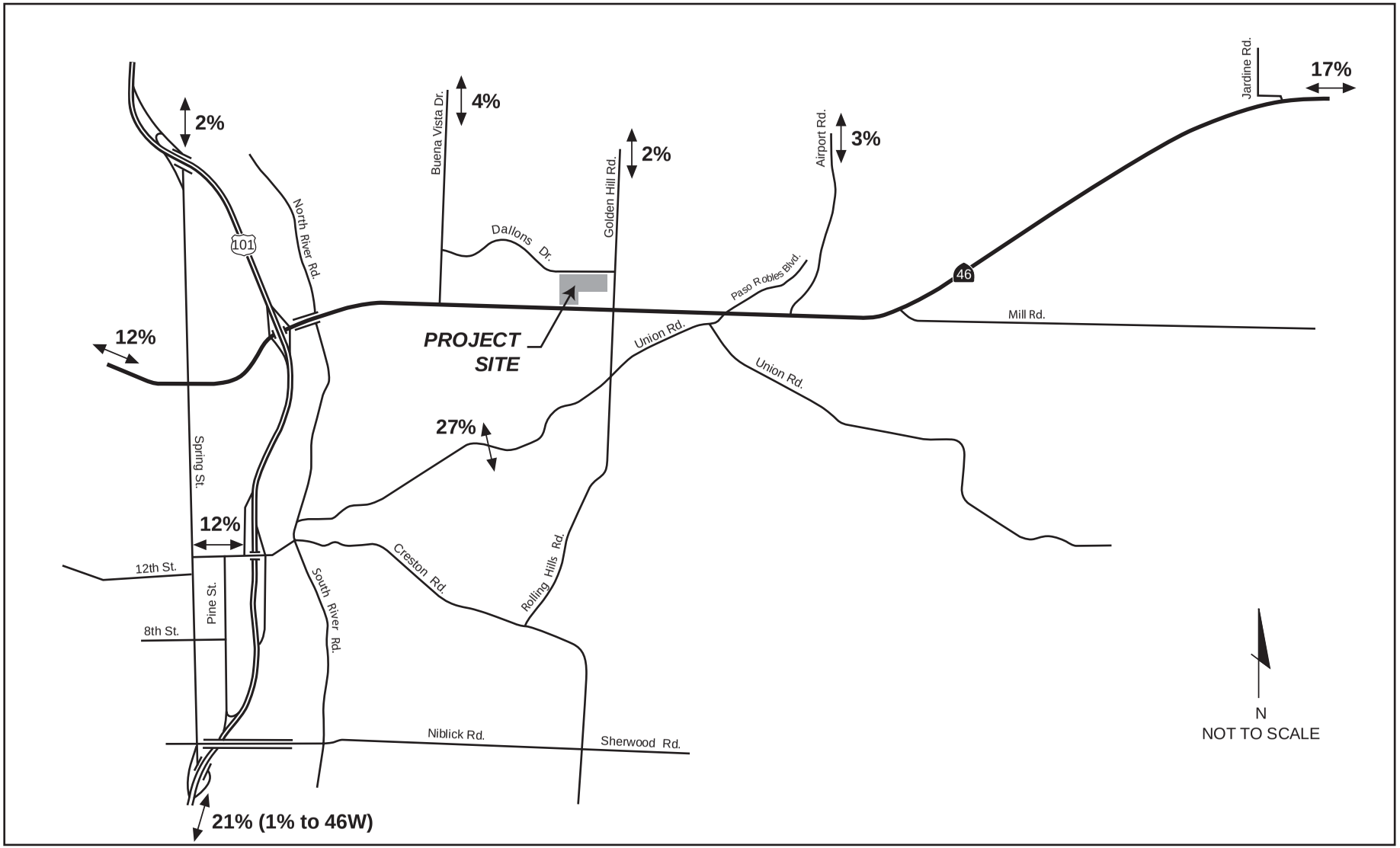
With the exception of SR 46/Buena Vista Drive and the two intersections on Dallons Road (at Buena Vista Drive and at Golden Hill Road), traffic from the proposed project is estimated to degrade the level of service rating or exacerbate unacceptable LOS E or F operations at all study intersections.

Roadway Segments

The results of the roadway segments level of service analysis for Existing Plus Project Conditions are summarized in Table 11. The two study segments on SR 46, segment of US 101 between SR 46 E and SR 46W, and the segment on Golden Hill north of SR 46 are projected to operate at unacceptable levels with the addition of project traffic. Dallons Road is projected to operate at acceptable levels.

Ramp Junctions

Freeway ramp junction LOS analysis was conducted with traffic added by the project. The results are summarized in Table 12 and the corresponding calculation sheets are contained in Appendix C. The addition of project traffic is not projected to degrade the level of service ratings at the ramp junctions between Existing and Existing Plus Project Conditions. All ramp junctions will continue to operate at acceptable levels.



Golden Hill Retail Center

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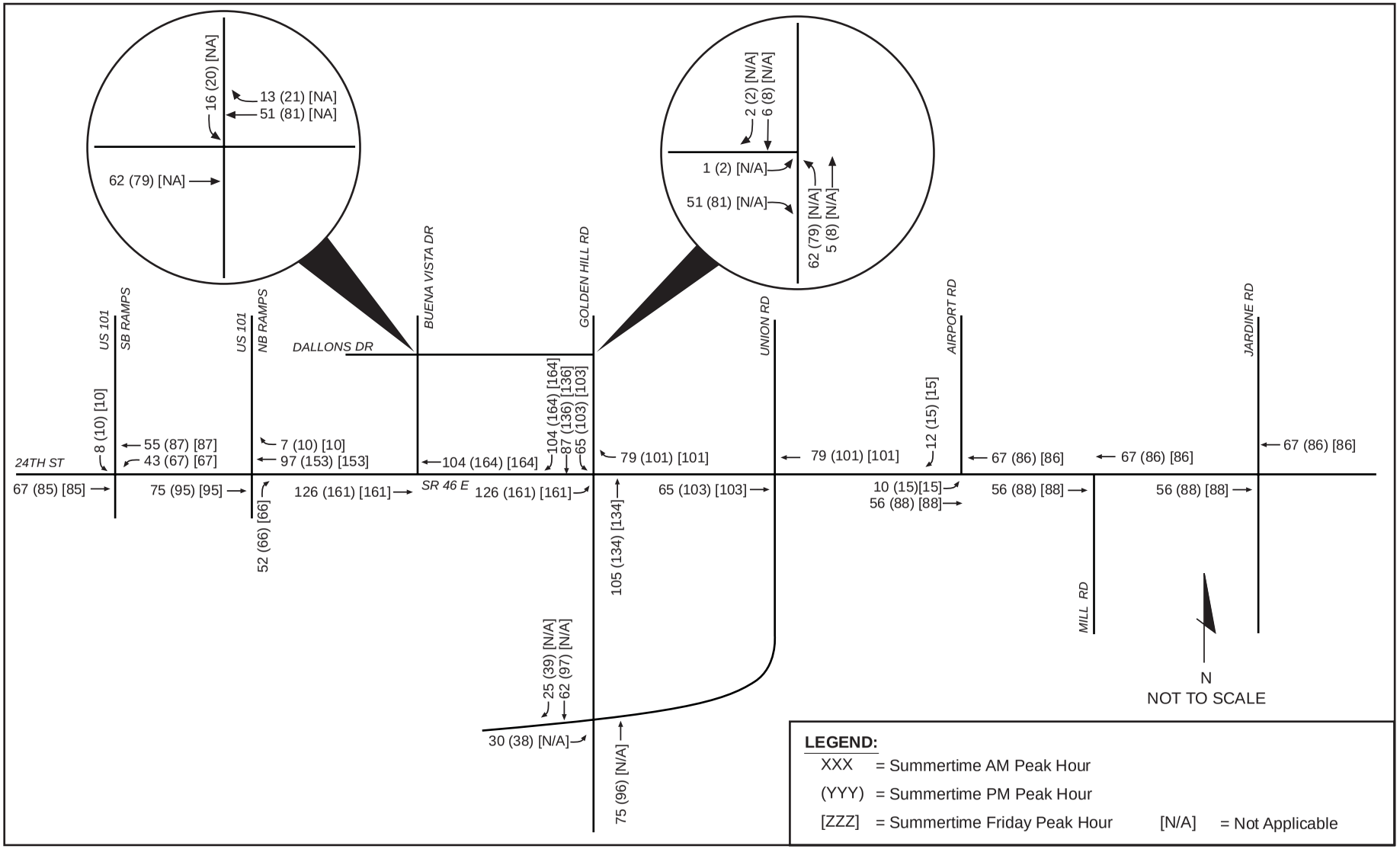
PROJECT TRIP DISTRIBUTION

April 2007
SJ06-876

FIGURE 6



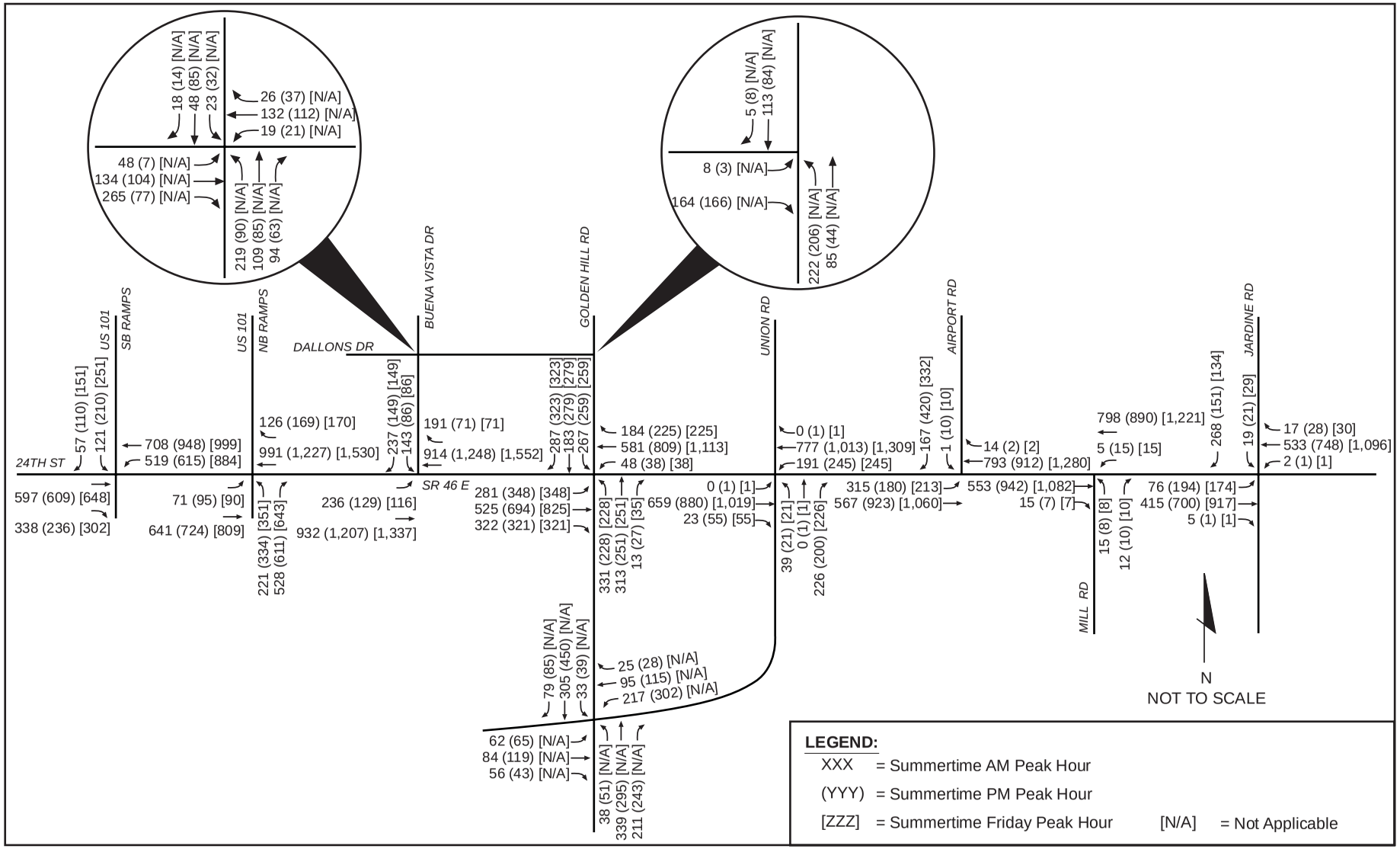
Golden Hill Retail Center

FEHR & PEERS
TRANSPORTATION CONSULTANTS

PROJECT TRIP ASSIGNMENT

April 2007
SJ06-876

FIGURE 7



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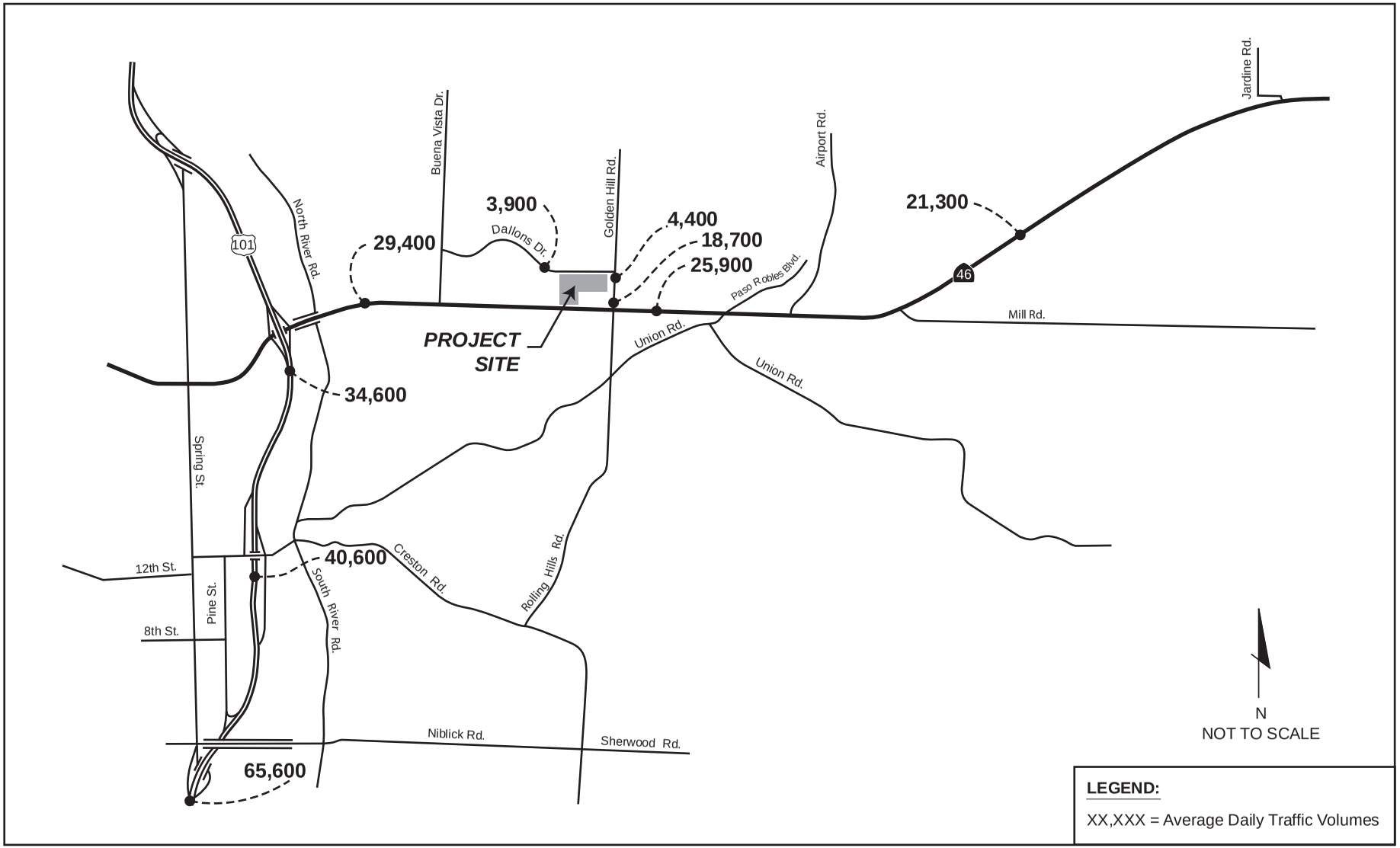
SJ06-876

Golden Hill Retail Center

EXISTING PLUS PROJECT PEAK-HOUR TRAFFIC VOLUMES

FIGURE 8



Golden Hill Retail Center

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EXISTING PLUS PROJECT AVERAGE DAILY TRAFFIC VOLUMES

June 2007
SJ06-876

FIGURE 9

TABLE 10
EXISTING AND EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour[1]	Existing		Existing Plus Project	
		Delay[2]	LOS[3]	Delay	LOS
1. SR 46 E/ US 101 SB Ramps	AM	23.4	C	24.9	C
	PM	30.5	C	39.6	D
	Friday PM	119.8	F	**146.2**	**F**
2. SR 46 E/ US 101 NB Ramps	AM	31.1	C	51.0	D
	PM	31.3	C	49.1	D
	Friday PM	72.7	E	**113.3**	**F**
3. SR 46E/ Buena Vista Dr	AM	18.1	B	19.4	B
	PM	14.6	B	15.8	B
	Friday PM	15.8	B	22.2	C
4. SR 46 E/ Golden Hill Rd	AM	>150	F	**>150**	**F**
	PM	90.3	F	**>150**	**F**
	Friday PM	>150	F	**>150**	**F**
5. SR 46 E/ Union Rd	AM	71.9	F	**98.5**	**F**
	PM	>150	F	**>150**	**F**
	Friday PM	>150	F	**>150**	**F**
6. SR 46E/ Airport Rd	AM	14.3	B	15.6	C
	PM	74.8	F	**129.3**	**F**
	Friday PM	>150	F	**>150**	**F**
7. SR 46 E/ Mill Rd	AM	29.0	D	34.6	D
	PM	53.6	F	71.2	F
	Friday PM	120.9	F	>150	F
8. SR 46 E/ Jardine Rd	AM	28.4	D	**37.8**	**E**
	PM	78.5	F	**117.9**	**F**
	Friday PM	>150	F	**>150**	**F**
9. Golden Hill Rd/ Union Rd[4]	AM	23.4	C	**42.4**	**E**
	PM	64.7	F	**116.6**	**F**
	Friday PM	N/A	N/A	N/A	N/A
10. Buena Vista Drive/Dallons Road	AM	18.7	C	22.2	C
	PM	9.4	A	10.8	B
	Friday PM	N/A	N/A	N/A	N/A
11. Golden Hill Road/Dallons Road	AM	9.8	A	10.2	B
	PM	9.1	A	9.7	A
	Friday PM	N/A	N/A	N/A	N/A

Notes:
1 AM = morning peak hour, PM = afternoon peak hour.
2 Whole intersection weighted average control delay expressed in seconds per vehicle using methodology described in the *2000*

TABLE 10
EXISTING AND EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour[1]	Existing		Existing Plus Project	
		Delay[2]	LOS[3]	Delay	LOS

HCM. For side street stop controlled intersections, total control delay for the worst movement is presented.

3 LOS = Level of service. LOS calculations conducted using the TRAFFIX software for unsignalized (stop-controlled) intersections and the SYNCHRO software for signalized intersections.

4 The analysis of Friday PM peak-hour is to evaluate the effects of regional through traffic for intersections on SR 46. Local city intersections were not evaluated for Friday PM conditions.

Significant Impacts indicated in **bold**.

TABLE 11
EXISTING AND EXISTING PLUS PROJECT ROADWAY LEVELS OF SERVICE

Roadway Segment	Roadway Type	Existing		Existing Plus Project	
		Volume[1]	LOS[2]	Volume[1]	LOS[3]
1. SR 46 E, between US 101 and Airport Road	4-Lane Divided Arterial	25,500	C	**29,400**	**D**
2. SR 46 E, east of Airport Road	2-Lane Undivided Highway	**19,200**	**D**	**21,300**	**E**
3. US 101, north of SR 46 E to south of SR 46 W	4-Lane Divided Freeway	**63,000**	**D**	**65,600**	**D**
3. Golden Hill Road, between Dallons Road and SR 46[3]	2-Lane Collector (no left turn lane)	9,000	B	**18,700**	**F**
4. Dallons Road, west of Golden Hill Road	2-Lane Collector (no left turn lane)	1,500	A	3,900	A

Notes:

1 Average daily traffic.

2 LOS = Level of service.

3 Two-lane arterial volume thresholds are not provided in the City's Circulation Element. Thus, the threshold for a two-lane collector was applied.

Unacceptable operations indicated in **bold**.

TABLE 12
EXISTING AND EXISTING PLUS PROJECT US 101/SR 46E RAMP JUNCTION LEVELS OF SERVICE

Merge/Diverge	Peak Hour	Existing		Existing Plus Project	
		Density[1]	LOS[2]	Density[1]	LOS[2]
Diverge (Northbound Off-ramp)	AM	13.6	B	14.1	B
	PM	18.8	B	19.4	B
	Friday PM	21.5	C	22.1	C
Merge (Northbound On-ramp)	AM	7.4	A	7.5	A
	PM	11.2	B	11.3	B
	Friday PM	13.2	B	13.2	B
Diverge (Northbound Off-ramp)	AM	9.2	A	9.2	A
	PM	13.6	B	13.7	B
	Friday PM	16.1	B	16.2	B
Merge (Northbound On-ramp)	AM	13.0	B	13.3	B
	PM	15.6	B	16.2	B
	Friday PM	19.8	B	20.4	C

Notes:
1 Measured in vehicles per mile per lane.
2 LOS = Level of service.

THRESHOLDS OF SIGNIFICANCE AND PROJECT IMPACTS

City of Paso Robles

According to the City of Paso Robles *Circulation Element* (2003), the minimum acceptable Level of Service (LOS) is LOS D. Since none of the signalized intersections are under the jurisdiction of the City, only unsignalized intersections are discussed in this sub-section.

Unsignalized Intersections

A significant impact at an unsignalized intersection is defined to occur when the addition of project traffic:

1. Causes intersection operations for the side-street movement or approach to deteriorate from an acceptable level (LOS D or better) to an unacceptable level (LOS E or F) and satisfies the peak-hour signal warrant from the *Manual on Uniform Traffic Control Devices (MUTCD)*.
2. Exacerbates unacceptable operations (LOS E or F) and satisfies the peak-hour signal warrant from the *Manual on Uniform Traffic Control Devices* (MUTCD).

Based on these impact criteria, the addition of project traffic is estimated to have a significant impact at the intersection of Golden Hill Road/Union Road.

Roadway Segments

As noted previously, evaluation of roadway segments is used as a general guide to determine if a street is operating below or over capacity; in most cases, analysis of the intersections represent the constraint points and better reflect operating conditions of the roadway. Typically, poor operating conditions on a roadway are due to capacity constraints at the intersections, and can be mitigated accordingly. Therefore, if a roadway segment analysis shows poor operating conditions, but individual intersections operate within acceptable standards, the mitigation measures defer to the intersection. For roadway segments, a degradation in the level of service from an acceptable level (LOS D or better) to an unacceptable level (LOS E or F) is a significant impact. For segments already operating at LOS E or F without the project, the addition of any project traffic to that location is considered a significant impact.

Golden Hill Road is projected to degrade to an unacceptable level of service under Existing Plus Project Conditions. Thus, the project's impact to this City of Paso Robles roadway segment is significant.

Caltrans

Signalized Intersections and Ramp Junctions

A degradation in the level of service from an acceptable level (LOS C or better) to an unacceptable level (LOS D, E, or F) is considered to be a significant impact. For those facilities already operating at LOS D, E, or F without the project, the addition of any project traffic to that location is considered a significant impact.

The signalized intersection of SR 46/Buena Vista Drive operates at acceptable levels of service under Project Conditions. The addition of project traffic is estimated to have a significant impact on the following signalized intersections:

- SR 46/US 101 SB Ramps (Friday PM peak-hour)
- SR 46/US 101 NB Ramps (Friday PM peak-hour)
- SR 46/Golden Hill Road (Weekday AM and PM peak-hours and Friday PM peak-hour)

All US 101/SR 46E ramp junctions are estimated to operate at acceptable levels of service under Project Conditions. No significant impacts to any of the ramp junctions are projected.

Unsignalized Intersections

The significance impact criteria presented above for unsignalized City of Paso Robles intersections was applied to unsignalized intersections on SR 46. The project traffic is projected to have a significant impact at the following locations:

- SR 46/Union Road (Weekday AM and PM peak-hours and Friday PM peak-hour)
- SR 46/Airport Road (Weekday PM peak-hour and Friday PM peak-hour)
- SR 46/Jardine Road (Weekday AM and PM peak-hours and Friday PM peak-hour)

The unsignalized intersection of SR 46/Mill Road is projected to operate at unacceptable levels during the AM, PM, and Friday PM peak-hours, however, the MUTCD peak-hour signal warrant is not satisfied and the project's impact to this location is considered less-than-significant. Appendix D contains the peak-hour warrant.

It should be noted that the MUTCD contains seven other warrants that should be considered when determining the need for a traffic signal. The peak-hour signal warrant analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on a thorough study of traffic and roadway conditions. The decision to install a signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. Caltrans shall make the final determination on the need for a signal at this location since SR 46 is a state-maintained roadway.

Freeway and Roadway Segments

The analysis of Caltrans roadway and freeway segments were analyzed using the City of Paso Robles significance criteria as described above. The addition of project traffic is estimated to have a significant impact on the two-lane segment of SR 46 east of Airport Road and on the segment of US 101, between SR 46E and SR 46W. All other roadway segments are projected to operate at acceptable levels of service.

Transit Impacts

Impacts to transit are considered significant if the proposed project will conflict with existing or planned transit facilities or will generate potential transit trips and will not provide adequate facilities for pedestrians and bicyclists to access transit routes and stops.

The proposed retail development is estimated to generate transit demand from City of Paso Robles residents as both patrons and employees. However, direct transit service to the site is not provided. Thus, the project impact to the transit facilities is considered potentially significant.

Bicycle and Pedestrian Impacts

An impact to pedestrians and bicyclists would be considered significant if implementation of the proposed project will conflict with existing or planned bicycle facilities or will generate pedestrian and bicycle demand without providing adequate and appropriate facilities for safe non-motorized mobility.

On-site pedestrian circulation is generally adequate and direct. Pedestrian crosswalks are proposed on-site to provide a connection between the parking aisles and the retail buildings. The project will include sidewalks along its frontage on Dallons Road and Golden Hill Road. According to the City of Paso Robles' *Bikeway Master Plan* (2002), bike lanes are designated on Golden Hill Road and a bike path is designated on Dallons Road. The project will be widening and constructing improvements on Golden Hill Road and Dallons Road adjacent to the site. These improvements shall not preclude construction of the planned bike facilities as outlined in the *Bikeway Master Plan*.

Thus, the proposed project is estimated to have a less-than-significant impact to existing and planned pedestrian and bicycle facilities.

PROJECT MITIGATION MEASURES

Intersections

The following intersection improvements were identified to mitigate significant impacts. The resulting mitigated delays and levels of service with implementation of these improvements are presented in Table 13. The corresponding calculation sheets are included in Appendix B. The project applicant will contribute their fair share costs towards some of these mitigation measures through payment of the City of Paso Robles development impact fee program. The last column identifies the percentage of project traffic over the total intersection volume for each peak hour. These percentages are not typically associated with "fair-share" cost percentages because Caltrans use a different formula to calculate project responsibility.

City of Paso Robles

- *Golden Hill Road/Union Road* – The City of Paso Robles has adopted a plan line for this intersection. The plan line includes a one-lane roundabout with flared northbound and southbound right-turn lanes. As shown in Table 13, a roundabout will provide LOS A operations during both AM and PM peak-hours. As a fair-share contribution, the project applicant will be responsible for the design of the roundabout at this location.

Caltrans

- *SR 46/US 101 SB Ramps* – The addition of a second westbound left-turn lane and third eastbound through lane will provide acceptable LOS B operations during the weekday AM and PM peak hours. This intersection is projected to operate at LOS D during the Friday peak-hour. The proposed improvement includes widening of the southbound on-ramp to provide two receiving lanes. According to Caltrans staff, environmental review for this improvement is underway and scheduled to be completed by the end of the year.

- *SR 46/US 101 NB Ramps* – With the proposed second westbound left-turn lane at the US 101 SB Ramp intersection, two additional westbound through lanes are provided at this intersection. These new westbound through lanes will lead directly into the westbound left-turn lanes at the southbound ramp intersection. With this improvement, the intersection will operate at acceptable levels of service (LOS C) during all peak-hours.

- *SR 46/Golden Hill Road* – The SR 46/Golden Hill intersection needs to be widened to provide the following configuration:

    - Two left-turn lanes, one through lane, and one shared through/right-turn lane (northbound)
    - Two left-turn lanes, one through lane, and one right-turn lane (southbound)
    - Two left-turn lanes, two through lanes, and one right-turn lane (eastbound and westbound)

  Modification to the existing traffic signal timings and phasing will be required. These improvements will substantially improve the level of service rating (LOS F to LOS D).

- *SR 46/Union Road* – The restriction of northbound left-turns from Union Road to west SR 46 will provide acceptable levels of service on the side street (Union Road) during all peak-hours. Vehicles currently turning left from Union Road will be required to travel west and utilize the signalized intersection at SR

46/Golden Hill Road to make a left-turn. Approximately 30 or fewer vehicles during each peak-hour will be affected.

TABLE 13
MITIGATED EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour[1]	Existing Plus Project		Mitigated Existing Plus Project			
		Delay	LOS	Delay	LOS	Improvement	% of Project Traffic[5]
1. SR 46 E/ US 101 SB Ramps	AM	24.9	C	16.4	B	Add 2nd westbound left-turn lane, restripe eastbound approach	7%
	PM	39.6	D	19.4	B		9%
	Friday PM	**146.2**	**F**	39.9	D		8%
2. SR 46 E/ US 101 NB Ramps	AM	51.0	D	26.7	C	Add 3rd and 4th westbound through lane	9%
	PM	49.1	D	29.1	C		10%
	Friday PM	**113.3**	**F**	34.3	C		9%
3. SR 46E/ Buena Vista Dr	AM	19.4	B	None Required			
	PM	15.8	B				
	Friday PM	22.2	C				
4. SR 46 E/ Golden Hill Rd	AM	**>150**	**F**	42.4	D	Widen intersection and update signal phasing	17%
	PM	**>150**	**F**	37.8	D		21%
	Friday PM	**>150**	**F**	46.4	D		19%
5. SR 46 E/ Union Rd	AM	**98.5**	**F**	15.1	C	Prohibit northbound left-turns	8%
	PM	**>150**	**F**	17.8	C		8%
	Friday PM	**>150**	**F**	22.8	C		7%
6. SR 46E/ Airport Rd	AM	15.3	C	14.4	B	Widen SR 46 widening to 4 lanes	8%
	PM	**53.3**	**F**	65.6	F		8%
	Friday PM	**>150**	**F**	97.0	F		7%
7. SR 46 E/ Mill Rd	AM	34.6	D	None Required			
	PM	**71.2**	**F**				
	Friday PM	**>150**	**F**				
8. SR 46 E/ Jardine Rd	AM	**37.8**	**E**	19.3	C	Widen SR 46 widening to 4 lanes	9%
	PM	**117.9**	**F**	20.7	C		9%
	Friday PM	**>150**	**F**	31.8	D		7%
9. Golden Hill Rd/ Union Rd[4]	AM	**42.4**	**E**	7	A	Design roundabout[6]	12%
	PM	**116.6**	**F**	8	A		15%
	Friday PM	N/A	N/A				N/A
10. Buena Vista Drive/Dallons Road	AM	22.2	C	None Required			
	PM	10.8	B				
	Friday PM	N/A	N/A				
11. Golden Hill Road/Dallons Road	AM	10.2	B	None Required			
	PM	9.7	A				
	Friday PM	N/A	N/A				

TABLE 13
MITIGATED EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour[1]	Existing Plus Project		Mitigated Existing Plus Project			
		Delay	LOS	Delay	LOS	Improvement	% of Project Traffic[5]

Notes:

1 AM = morning peak hour, PM = afternoon peak hour.

2 Whole intersection weighted average control delay expressed in seconds per vehicle using methodology described in the *2000 HCM*. For side street stop controlled intersections, total control delay for the worst movement is presented.

3 LOS = Level of service. LOS calculations conducted using the TRAFFIX software for unsignalized (stop-controlled) intersections and the SYNCHRO software for signalized intersections.

4 The analysis of Friday PM peak-hour is to evaluate the effects of regional through traffic for intersections on SR 46. Local city intersections were not evaluated for Friday PM conditions.

5 Percent of project traffic was calculated by dividing the project trips over the total intersection volume.

6 Project applicant will be responsible for design of roundabout at Golden Hill Road/Union Road.

Significant Impacts indicated in **bold**.

- *SR 46/Airport Road* – SR 46 currently narrows from four lanes to two lanes east of Airport Road. Caltrans is preparing environmental documentation for a project to widen SR 46, east of Airport Road, to provide two travel lanes in each direction to the Shandon rest stop. The widening plans include acceleration and deceleration lanes to improve merging maneuvers for left- and right-turning vehicles from the side streets (at Airport Road, Mill Road, Jardine Road) with SR 46 traffic. This project is expected to start construction in 2008. With these proposed improvements, the side street movements will operate with lower vehicular delays when compared to Existing Conditions.

- *SR 46/Jardine Road* – As noted above, acceleration and deceleration lanes will be provided at this location with the SR 46 Widening project. With these proposed improvements, the side street movements will operate with lower vehicular delays when compared to Existing Conditions.

Roadway Segments

The SR 46 Widening project discussed above will provide two travel lanes in each direction and improve the level of service along SR 46 to LOS A east of Airport Road. Golden Hill Road, north of SR 46, will be widened to provide two travel lanes in each direction. As part of the dual left-turn lane improvements at the US 101/SR 46E interchange, a southbound auxiliary lane will be provided on US 101 between SR 46E and 16th Street to provide additional capacity on US 101. These improvements are sufficient to mitigate the project's impact on the roadway segments.

Freeway Ramp Junctions

No significant impacts to the freeway ramp junctions were identified, thus no mitigation measures are proposed.

Transit Facilities

The project sponsor shall coordinate with San Luis Obispo Regional Transit Authority (RTA) and the City of Paso Robles to provide transit service to the site. Since the North County Shuttle stops near the site, at the northeast corner of the Buena Vista Drive/Dallons Road intersection, the bus route could be adjusted to operate on Dallons

Road. The appropriate location for a bus stop along the project frontage shall be determined in consultation with City and RTA staff. The existing transit stop on the east side of Golden Hill may be relocated to Dallons Road. With the above recommendations, the project's impacts are mitigated to a less-than-significant level.

Bicycle and Pedestrian Facilities

As noted in the previous section, the widening plans on Dallons Road and Golden Hill Road shall not preclude construction of future bicycle facilities. Bike lanes are to be provided along the east side of Golden Hill Road north of SR 46, and along the west side of Golden Hill Road between Dallons Road and the project driveway. As directed by the City of Paso Robles staff, the 10-foot wide sidewalk on the west side of Golden Hill Road between the project driveway and SR 46 is to be maintained, and the bike lane will transition to a signed bike route (Class III facility). Thus the project's impacts to the bicycle and pedestrian facilities are less-than-significant, and no mitigation is required.

Other Mitigation Measures

To allow for the addition of a third lane in each direction on SR 46 or to upgrade this facility to a freeway, the project applicant has agreed to provide a 30-foot easement to the City of Paso Robles along the southern project frontage. This easement will provide sufficient right-of-way to accommodate future improvements to SR 46. A discussion of when these future improvements are needed is presented in the next two chapters.

SITE ACCESS AND ON-SITE CIRCULATION

The site plan (dated November 20, 2006) for the proposed project is shown on Figure 2. Access to the site will be provided via one driveway on Golden Hill Road and three driveways on Dallons Road. The majority of the project traffic is estimated to utilize the Golden Hill Road driveway due to the roadway's direct connection to SR 46 East. The number of proposed driveways is sufficient to accommodate the total number of trips generated by the project.

The site plan is oriented with the majority of parking spaces located in the center of the site. The larger retail buildings are oriented along the northern border of the site with the smaller retail pads and restaurants located along the southern border and adjacent to the gas stations. A main east-west aisle bisects the site and leads directly to the Golden Hill Road driveway. A secondary east-west aisle provides direct access to the smaller retail buildings and restaurants. Due to the location of the loading docks for the large retail buildings, primary truck access is proposed from Dallons Road.

The original site plan was modified to include the following improvements recommended by Fehr & Peers (site plan dated March 8, 2007):

1. Parking was eliminated in front of Majors 3 and 4 so that vehicles entering or exiting will not conflict with traffic on the main aisle.

2. An all-way stop at the internal intersection located southeast of the Garden Center was provided.

Golden Hill Road/Project Driveway Traffic Control

A review of the peak-hour volumes was conducted at the main project driveway on Golden Hill Road to determine the appropriate traffic control device (e.g. stop control, traffic signal, or roundabout). The projected volumes meet the requirements of the MUTCD peak-hour signal warrant. The main driveway is projected to operate at LOS B with a traffic signal under Existing Plus Project Conditions.

City staff requested a single-lane roundabout be considered as the traffic control for the main driveway location, and directed that the roundabout be centered around two large oak trees on the eastern side of the site. Fehr & Peers investigated the feasibility of a roundabout at this location. However, based on planning-level daily volumes from *Roundabouts: An Informational Guide* (Federal Highway Administration, Publication No. FHWA-RD-00-067), a two-lane roundabout is needed to serve the Project volumes and traffic from future approved and pending projects (see next chapter for discussion of future approved and pending projects). According to *Roundabouts*, a two-lane roundabout has a typical inscribed diameter of 180 feet. Implementation of a two-lane roundabout would require substantial right-of-way on both sides of Golden Hill Road and would impact existing residences and businesses. Thus, the City did not consider a roundabout as a feasible traffic control device at this location.

Golden Hill Road and Dallons Road Improvement Plans

Conceptual roadway improvement plans were prepared on Golden Hill Road (between SR 46 and Dallons Road) and on Dallons Road (between the western project boundary and Golden Hill Road). Figures 10a and 10b present these conceptual plans, and a text description of design issues is presented below.

Golden Hill Road

As shown on Figure 10a, two travel lanes with bike lanes in each direction are proposed on Golden Hill Road between SR 46 and Dallons Road. The four-lane section tapers to match the existing cross-sections on Golden Hill north of Dallons Road and south of SR 46. The improvement plans also incorporate the proposed lane improvements at the SR 46/Golden Hill Road intersection that were discussed above as mitigation.

Due to the number and location of existing gas station driveways on Golden Hill Road between the main driveway and SR 46, City of Paso Robles staff indicated that a raised median on Golden Hill is required to minimize vehicle conflicts. The raised median will require outbound gas station traffic on the east side of Golden Hill Road, outbound Wallace Drive traffic, and inbound gas station traffic on the west side of Golden Hill Road to make U-turns at the proposed signalized main driveway. Two left-turn lanes at the project driveway are proposed to accommodate U-turning traffic and inbound project traffic. The existing outbound gas station driveway would be required to realign opposite the project driveway to create the east leg of the signalized intersection. To accommodate larger inbound vehicles at the Pacific Pride gas station, trucks, buses, and recreational vehicles would be required to turn left into the project site and use a shared driveway on the main circulation aisle.

A review of the operations on Golden Hill Road between SR 46 and Dallons Road was conducted using the Synchro software program. The purpose of this supplemental analysis is to determine whether vehicles would spill back between the project driveway and SR 46. Based on the Synchro results, vehicles traveling north on Golden Hill Road and into the project site are not expected to spill back to SR 46. Similarly, southbound vehicle queues on Golden Hill Road at SR 46 are not projected to extend back to the project driveway.

Dallons Road

Figure 10b presents the improvement plan on Dallons Road. One lane of travel is proposed on Dallons Road with a center two-way left-turn lane. Left-turn lanes are proposed at the two western driveways. An eastbound bicycle lane is proposed along the project's frontage. A westbound bicycle lane will be constructed when development on the north side of Dallons Road occurs.

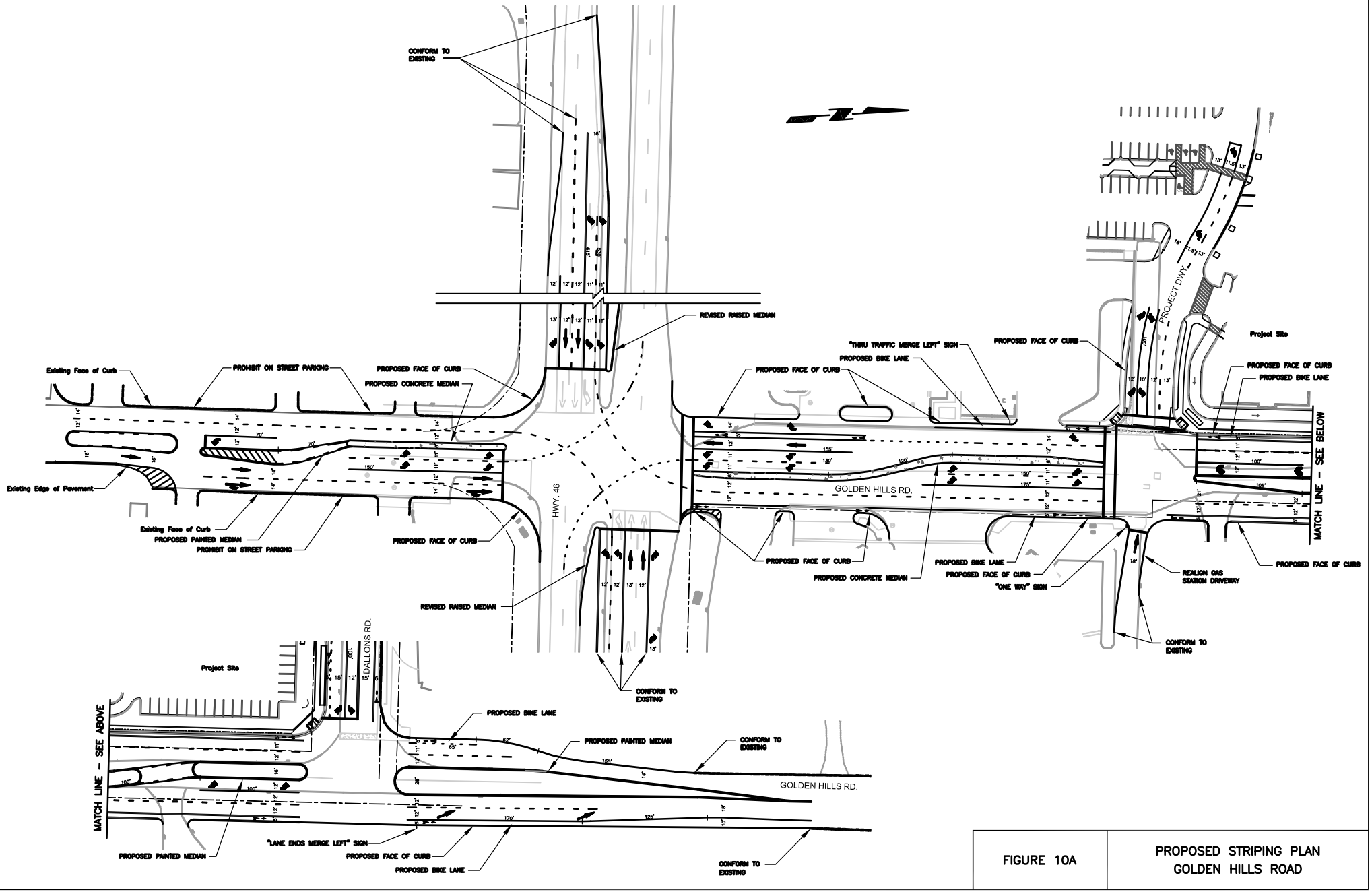


FIGURE 10A	PROPOSED STRIPING PLAN GOLDEN HILLS ROAD

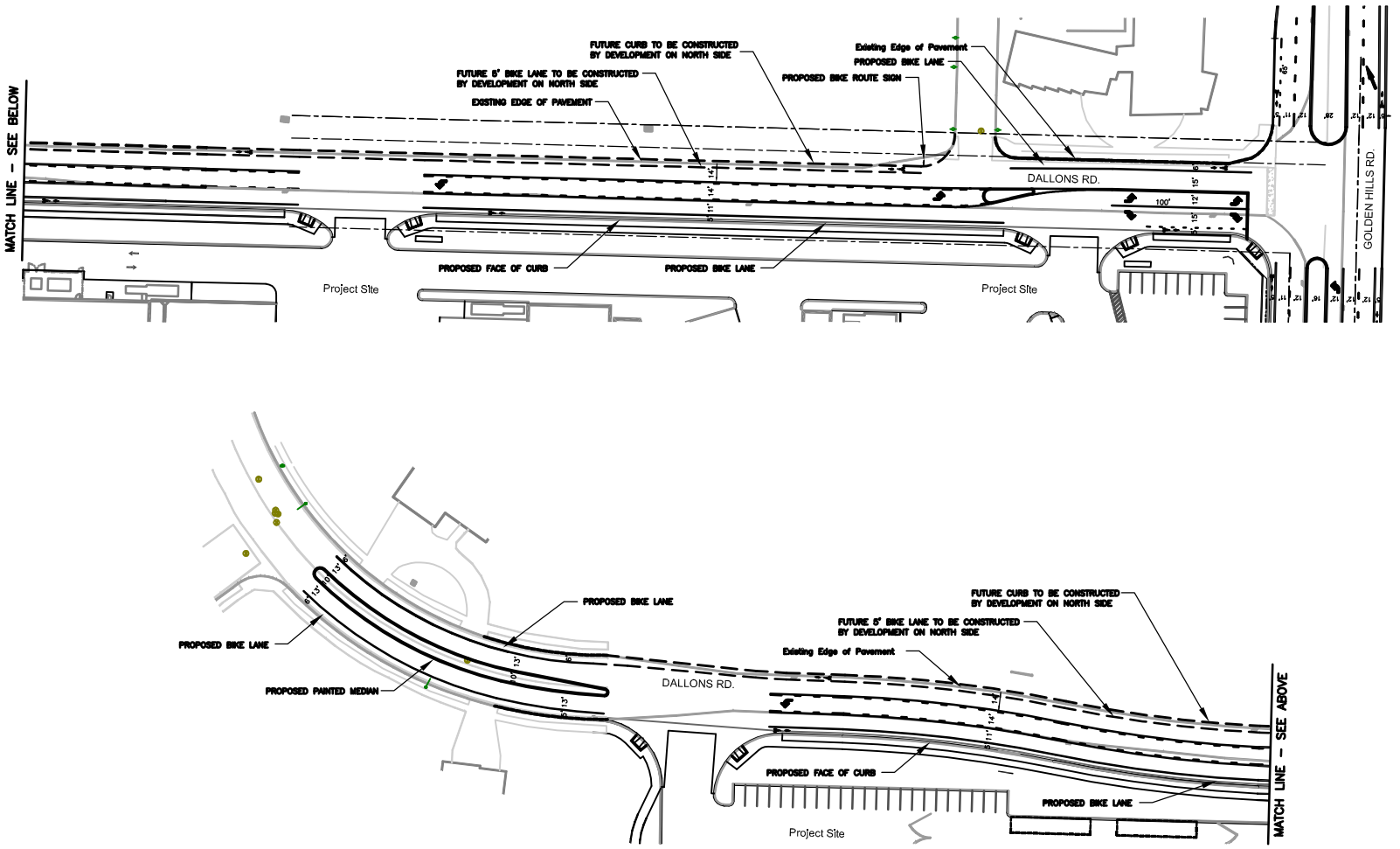


FIGURE 10B	PROPOSED STRIPING PLAN DALLONS ROAD

4. NEAR-TERM (YEAR 2010) CUMULATIVE CONDITIONS

This chapter presents an analysis of Near-Term Cumulative Conditions. Near-Term Conditions represent traffic growth to Year 2010 which accounts for buildout of the project, construction of one pending and all approved projects near the site, and future growth in the SR 46 corridor.

NEAR-TERM CUMULATIVE TRAFFIC ESTIMATES

According to Caltrans District 5 staff, volumes on SR 46, west of Jardine Road, have increased by 4.1 percent per year between 1993 and 2006. The existing segment volumes on SR 46, west of Jardine Road, were multiplied by 20.5 percent (representing five years of growth at 4.1 percent per year from 2005). The added growth was assigned through the SR 46 corridor and added to the Existing volumes to establish Near-Term baseline traffic volumes. This approach was requested by Caltrans and represents a conservative estimate of traffic.

The following list of approved and pending projects, developed in consultation with City of Paso Robles and Caltrans staff, was included under Near-Term Conditions:

- Projects located on Airport Road
    - Airport/Dry Creek Business Park—39 acres of industrial/commercial development
    - Block Graphics—73,000 s.f. of light industrial development
    - Nunno LLC—100,000 s.f. of light industrial development
    - Santa Cruz Biotechnology—98,000 s.f. of light industrial development
- Projects located off of Golden Hill Road[1]
    - IQMS—28,700 s.f.
    - Wheelton Partnership—24,200 s.f.
    - Coastal Crop Care—5,000 s.f.
    - McKenzie Valley Investments—27,000 s.f.
    - Anthony Sheplay—19,000 s.f.
    - Airflow Research Heads—94,000 s.f.
    - JRW Group—23,900 s.f.
    - Golden Hill Business Park—365,500 s.f.
    - Colin Weyrick—14.44 acres

[1] Note all projects located off Golden Hill Road are light industrial developments, except where indicated.

  - Robert Shannon (Tract 2594)—17.46 acres
  - Ole Viborg/Don Thiessen—27,500 s.f.
  - Nanometer Technologies—56,100 s.f.
  - Paso Robles Ford—36,335 s.f. car dealership
- Links Industrial/Office—154,000 s.f. of industrial and office development on Jardine Road (pending)

Daily, AM peak-hour, and PM peak-hour traffic estimates for the above projects were obtained either from their respective traffic studies or from Caltrans and added to the Near-Term baseline volumes to represent Near-Term Condition volumes. The Near-Term intersection volumes are presented on Figure 11. Daily project trips were added to the existing average daily traffic (ADT) for each of the study roadway segments as shown on Figure 12.

NEAR-TERM CUMULATIVE ROADWAY NETWORK

The existing roadway geometry was assumed for near-term cumulative conditions.

NEAR-TERM CUMULATIVE LEVELS OF SERVICE

Intersections

Levels of service were calculated under Near-Term Cumulative volumes to evaluate the operating conditions of the intersection. When intersections operate at congested levels (i.e. LOS E or F), the number of vehicles that travel through the intersection is constant and evenly distributed throughout the entire peak-hour. Thus, the peak-hour factor was increased to 0.95 for all study intersections under this scenario to reflect this condition.

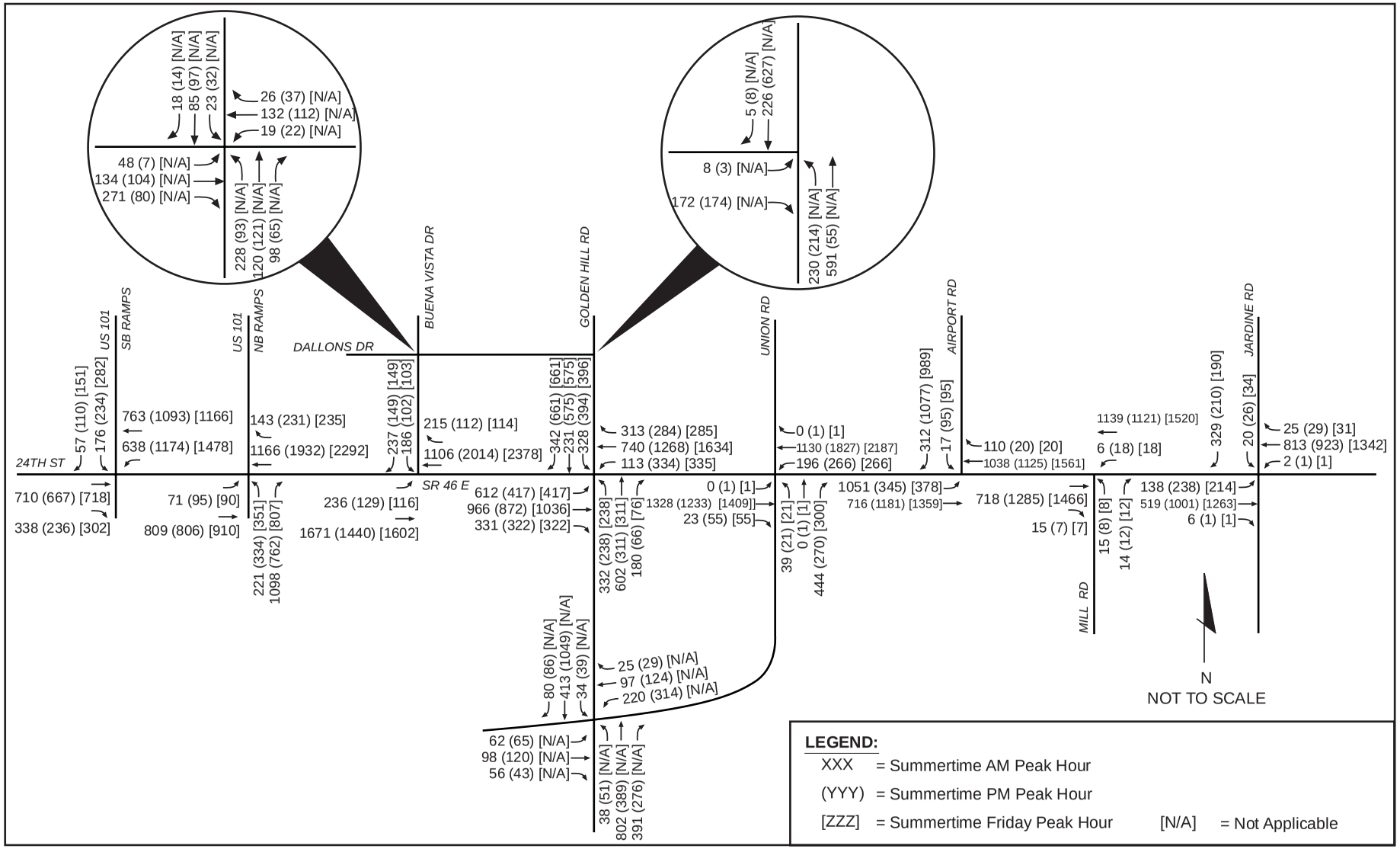
The results of the intersection level of service calculations are presented in Table 14. The LOS calculation sheets are included in Appendix B. All study intersections except Buena Vista Drive/Dallons Road and Golden Hill Road/Dallons Road, are projected to operate at unacceptable levels (LOS E or F for at least the PM peak hour) under Near-Term Conditions with the existing roadway geometry.

Roadway Segments

The results of the roadway segments level of service analysis for Near-Term Cumulative Conditions are summarized in Table 15. Both segments of SR 46, between US 101 and Airport Road, and east of Airport Road, and the segment of US 101 between SR 46E and SR 46W are projected to operate at unacceptable levels. The other roadway segments are projected to operate at acceptable levels of service.

Ramp Junctions

Freeway ramp junction merge/diverge analysis was conducted for the study ramps with the added traffic from the Near-Term projects. The results are summarized in Table 16, and the corresponding calculation sheets are contained in Appendix C. The US 101/SR 46 ramp junctions are projected to operate at acceptable levels (LOS C or better).



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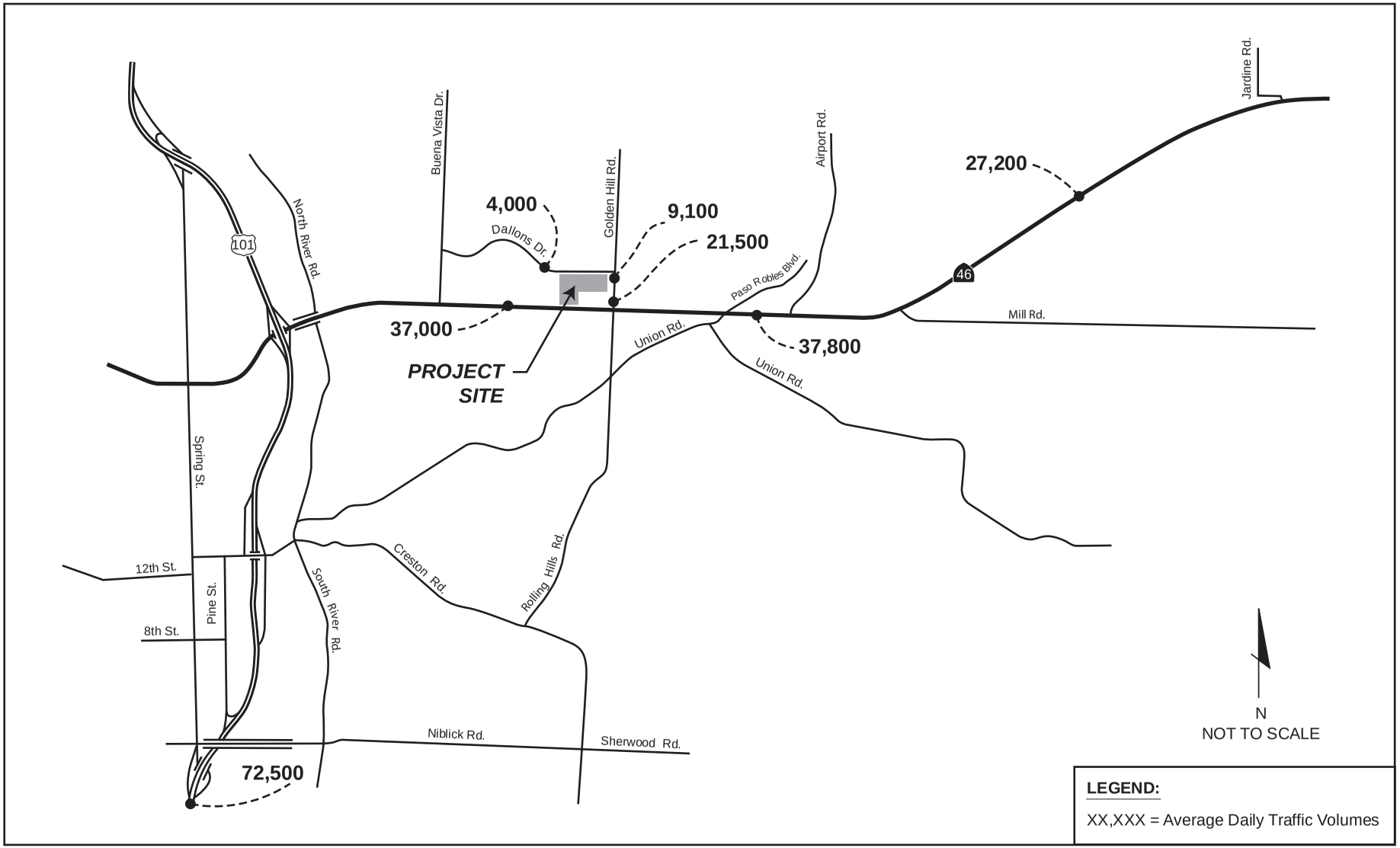
SJ06-876

Golden Hill Retail Center

NEAR-TERM CUMULATIVE PEAK-HOUR TRAFFIC VOLUMES

FIGURE 11



Golden Hill Retail Center

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NEAR-TERM CUMULATIVE AVERAGE DAILY TRAFFIC VOLUMES

June 2007
SJ06-876

FIGURE 12

TABLE 14
NEAR-TERM CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Near-Term Cumulative (Existing Roadway Geometry)		Mitigated Near-Term Cumulative (with Existing Plus Project Mitigation)			Mitigated Near-Term Cumulative (with Existing Plus Project and Additional Mitigation)			% of Project Traffic[5]
		Delay	LOS	Delay	LOS	Improvement	Delay	LOS	Improvement	
1. SR 46 E / US 101 SB Ramps	AM	35.1	D	20.1	C	Add 2nd westbound left-turn lane, restripe eastbound approach	21.6	C	Re-optimization of the signal timings	6%
	PM	>150	F	36.8	D		25.1	C		7%
	Friday PM	>150	F	61.7	E		60.2	E		6%
2. SR 46 E / US 101 NB Ramps	AM	>150	F	89.5	F	Add 3rd and 4th westbound through lane	27.1	C	Add dual northbound right-turn lanes	7%
	PM	>150	F	63.7	E		25.7	C		8%
	Friday PM	>150	F	85.5	F		33.8	C		7%
3. SR 46E / Buena Vista Dr	AM	20.5	C	No Mitigation Required.			12.7	B	Add westbound right-turn lane; Add 2nd eastbound left-turn lane	6%
	PM	80.4	F				20.7	C		7%
	Friday PM	130.5	F				31.3	C		8%
4. SR 46 E / Golden Hill Rd	AM	>150	F	51.6	D	Widen intersection and update signal phasing	42.3	D	Add 3rd eastbound and westbound through lane	11%
	PM	>150	F	93.6	F		57.6	E		14%
	Friday PM	>150	F	131.8	F		77.0	E		13%
5. SR 46 E / Union Rd	AM	>150	F	>150	F	Prohibit northbound left-turns	19.5	C	Add eastbound acceleration lane for northbound right turn	5%
	PM	>150	F	33.4	D		22.6	C		5%
	Friday PM	>150	F	63.2	F		32.9	D		5%
6. SR 46 E / Airport Rd	AM	>150	F	>150	F	Widen SR 46 to 4 lanes and add southbound right-turn lane				
	PM	>150	F	>150	F					
	Friday PM	>150	F	>150	F					
6a. SR 46 EB Ramps/Airport Rd	AM						16.4	C	Grade Separation/ Interchange (stop-sign controlled)	4%
	PM						9.8	A		5%
	Friday PM						9.9	A		5%

TABLE 14
NEAR-TERM CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Near-Term Cumulative (Existing Roadway Geometry)		Mitigated Near-Term Cumulative (with Existing Plus Project Mitigation)			Mitigated Near-Term Cumulative (with Existing Plus Project and Additional Mitigation)			% of Project Traffic[5]
		Delay	LOS	Delay	LOS	Improvement	Delay	LOS	Improvement	
6b. SR 46 WB Ramps/Airport Road	AM PM Friday PM						14.7 12.2 12.4	B B B	Grade Separation/ Interchange (stop-sign controlled)	4% 5% 5%
7. SR 46 E / Mill Rd	AM PM Friday PM	72.4 >150 >150	F F F	No Mitigation Required.						
8. SR 46 E / Jardine Rd	AM PM Friday PM	72.4 >150 >150	F F F	19.9 27.5 43.0	C D E	Widen SR 46 to 4 lanes	N/A N/A N/A	N/A N/A N/A	No additional mitigation required	7% 7% 6%
9. Golden Hill Rd / Union Rd[4]	AM PM Friday PM	>150 >150 N/A	F F N/A	56 77 N/A	F F N/A	Construct single-lane roundabout	4 4 N/A	A A N/A	Widen single-lane roundabout to two lanes	8% 10% N/A
10. Buena Vista Dr/ Dallons Road	AM PM Friday PM	13.1 9.7 N/A	B A N/A	No Mitigation Required.						
11. Golden Hill Rd/ Dallons Road	AM PM Friday PM	12.6 18.7 N/A	B C N/A	No Mitigation Required.						

Notes:

1 AM = morning peak hour, PM = afternoon peak hour.

2 Whole intersection weighted average control delay expressed in seconds per vehicle using methodology described in the *2000 HCM*. For side street stop controlled intersections, total control delay for the worst movement is presented.

3 LOS = Level of service. LOS calculations conducted using the TRAFFIX software for unsignalized (stop-controlled) intersections and the SYNCHRO software for signalized

TABLE 14
NEAR-TERM CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Near-Term Cumulative (Existing Roadway Geometry)		Mitigated Near-Term Cumulative (with Existing Plus Project Mitigation)			Mitigated Near-Term Cumulative (with Existing Plus Project and Additional Mitigation)			% of Project Traffic[5]
		Delay	LOS	Delay	LOS	Improvement	Delay	LOS	Improvement	

intersections.

4 The analysis of Friday PM peak-hour is to evaluate the effects of regional through traffic for intersections on SR 46. Local city intersections were not evaluated for Friday PM conditions.

5 Percent of project traffic was calculated by dividing the project trips over the total intersection volume.

TABLE 15
NEAR-TERM CUMULATIVE ROADWAY LEVELS OF SERVICE

Roadway Segment	Roadway Type	Volume[1]	LOS[2]
1. SR 46 E, between US 101 and Airport Road	4-Lane Divided Arterial	37,800	F
2. SR 46 E, east of Airport Road	2-Lane Undivided Highway	27,200	F
3. US 101, north of SR 46 E to south of SR 46 W	4-Lane Divided Freeway	72,500	D
4. Golden Hill Road, between Dallons Road and SR 46	4-Lane Divided Arterial	21,500	A
5. Dallons Road, west of Golden Hill Road	2-Lane Collector (no left turn lane)	4,000	A

Notes:
1 Average daily traffic. Note volume reported is the maximum volume on the given roadway segment within the project study area.
2 LOS = Level of service.

TABLE 16
NEAR-TERM CUMULATIVE US 101/SR 46 E RAMP JUNCTION LEVELS OF SERVICE

Merge/Diverge	Peak Hour	Density[1]	Level of Service
Diverge (Northbound Off-ramp)	AM	18.7	B
	PM	20.5	C
	Friday PM	22.9	C
Merge (Northbound On-ramp)	AM	7.2	A
	PM	11.6	B
	Friday PM	13.3	B
Diverge (Southbound Off-ramp)	AM	9.3	A
	PM	13.3	B
	Friday PM	15.6	B
Merge (Southbound On-ramp)	AM	13.7	B
	PM	19.8	B
	Friday PM	24.0	C

Notes:
1 Measured in vehicles per mile per lane.

NEAR-TERM CUMULATIVE MITIGATION MEASURES

Intersections

Table 14 presents the mitigated level of service calculations under Near-Term Conditions with the mitigation measures identified under Existing Plus Project Conditions. Additional mitigation measures beyond those identified in the previous chapter are presented to provide improved operations. The last column identifies the percentage of project traffic over the total intersection volume for each peak hour. These percentages are not typically associated with "fair-share" cost percentages because Caltrans use a different formula to calculate project responsibility.

City of Paso Robles

- *Golden Hill Road/Union Road* – The addition of a second circulating lane in the roundabout will provide acceptable operations. This mitigation will likely require additional right-of-way acquisition.

Caltrans

- *SR 46/US 101 SB Ramps* – Re-optimization of the signal timings and the splits for each phase will provide LOS C or better operations during the weekday AM and PM peak hours. This improvement will be made in conjunction with the proposed mitigation at the SR 46/US 101 NB Ramps (see below). This intersection is projected to operate at LOS E, however, the mitigated delay will be lower than Existing Conditions.

- *SR 46/US 101 NB Ramps* – The widening of the northbound off-ramp structure to provide dual northbound right-turn lanes will provide LOS C or better operations during all peak hours. The approach will contain one shared left-turn/through lane and two right-turn lanes.

- *SR 46/Buena Vista Drive* – The addition of a westbound right-turn lane and dual eastbound left-turn lanes will provide LOS C operations.

- *SR 46/Golden Hill Road* – The addition of a third eastbound and westbound through lane is required to provide improved intersection operations. The intersection is projected to operate at LOS D or E but the mitigated delays are less than Existing Conditions. As noted in the previous chapter, the project applicant is providing an easement along the southern project frontage to accommodate widening of SR 46 or conversion of SR 46 to a freeway.

- *SR 46/Union Road* – The addition of an eastbound acceleration lane for the northbound right-turn is recommended to reduce delays for vehicles to turn from Union Road to eastbound SR 46. Applying guidelines from the Caltrans' *Highway Design Manual*, a 700-foot acceleration lane should be provided. The acceleration lane will terminate prior to the Huerhuero Creek overcrossing. With the acceleration lane, the SR 46/Union Road intersection is projected to operate at LOS C during weekdays, and LOS D during the Friday PM peak hour.

- *SR 46/Airport Road* – The projected peak-hour volumes at this location meet the minimum volume thresholds for the MUTCD peak-hour signal warrant. While a signal could be constructed at this location, the north leg of the intersection would have to be substantially widened and re-constructed with retaining walls to accommodate up to four lanes (two receiving lanes for dual eastbound left-turns and one lane each for southbound left-turn and right-turn).. According to Caltrans District 5 staff, a traffic signal would conflict with long-term plans for grade separation at this location. Thus, Caltrans is requesting grade

separation of Airport Road with SR 46 as the preferred improvement to provide acceptable operations. The preferred design is a diamond interchange (Type L-1 from Figure 502.2 of the Caltrans *Highway Design Manual*) with two ramp intersections. Right-of-way acquisition will be required. Additional environmental documentation is needed to completely evaluate the feasibility and impacts of the interchange. An assessment district fee will be collected to secure funding for the SR 46/Airport Road interchange. The project applicant required participation in this program will constitute its fair share towards the SR 46/Airport Road improvements.

Golden Hill Road Operations

A review of the Synchro outputs for Golden Hill Road between the project driveway and SR 46 indicates that vehicles traveling north on Golden Hill Road will extend back to the SR 46/Golden Hill Road intersection. Similarly, southbound Golden Hill Road vehicles would extend back from SR 46 to the project driveway. Signal coordination between the project driveway and SR 46 will be required to minimize delays and queues on Golden Hill Road. Some local traffic will use other routes (eg Buena Vista Drive and Dallons Road) to travel to the site if congestion increases.

Roadway Segments

The SR 46 Widening project, discussed in the previous chapter, would provide acceptable levels on SR 46 east of Airport Road. The addition of a third through lane on SR 46, which was recommended at Golden Hill Road to mitigate intersection impacts, would provide acceptable levels of service on this section of SR 46 between US 101 and Airport Road.

Freeway Ramp Junctions

No significant impacts to the freeway ramp junctions were identified; thus no mitigation measures are proposed.

5. CUMULATIVE (YEAR 2030) CONDITIONS

Long-term cumulative conditions are assumed to represent Year 2030 conditions. Traffic operations with the project in place under this scenario are presented in this chapter.

CUMULATIVE (2030) TRAFFIC ESTIMATES

Consistent with the approach used for Near-Term Conditions, the 4.1 percent annual growth rate was applied to the existing link volumes for a 25-year period (between Year 2005 to Year 2030). This added growth was distributed through the SR 46 corridor. The existing volumes are projected to increase by 100 percent under Cumulative Conditions with the use of the growth factor. While this growth rate is not typically sustained over an extended period of time and results in a very conservative estimate of traffic, Caltrans has requested this approach for SR 46, which is a State-maintained facility. In addition, the Cumulative scenario analyzed for this study reflects a five-year horizon beyond what was evaluated in the City's Circulation Element (Year 2025).

To account for additional growth from development and/or land use changes within the project study area, the Near-Term side-street volumes were increased by a 1% annual growth rate until Year 2030. Project traffic from the Chandler Ranch Area Specific Plan (CRASP) and the expansion of Cuesta College was also assigned to the network under the Cumulative Scenario. Figure 13 presents the Cumulative peak-hour volumes at the study intersections.

CUMULATIVE ROADWAY NETWORK

The following improvements (recommended as mitigation measures for Existing Plus Project Conditions and Near-Term Cumulative Conditions) were assumed to be in place under Cumulative Year 2030 Conditions:

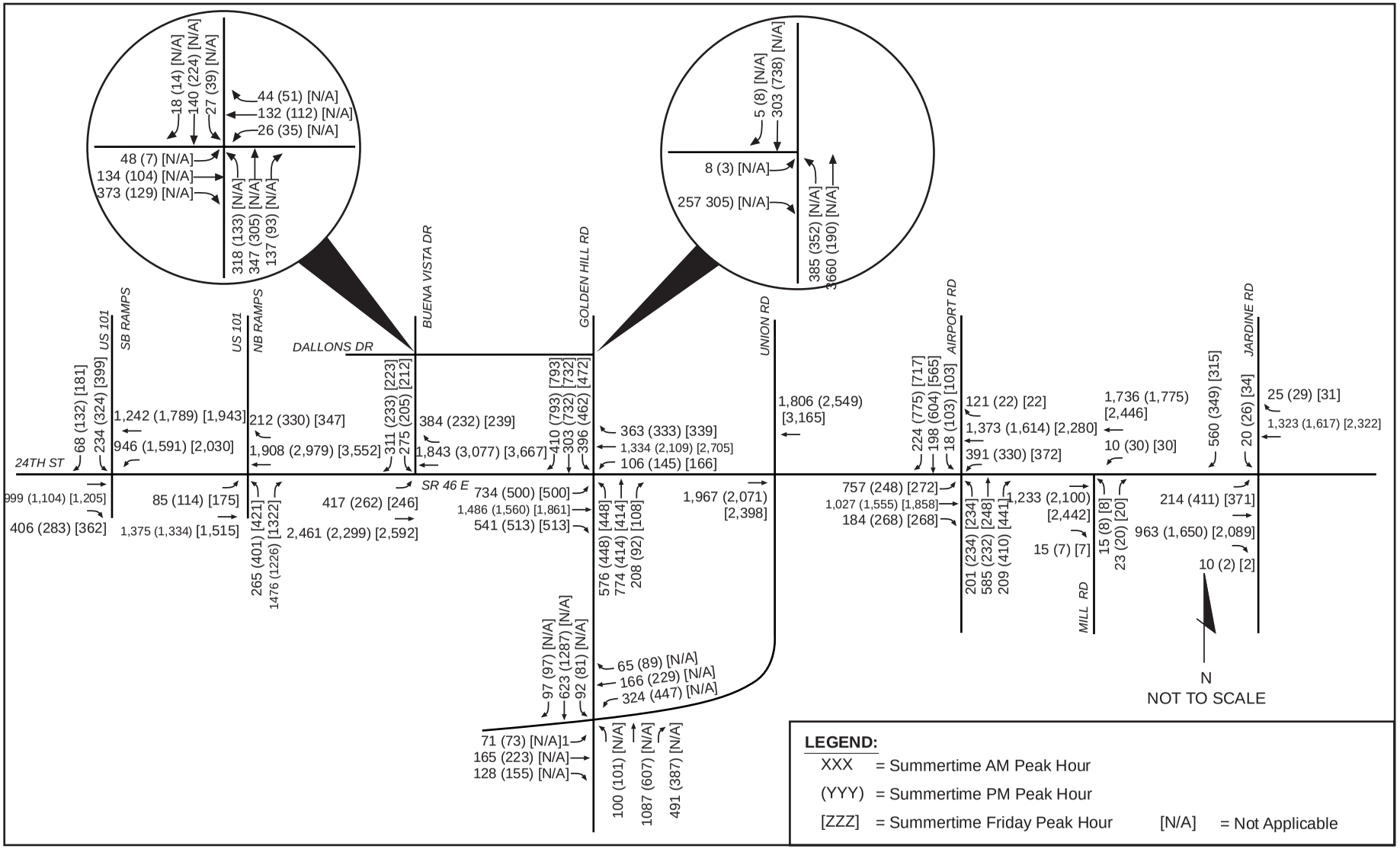
- Addition of second westbound left-turn lane at US 101 SB Ramps/SR 46E
- Addition of third and fourth westbound through lane at US 101 NB Ramps/SR 46E
- Widening of the SR 46/Golden Hill Road intersection
- Widening of SR 46E to four lanes east of Airport Road and acceleration/deceleration lanes (at Airport Road, Mill Road, Jardine Road)
- Roundabout at Golden Hill Road/Union Road
- Extension of Airport Road south from SR 46 to provide direct access to the Chandler Ranch project. A full interchange is assumed at this location.

CUMULATIVE (2030) LEVELS OF SERVICE

Intersection

Table 17 presents the levels of service at the study intersections under Cumulative Conditions. Even with the mitigation measures identified under Existing Plus Project Conditions, all intersections operate at LOS F except for the Buena Vista Drive/Dallons Road intersection. Additional improvements are presented in the following section. The last column identifies the percentage of project traffic over the total intersection volume for each peak hour. These percentages are not typically associated with "fair-share" cost percentages because Caltrans use a

different formula to calculate project responsibility. Under the Cumulative (Year 2030) volumes, project traffic generally represents five (5) percent or less of the total volumes at intersections on SR 46 west and east of Golden Hill Road.



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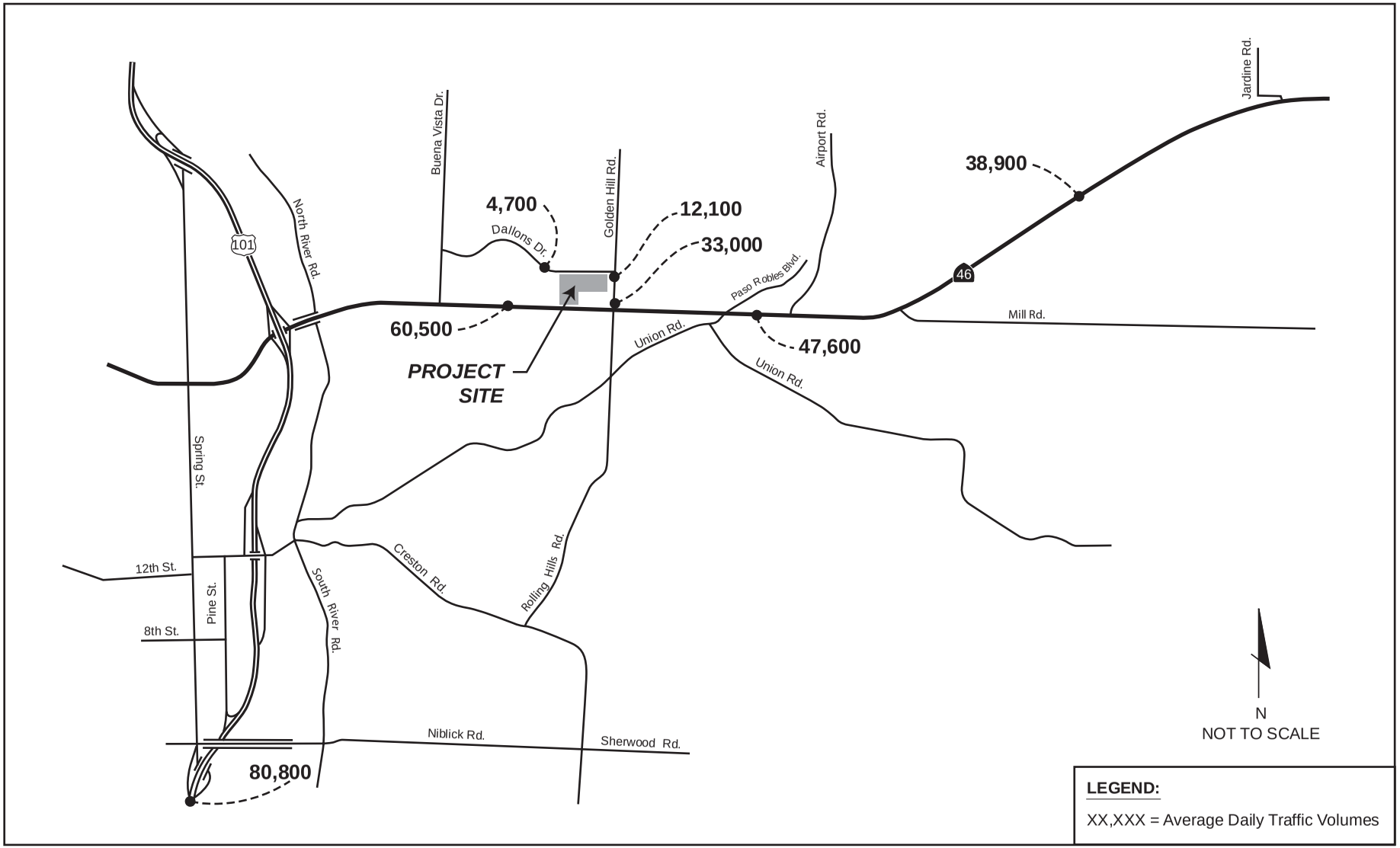
June 2007
SJ06-876

Golden Hill Retail Center

CUMULATIVE PEAK-HOUR TRAFFIC VOLUMES

FIGURE 13



Golden Hill Retail Center

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CUMULATIVE AVERAGE DAILY TRAFFIC VOLUMES

June 2007
SJ06-876

FIGURE 14

TABLE 17
CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Cumulative (With Existing Plus Project Mitigation)		Mitigated Cumulative (with Near-Term Mitigation)			Mitigated Cumulative (with Project, Near-Term, and Additional Mitigation)			% of Project Traffic[5]
		Delay	LOS	Delay	LOS	Improvement	Delay	LOS	Improvement	
1. SR 46 E / US 101 SB Ramps	AM PM Friday PM	32.6 97.7 >150	C F F	31.9 100.3 >150	C F F	Re-optimization of signal timings	Conversion of SR 46 to 4-lane freeway with new direct connections to US 101. Design to be determined as part of future studies.			4% 5% 4%
2. SR 46 E / US 101 NB Ramps	AM PM Friday PM	>150 >150 >150	F F F	80.4 120.2 >150	F F F	Add dual northbound right-turn lane	Conversion of SR 46 to 4-lane freeway with new direct connections to US 101. Design to be determined as part of future studies.			4% 5% 4%
3. SR 46E / Buena Vista Dr	AM PM Friday PM	N/A N/A N/A	N/A N/A N/A	96.6 >150 >150	F F F	Add westbound right-turn lane; Add dual eastbound left-turn lanes	Close Buena Vista Drive with conversion of SR 46 to freeway			4% 5% 5%
4. SR 46 E / Golden Hill Rd	AM PM Friday PM	>150 >150 >150	F F F	96.6 >150 >150	F F F	Add 3rd east and westbound through lanes				8% 10% 9%
4a. SR 46 WB Ramps / Golden Hill Rd	AM PM Friday						43.9 54.7 58.3	D D E	Grade-separated interchange	8% 10% 9%
4b. SR 46 EB Ramps / Golden Hill Rd	AM PM Friday PM						100.3 43.9 45.5	F D D	Grade-separated interchange	8% 10% 9%
5. SR 46 E / Union Rd	AM PM Friday PM	Close Union Road with conversion of SR 46 to freeway								

TABLE 17
CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Cumulative (With Existing Plus Project Mitigation)		Mitigated Cumulative (with Near-Term Mitigation)			Mitigated Cumulative (with Project, Near-Term, and Additional Mitigation)			% of Project Traffic[5]
		Delay	LOS	Delay	LOS	Improvement	Delay	LOS	Improvement	
6. SR 46E / Airport Rd	AM PM Friday PM	>150 >150 >150	F F F							3% 3% 3%
6a. SR 46 WB Ramps / Airport Rd	AM PM Friday PM			>150 >150 >150	F F F	Grade-separated intersection (unsignalized)	14.0 42.0 53.9	B D D	Grade-separated interchange (signal)	3% 3% 3%
6b. SR 46 EB Ramps / Airport Rd	AM PM Friday PM			>150 >150 >150	F F F	Grade-separated intersection (unsignalized)	25.5 14.3 15.1	C B B	Grade-separated interchange (signal)	3% 3% 3%
7. SR 46 E / Mill Rd	AM PM Friday PM	Close Mill Road with conversion of SR 46 to freeway								
8. SR 46 E / Jardine Rd	AM PM Friday PM	>150 >150 >150	F F F	Widen SR 46 to 4 lanes						4% 4% 3%
8a. SR 46 WB Ramps / Jardine Rd	AM PM Friday PM						9.8 8.6 11.1	A A B	Grade-separated intersection (unsignalized)	4% 4% 3%
8b. SR 46 EB Ramps / Jardine Rd	AM PM Friday PM						7.6 8.2 7.9	A A A	Grade-separated intersection (unsignalized)	4% 4% 3%
9. Golden Hill Rd /	AM	>150	F	6	A	Widen single–lane roundabout to 2 lanes				6%

TABLE 17
CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Cumulative (With Existing Plus Project Mitigation)		Mitigated Cumulative (with Near-Term Mitigation)			Mitigated Cumulative (with Project, Near-Term, and Additional Mitigation)			% of Project Traffic[5]
		Delay	LOS	Delay	LOS	Improvement	Delay	LOS	Improvement	
Union Rd[4]	PM Friday PM	>150 N/A	F N/A	6 N/A	A N/A		No Mitigation Required			7% N/A
10. Buena Vista Dr/ Dallons Road	AM PM Friday PM	25.7 13.9 N/A	D B N/A	No Mitigation Required						
11. Golden Hill Rd/ Dallons Road	AM PM Friday PM	69.7 63.1 N/A	F F N/A	No Mitigation Required			12.4 16.6 N/A	B B N/A	Signalize intersection	8% 11% N/A

Notes:

1 AM = morning peak hour, PM = afternoon peak hour.

2 Whole intersection weighted average control delay expressed in seconds per vehicle using methodology described in the *2000 HCM*. For side street stop controlled intersections, total control delay for the worst movement is presented.

3 LOS = Level of service. LOS calculations conducted using the TRAFFIX software for unsignalized (stop-controlled) intersections and the SYNCHRO software for signalized intersections.

4 The analysis of Friday PM peak-hour is to evaluate the effects of regional through traffic for intersections on SR 46. Local city intersections were not evaluated for Friday PM conditions.

5 Percent of project traffic was calculated by dividing the project trips over the total intersection volume.

Roadway Segments

Figure 14 and Table 18 present the projected Year 2030 roadway segment volumes. The SR 46 E volumes were estimated by applying the 4.1 percent annual growth (from Year 2005 to 2030) and assigning this growth through the corridor. Traffic from approved, pending, and the proposed project were added to develop Cumulative daily volumes. The projected increase in traffic volumes on the US 101 freeway mainline was estimated by applying a growth factor of one percent per year to the existing volumes.

As shown in Table 18, the segments of SR 46 are projected to operate at LOS F if this facility continued to operate as a four-lane divided arterial. Similarly, US 101 is projected to operate at LOS F as a four-lane freeway. Golden Hill Road is projected to operate at LOS E.

TABLE 18
CUMULATIVE (2030) ROADWAY LEVELS OF SERVICE

Roadway Segment	Roadway Type	Volume[1]	LOS[2]
1. SR 46 E, between US 101 and Airport Road	4-Lane Divided Arterial	60,500	F
2. SR 46 E, east of Airport Road	4-Lane Divided Arterial	43,000	F
3. US 101, north of SR 46 E to south of SR 46 W	4-Lane Divided Freeway	80,800	F
4. Golden Hill Road, between Dallons Road and SR 46	4-Lane Divided Arterial	33,000	E
5. Dallons Road, west of Golden Hill Road	2-Lane Collector (no left turn lane)	4,700	A

Notes:
1 Average daily traffic. Note volume reported is the maximum volume on the given roadway segment within the project study area.
2 LOS = Level of service.

CUMULATIVE (2030) MITIGATION MEASURES

Intersections

As stated earlier in this chapter, most intersections are projected to operate at unacceptable LOS F with the mitigation measures identified under Existing Plus Project Conditions. Additional improvements were identified in the Near-Term Cumulative chapter to provide improved operations, however, all of the signalized intersections are still operating at LOS F for one or more peak hours (see second column in Table 16). This section identifies additional improvements to serve the projected volumes (see third column in Table 16).

City of Paso Robles

- *Golden Hill Road/Union Road* – The addition of a second lane within the roundabout will provide acceptable operations.
- *Golden Hill Road/Dallons Drive* – A traffic signal will provide acceptable operations.

Caltrans

Under Near-Term Cumulative Conditions, a third lane in each direction was recommended at Golden Hill to provide improved operations. For Year 2030 Cumulative Conditions, the removal of at-grade crossings on SR 46 (via an upgrade to an expressway or freeway) would provide improved corridor operations. Closure of Buena Vista Drive, Union Road, and Mill Road would likely be required to meet Caltrans requirements for spacing of grade-separated locations. Grade-separation of intersections is anticipated at Golden Hill Road, Airport Road, and Jardine Road. However, substantial right-of-way acquisition is required. To mitigate cumulative impacts, the project applicant has agreed to provide a 30-foot easement to the City of Paso Robles along the southern project frontage to provide sufficient right-of-way to accommodate future improvements to SR 46. According to Caltrans District 5 staff, the easement would allow for a future upgrade of SR 46 to provide additional capacity. Caltrans staff has indicated that this easement in addition to the proposed Existing Plus Project improvements would constitute "fair-share" contribution towards near-term and cumulative impacts on SR 46. As noted in the previous section, the project traffic represents a small percentage of the total intersections volumes on SR 46 under Cumulative Conditions.

The following text describes the geometric changes at each intersection on SR 46.

- *SR 46/US 101 Ramps* – The removal of at-grade crossing will require direct freeway-to-freeway connections at US 101. Additional environmental documentation will be required to determine the appropriate modifications to the interchange. Access to properties and to downtown Paso Robles will also need to be addressed.

- *SR 46/Buena Vista Drive* – According to Caltrans District 5 staff, closure of Buena Vista Drive may be required to meet Caltrans guidelines for minimum interchange spacing because the Buena Vista Drive intersection is located too close to the US 101 northbound ramp intersection. Buena Vista Drive traffic would have to shift to Golden Hill Road (via Dallons Road) or use River Road to access downtown Paso Robles.

- *SR 46/Golden Hill Road* – Removal of at-grade crossings at Golden Hill Road/ SR 46 is required to serve the projected volumes. A diamond interchange configuration is assumed and right-of-way acquisition will be required at all corners of the Golden Hill Road intersection to accommodate the interchange. The future ramps are assumed to be signalized.

- *SR 46/Union Road* – According to Caltrans staff, closure of Union Road will be required due to its proximity to the future interchange at Airport Road.

  SR 46/Airport Road – An interchange was recommended under Near-Term Conditions. No further improvements were identified under this scenario.

- *SR 46/Mill Road* – Similar to Buena Vista Drive and Union Road, Mill Road will be closed due to its proximity to future interchanges.

- *SR 46/Jardine Road* – An interchange (Type L-12 as indicated on Figure 502.2 from the *Caltrans Design Manual*) will be required to serve the Cumulative volumes.

We strongly recommend that a comprehensive SR 46 corridor study be conducted to evaluate the potential for modification or removal of at-grade crossings and to address all design issues, including right-of-way concerns and appropriate locations for on- and off-ramps. Traffic forecasts should be developed using the SLOCOG or equivalent travel demand model to account for anticipated future regional growth and potential diversion to parallel facilities.

Roadway Segments

SR 46 and US 101

The results of the planning level analysis indicates a grade-separated facility on SR 46 will be required under Cumulative (Year 2030) Conditions to provide sufficient capacity and reduce delay at the study intersections. As noted in the section above, a comprehensive study with a review of the traffic volume projections should be conducted to determine the appropriate long-range concept for this corridor.

SR 46, as a 4-lane grade-separated facility, would operate at LOS C based on the daily planning level volume thresholds presented in Table 3. Modifications to the US 101/SR 46 interchange would also be required including construction of new direct ramp connectors/flyovers from the east side of the SR 46 bridge over the Salinas River to the US 101 mainline. The existing US 101/SR 46E ramps would also have to be reconfigured requiring extensive right-of-way acquisition and possibly demolition and relocation of existing buildings.

A southbound auxiliary lane on US 101 will be constructed with the dual left-turn lane improvement project at the southbound ramp intersection and will provide additional capacity to the mainline. Modification of the US 101/SR 46E interchange will identify and address ramp merge/diverge operations.

Extension of Dallons Drive

The City of Paso Robles is contemplating an extension of Dallons Road east from Golden Hill Road to Airport Road to provide an alternate parallel facility to US 101. This roadway extension would provide an alternate route to SR 46 between Buena Vista Drive and Airport Road. However, through vehicles on Dallons Road would interact with traffic from Cuesta College, the project site, and existing front-on housing units west of Golden Hill Road. The extension of Dallons Drive could serve as an interim parallel route to SR 46 until additional capacity on SR 46 is provided. The proposed street improvements on Golden Hill Road are consistent with and do not preclude the future Dallons Road extension.

APPENDIX A:
TRAFFIC COUNTS

Traffic Data Service

1386 White Oaks Road, Suite 1
Campbell, CA 95008
tdsbay@cs.com

File Name : 2AM
Site Code : 00000002
Start Date : 9/7/2006
Page No : 1

Groups Printed- Vehicles

	BUENA VISTA DR Southbound					DALLONS DR Westbound					BUENA VISTA DR Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	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		1.0	1.0	1.0	1.0		
07:00 AM	0	9	0	0	9	1	3	2	0	6	1	2	7	0	10	10	3	1	0	14	39
07:15 AM	3	6	3	0	12	2	4	2	0	8	0	7	10	0	17	18	7	1	0	26	63
07:30 AM	2	5	1	0	8	3	8	4	0	15	13	13	28	0	54	29	8	4	0	41	118
07:45 AM	5	14	1	0	20	3	18	3	0	24	25	33	53	0	111	44	8	12	0	64	219
Total	10	34	5	0	49	9	33	11	0	53	39	55	98	0	192	101	26	18	0	145	439
08:00 AM	5	8	3	0	16	3	24	2	0	29	18	13	51	0	82	66	20	8	0	94	221
08:15 AM	0	5	0	0	5	0	4	4	0	8	7	14	15	0	36	38	12	8	0	58	107
08:30 AM	1	14	1	0	16	9	5	1	0	15	9	9	7	0	25	11	10	4	0	25	81
08:45 AM	2	7	0	0	9	3	2	3	0	8	23	26	8	0	57	10	2	3	0	15	89
Total	8	34	4	0	46	15	35	10	0	60	57	62	81	0	200	125	44	23	0	192	498
Grand Total	18	68	9	0	95	24	68	21	0	113	96	117	179	0	392	226	70	41	0	337	937
Apprch %	18.9	71.6	9.5	0		21.2	60.2	18.6	0		24.5	29.8	45.7	0		67.1	20.8	12.2	0		
Total %	1.9	7.3	1	0	10.1	2.6	7.3	2.2	0	12.1	10.2	12.5	19.1	0	41.8	24.1	7.5	4.4	0	36	

	BUENA VISTA DR Southbound					DALLONS DR Westbound					BUENA VISTA DR Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	2	5	1	0	8	**3**	8	**4**	0	15	13	13	28	0	54	29	8	4	0	41	118
07:45 AM	**5**	**14**	1	0	**20**	3	18	3	0	24	**25**	**33**	**53**	0	**111**	44	8	**12**	0	64	219
08:00 AM	5	8	**3**	0	16	3	**24**	2	0	**29**	18	13	51	0	82	**66**	**20**	8	0	**94**	**221**
08:15 AM	0	5	0	0	5	0	4	4	0	8	7	14	15	0	36	38	12	8	0	58	107
Total Volume	12	32	5	0	49	9	54	13	0	76	63	73	147	0	283	177	48	32	0	257	665
% App. Total	24.5	65.3	10.2	0		11.8	71.1	17.1	0		22.3	25.8	51.9	0		68.9	18.7	12.5	0		
PHF	.600	.571	.417	.000	.613	.750	.563	.813	.000	.655	.630	.553	.693	.000	.637	.670	.600	.667	.000	.684	.752

Traffic Data Service

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File Name : 2PM
Site Code : 00000002
Start Date : 9/7/2006
Page No : 1

Groups Printed- Vehicles

	BUENA VISTA DR Southbound					DALLONS DR Westbound					BUENA VISTA DR Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	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		1.0	1.0	1.0	1.0		
04:00 PM	1	22	5	0	28	5	5	3	0	13	12	12	19	0	43	17	6	1	0	24	108
04:15 PM	3	13	2	0	18	9	5	3	0	17	8	17	20	0	45	13	5	3	0	21	101
04:30 PM	3	16	1	0	20	2	7	3	0	12	9	12	18	0	39	15	8	2	0	25	96
04:45 PM	1	5	8	0	14	2	11	11	0	24	21	12	21	0	54	18	7	2	0	27	119
Total	8	56	16	0	80	18	28	20	0	66	50	53	78	0	181	63	26	8	0	97	424
05:00 PM	3	12	2	0	17	2	10	12	0	24	11	14	20	0	45	15	6	3	0	24	110
05:15 PM	4	14	3	0	21	3	7	5	0	15	7	13	32	0	52	24	5	0	0	29	117
05:30 PM	2	16	3	0	21	3	4	3	0	10	23	21	22	0	66	28	7	1	0	36	133
05:45 PM	5	43	4	0	52	8	10	9	0	27	22	37	16	0	75	10	7	3	0	20	174
Total	14	85	12	0	111	16	31	29	0	76	63	85	90	0	238	77	25	7	0	109	534
Grand Total	22	141	28	0	191	34	59	49	0	142	113	138	168	0	419	140	51	15	0	206	958
Apprch %	11.5	73.8	14.7	0		23.9	41.5	34.5	0		27	32.9	40.1	0		68	24.8	7.3	0		
Total %	2.3	14.7	2.9	0	19.9	3.5	6.2	5.1	0	14.8	11.8	14.4	17.5	0	43.7	14.6	5.3	1.6	0	21.5	

	BUENA VISTA DR Southbound					DALLONS DR Westbound					BUENA VISTA DR Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	3	12	2	0	17	2	**10**	**12**	0	24	11	14	20	0	45	15	6	**3**	0	24	110
05:15 PM	4	14	3	0	21	3	7	5	0	15	7	13	**32**	0	52	24	5	0	0	29	117
05:30 PM	2	16	3	0	21	3	4	3	0	10	**23**	21	22	0	66	**28**	**7**	1	0	**36**	133
05:45 PM	**5**	**43**	**4**	0	**52**	**8**	10	9	0	**27**	22	**37**	16	0	**75**	10	7	3	0	20	**174**
Total Volume	14	85	12	0	111	16	31	29	0	76	63	85	90	0	238	77	25	7	0	109	534
% App. Total	12.6	76.6	10.8	0		21.1	40.8	38.2	0		26.5	35.7	37.8	0		70.6	22.9	6.4	0		
PHF	.700	.494	.750	.000	.534	.500	.775	.604	.000	.704	.685	.574	.703	.000	.793	.688	.893	.583	.000	.757	.767

Traffic Data Service

1386 White Oaks Road, Suite 1
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File Name : 1AM
Site Code : 00000001
Start Date : 9/6/2006
Page No : 1

Groups Printed- Vehicles

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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		1.0	1.0	1.0	1.0		
07:00 AM	0	7	0	0	7	0	0	0	0	0	0	13	7	0	20	5	0	1	0	6	33
07:15 AM	1	10	0	0	11	0	0	0	0	0	0	9	7	0	16	8	0	3	0	11	38
07:30 AM	0	10	0	0	10	0	0	0	0	0	0	12	16	0	28	8	0	1	0	9	47
07:45 AM	1	10	0	0	11	0	0	0	0	0	0	14	31	0	45	4	0	0	0	4	60
Total	2	37	0	0	39	0	0	0	0	0	0	48	61	0	109	25	0	5	0	30	178
08:00 AM	0	5	0	0	5	0	0	0	0	0	0	11	39	0	50	18	0	1	0	19	74
08:15 AM	1	2	0	0	3	0	0	0	0	0	0	8	5	0	13	16	0	0	0	16	32
08:30 AM	2	6	0	0	8	0	0	0	0	0	0	3	20	0	23	7	0	0	0	7	38
08:45 AM	1	6	0	0	7	0	0	0	0	0	0	4	15	0	19	9	0	0	0	9	35
Total	4	19	0	0	23	0	0	0	0	0	0	26	79	0	105	50	0	1	0	51	179
Grand Total	6	56	0	0	62	0	0	0	0	0	0	74	140	0	214	75	0	6	0	81	357
Apprch %	9.7	90.3	0	0		0	0	0	0		0	34.6	65.4	0		92.6	0	7.4	0		
Total %	1.7	15.7	0	0	17.4	0	0	0	0	0	0	20.7	39.2	0	59.9	21	0	1.7	0	22.7	

	GOLDEN HILL RD Southbound					Westbound					GOLDEN HILL RD Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**1**	**10**	0	0	**11**	0	0	0	0	0	0	9	7	0	16	8	0	**3**	0	11	38
07:30 AM	0	10	0	0	10	0	0	0	0	0	0	12	16	0	28	8	0	1	0	9	47
07:45 AM	1	10	0	0	11	0	0	0	0	0	0	**14**	31	0	45	4	0	0	0	4	60
08:00 AM	0	5	0	0	5	0	0	0	0	0	0	11	**39**	0	**50**	**18**	0	1	0	**19**	**74**
Total Volume	2	35	0	0	37	0	0	0	0	0	0	46	93	0	139	38	0	5	0	43	219
% App. Total	5.4	94.6	0	0		0	0	0	0		0	33.1	66.9	0		88.4	0	11.6	0		
PHF	.500	.875	.000	.000	.841	.000	.000	.000	.000	.000	.000	.821	.596	.000	.695	.528	.000	.417	.000	.566	.740

Traffic Data Service

1386 White Oaks Road, Suite 1
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File Name : 1PM
Site Code : 00000001
Start Date : 9/7/2006
Page No : 1

Groups Printed- Vehicles

	GOLDEN HILL RD Southbound					Westbound					GOLDEN HILL RD Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	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		1.0	1.0	1.0	1.0		
04:00 PM	0	11	0	0	11	0	0	0	0	0	0	8	10	0	18	14	0	1	0	15	44
04:15 PM	0	4	0	0	4	0	0	0	0	0	0	5	19	0	24	12	0	0	0	12	40
04:30 PM	2	11	0	0	13	0	0	0	0	0	0	1	14	0	15	13	0	1	0	14	42
04:45 PM	0	5	0	0	5	0	0	0	0	0	0	2	15	0	17	10	0	1	0	11	33
Total	2	31	0	0	33	0	0	0	0	0	0	16	58	0	74	49	0	3	0	52	159
05:00 PM	2	19	0	0	21	0	0	0	0	0	0	5	13	0	18	13	0	0	0	13	52
05:15 PM	1	14	0	0	15	0	0	0	0	0	0	5	23	0	28	14	0	1	0	15	58
05:30 PM	0	8	0	0	8	0	0	0	0	0	0	7	11	0	18	9	0	0	0	9	35
05:45 PM	1	4	0	0	5	0	0	0	0	0	0	4	26	0	30	15	0	0	0	15	50
Total	4	45	0	0	49	0	0	0	0	0	0	21	73	0	94	51	0	1	0	52	195
Grand Total	6	76	0	0	82	0	0	0	0	0	0	37	131	0	168	100	0	4	0	104	354
Apprch %	7.3	92.7	0	0		0	0	0	0		0	22	78	0		96.2	0	3.8	0		
Total %	1.7	21.5	0	0	23.2	0	0	0	0	0	0	10.5	37	0	47.5	28.2	0	1.1	0	29.4	

	GOLDEN HILL RD Southbound					Westbound					GOLDEN HILL RD Northbound					DALLONS DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**2**	**19**	0	0	**21**	0	0	0	0	0	0	5	13	0	18	13	0	0	0	13	52
05:15 PM	1	14	0	0	15	0	0	0	0	0	0	5	23	0	28	14	0	**1**	0	**15**	**58**
05:30 PM	0	8	0	0	8	0	0	0	0	0	0	**7**	11	0	18	9	0	0	0	9	35
05:45 PM	1	4	0	0	5	0	0	0	0	0	0	4	**26**	0	**30**	**15**	0	0	0	15	50
Total Volume	4	45	0	0	49	0	0	0	0	0	0	21	73	0	94	51	0	1	0	52	195
% App. Total	8.2	91.8	0	0		0	0	0	0		0	22.3	77.7	0		98.1	0	1.9	0		
PHF	.500	.592	.000	.000	.583	.000	.000	.000	.000	.000	.000	.750	.702	.000	.783	.850	.000	.250	.000	.867	.841

Traffic Data Service
Vehicle Counts

VehicleCount-1054 -- English (ENU)

Datasets:

Site: **[3E] EB DALLONS RD BETWEEN RESIDENTIAL DEVELOPMENTS E/O BUENA VISTA DR**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: East (bound)
Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (Scheme F)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)

*** Wednesday, September 06, 2006 - Total=713, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**5**	**0**	**2**	**7**	**13**	**28**	**51**	**34**	**36**	**61**	**39**	**49**	**88**	**36**	**43**	**49**	**52**	**32**	**34**	**38**	**12**	**4**	
0	0	1	0	0	1	4	4	21	11	4	**10**	8	8	**14**	10	10	12	10	11	3	16	6	1	1
0	0	0	0	1	1	2	10	14	1	7	**28**	8	14	**15**	9	9	12	14	7	11	10	3	2	0
0	0	4	0	0	2	2	9	8	11	**8**	8	10	11	**41**	5	8	14	5	9	7	8	3	1	0
0	0	0	0	1	3	5	5	8	11	**17**	15	13	16	**18**	12	16	11	23	5	13	4	0	0	1

AM Peak 1030 - 1130 (63), AM PHF=0.56 PM Peak 1400 - 1500 (88), PM PHF=0.54

*** Thursday, September 07, 2006 - Total=721, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	**1**	**3**	**1**	**2**	**5**	**12**	**24**	**55**	**52**	**34**	**34**	**56**	**50**	**68**	**43**	**49**	**50**	**60**	**32**	**24**	**47**	**13**	**4**	
1	0	0	0	0	3	4	8	**23**	16	6	6	18	10	**15**	12	14	15	10	11	2	14	10	2	0
0	0	3	0	0	1	3	4	**22**	12	3	10	17	6	**12**	9	12	13	11	11	6	9	1	1	2
0	0	0	0	1	0	4	4	**6**	10	14	6	8	13	**24**	12	12	8	17	5	5	20	0	0	0
1	1	0	1	1	1	1	**8**	4	14	11	12	13	**21**	17	10	11	14	22	5	11	4	2	1	0

AM Peak 0745 - 0845 (59), AM PHF=0.64 PM Peak 1345 - 1445 (72), PM PHF=0.75

Traffic Data Service
Vehicle Counts

VehicleCount-1053 -- English (ENU)

Datasets:

Site: **[3W] WB DALLONS RD BETWEEN RESIDENTIAL DEVELOPMENTS E/O BUENA VISTA DR**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: West (bound)
Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (Scheme F)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)

*** Wednesday, September 06, 2006 - Total=801, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	**1**	**1**	**0**	**0**	**2**	**18**	**63**	**83**	**52**	**51**	**52**	**28**	**49**	**70**	**71**	**60**	**77**	**67**	**26**	**10**	**11**	**3**	**4**	
0	1	0	0	0	0	2	7	**38**	11	13	7	11	14	18	14	**8**	18	11	9	1	3	2	1	0
0	0	0	0	0	0	7	9	**8**	8	12	9	7	9	20	6	**24**	11	9	5	1	2	0	2	0
1	0	1	0	0	1	2	17	**21**	10	14	17	3	9	14	**16**	12	15	14	5	5	1	1	0	0
1	0	0	0	0	1	7	**30**	16	23	12	19	7	17	18	**35**	16	33	33	7	3	5	0	1	0

AM Peak 0745 - 0845 (97), AM PHF=0.64 PM Peak 1530 - 1630 (83), PM PHF=0.59

*** Thursday, September 07, 2006 - Total=783, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**1**	**1**	**0**	**0**	**2**	**13**	**52**	**76**	**55**	**65**	**37**	**58**	**39**	**53**	**65**	**61**	**78**	**66**	**28**	**12**	**14**	**3**	**4**	
0	0	0	0	0	0	2	1	**38**	15	14	13	13	10	18	7	12	**16**	16	9	2	4	0	2	0
0	0	0	0	0	2	6	10	**13**	13	6	4	16	7	15	18	19	**24**	6	11	1	4	0	1	0
0	0	1	0	0	0	4	**9**	8	12	17	9	13	10	12	13	15	**11**	18	6	5	3	1	0	2
0	1	0	0	0	0	1	**32**	17	15	28	11	16	12	8	27	15	**27**	26	2	4	3	2	1	0

AM Peak 0730 - 0830 (92), AM PHF=0.61 PM Peak 1700 - 1800 (78), PM PHF=0.72

Traffic Data Service
Vehicle Counts

VehicleCount-1055 -- English (ENU)

Datasets:

Site: **[4N] NB GOLDEN HILL DR S/O DALLONS DR & N/O GAS STATIONS**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: North (bound)
Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (Scheme F)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)

*** Wednesday, September 06, 2006 - Total=1124, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	**1**	**1**	**0**	**3**	**6**	**41**	**113**	**105**	**80**	**78**	**75**	**58**	**68**	**89**	**90**	**75**	**95**	**77**	**30**	**15**	**13**	**5**	**4**	
0	1	0	0	0	1	8	20	**49**	13	19	9	17	21	28	16	**13**	17	15	9	1	4	3	1	0
0	0	0	0	2	1	9	**18**	13	19	16	13	18	14	22	12	**25**	18	13	6	4	3	1	2	1
2	0	1	0	0	0	7	**29**	24	20	22	24	10	14	18	**24**	13	22	21	7	6	1	1	0	0
0	0	0	0	1	4	17	**46**	19	28	21	29	13	19	21	**38**	24	38	28	8	4	5	0	1	0

AM Peak 0715 - 0815 (142), AM PHF=0.72 PM Peak 1530 - 1630 (100), PM PHF=0.66

*** Thursday, September 07, 2006 - Total=1088, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
1	**1**	**1**	**1**	**5**	**7**	**35**	**96**	**97**	**69**	**85**	**61**	**84**	**65**	**67**	**89**	**77**	**100**	**72**	**30**	**17**	**17**	**7**	**4**	
0	0	0	0	1	1	8	14	**50**	20	23	18	17	16	24	14	19	**18**	17	9	2	4	2	2	0
1	0	0	0	2	2	12	14	**21**	16	12	14	24	16	19	30	25	**31**	8	11	4	4	0	1	0
0	0	1	1	0	1	7	**22**	9	15	21	11	17	11	16	15	14	**19**	22	8	5	4	2	0	2
0	1	0	0	2	3	8	**46**	17	18	29	18	26	22	8	30	19	**32**	25	2	6	5	3	1	0

AM Peak 0730 - 0830 (139), AM PHF=0.69 PM Peak 1700 - 1800 (100), PM PHF=0.78

Traffic Data Service
Vehicle Counts

VehicleCount-1056 -- English (ENU)

Datasets:

Site: **[4S] SB GOLDEN HILL DR S/O DALLONS DR & N/O GAS STATIONS**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: South (bound)
Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (Scheme F)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)

*** Wednesday, September 06, 2006 - Total=1168, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**1**	**4**	**0**	**4**	**13**	**33**	**66**	**69**	**70**	**68**	**98**	**89**	**81**	**123**	**83**	**75**	**95**	**56**	**37**	**40**	**41**	**15**	**7**	
0	1	0	0	0	1	5	12	24	21	17	19	**22**	16	21	**28**	22	39	13	15	5	20	8	1	0
0	0	0	0	1	2	4	18	18	12	12	**35**	16	31	**24**	11	19	21	15	8	15	10	3	2	0
0	0	4	0	2	3	14	17	13	19	14	**21**	24	14	**52**	19	17	20	7	10	9	8	2	3	1
0	0	0	0	1	7	10	19	14	18	25	**23**	27	20	**26**	25	17	15	21	4	11	3	2	1	1

AM Peak 1115 - 1215 (101), AM PHF=0.72 PM Peak 1415 - 1515 (130), PM PHF=0.63

*** Thursday, September 07, 2006 - Total=1088, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	**1**	**4**	**2**	**6**	**11**	**38**	**39**	**81**	**68**	**57**	**73**	**80**	**78**	**85**	**89**	**79**	**98**	**69**	**38**	**27**	**45**	**14**	**4**	
0	0	0	0	0	3	5	8	33	21	12	11	**22**	17	17	**31**	25	32	15	12	4	12	11	3	1
0	0	1	0	0	2	10	11	28	14	10	20	**27**	18	15	**26**	16	28	12	13	7	6	1	1	3
1	0	2	1	4	1	15	7	10	15	14	**16**	10	18	**29**	21	24	18	15	7	3	19	0	0	0
1	1	1	1	2	5	8	13	10	18	21	**26**	21	25	**24**	11	14	20	27	6	13	8	2	0	0

AM Peak 1130 - 1230 (91), AM PHF=0.84 PM Peak 1430 - 1530 (110), PM PHF=0.89

Traffic Data Service
Event Counts

EventCount-1057 -- English (ENU)

Datasets:

Site: **[5N] NB GOLDEN HILL RD S/O WALLACE DR & S/O GAS STATIONS**
Input A: 1 - North bound. - Added to totals. (1)
Input B: 0 - Unused or unknown. - Excluded from totals. (0)
Name: Factory default profile
Scheme: Count events divided by two.
Units: Non metric (ft, mi, ft/s, mph, lb, ton)

*** Wednesday, September 06, 2006=4571, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
40	**19**	**30**	**24**	**62**	**148**	**261**	**382**	**303**	**281**	**281**	**248**	**266**	**281**	**338**	**307**	**297**	**274**	**222**	**162**	**127**	**93**	**74**	**51**	
11	4	3	8	16	21	59	**106**	105	76	59	57	69	85	**80**	67	64	66	41	39	30	36	26	6	6
15	5	10	6	16	26	53	**84**	77	65	57	61	65	62	**73**	68	84	60	54	44	36	20	19	15	8
10	2	10	6	18	40	72	**93**	61	66	86	71	56	52	**101**	77	74	69	71	42	31	17	17	15	8
4	8	7	4	12	61	77	**99**	60	74	79	59	76	82	**84**	95	75	79	56	37	30	20	12	15	3

AM Peak 0700 - 0800 (382), AM PHF=0.90 PM Peak 1400 - 1500 (338), PM PHF=0.84

*** Thursday, September 07, 2006=4581, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
25	**32**	**28**	**29**	**54**	**159**	**268**	**331**	**305**	**277**	**278**	**269**	**302**	**280**	**298**	**310**	**335**	**315**	**235**	**125**	**127**	**88**	**72**	**39**	
6	4	9	6	14	14	76	80	**119**	69	87	71	64	63	75	68	**84**	84	50	35	42	24	17	11	9
8	2	5	5	11	26	49	69	**75**	67	58	50	80	83	71	73	**93**	81	53	30	30	17	25	8	6
8	18	5	13	16	60	65	**81**	47	76	59	68	71	57	79	**75**	75	67	66	26	26	29	16	11	6
3	8	9	5	13	59	78	**101**	64	65	74	80	87	77	73	**94**	83	83	66	34	29	18	14	9	5

AM Peak 0730 - 0830 (376), AM PHF=0.79 PM Peak 1530 - 1630 (346), PM PHF=0.92

Traffic Data Service
Event Counts

EventCount-1058 -- English (ENU)

Datasets:

Site:	**[5S] SB GOLDEN HILL RD S/O WALLACE DR & S/O GAS STATIONS**
Input A:	3 - South bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

* Wednesday, September 06, 2006=4576, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
41	**26**	**31**	**46**	**62**	**127**	**232**	**297**	**246**	**264**	**247**	**299**	**277**	**280**	**356**	**313**	**310**	**320**	**214**	**169**	**154**	**125**	**85**	**55**	
5	6	6	14	6	17	52	67	81	70	61	77	66	63	88	94	83	99	56	49	36	50	30	16	9
13	5	5	10	21	24	53	91	57	74	46	81	69	87	68	68	66	77	43	43	48	29	24	13	6
10	6	12	13	23	32	60	62	54	62	59	75	71	68	99	60	89	73	49	42	36	23	18	12	13
13	9	8	9	12	54	67	77	54	58	81	66	71	62	101	91	72	71	66	35	34	23	13	14	10

AM Peak 1045 - 1145 (314), AM PHF=0.97 PM Peak 1415 - 1515 (362), PM PHF=0.90

* Thursday, September 07, 2006=4593, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
38	**30**	**36**	**34**	**59**	**132**	**274**	**259**	**273**	**249**	**251**	**271**	**275**	**280**	**304**	**324**	**363**	**341**	**251**	**159**	**129**	**134**	**92**	**35**	
9	0	8	7	10	18	66	51	61	54	53	57	69	81	75	103	103	92	57	52	30	34	28	10	16
6	7	5	5	8	18	64	72	79	72	71	66	67	59	73	82	78	103	67	42	43	28	23	11	13
13	3	6	7	19	35	73	67	68	57	56	61	68	67	73	86	98	70	53	30	24	34	25	6	4
10	20	17	15	22	61	71	69	65	66	71	87	71	73	83	53	84	76	74	35	32	38	16	8	9

AM Peak 1145 - 1245 (291), AM PHF=0.84 PM Peak 1630 - 1730 (377), PM PHF=0.92

* Friday, September 08, 2006=1222, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
42	**26**	**37**	**49**	**46**	**111**	**252**	**249**	**259**	**148**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	
16	6	2	21	9	10	60	61	71	53	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
13	4	15	14	7	16	64	55	86	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	10	8	11	10	39	65	61	57	45	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
9	6	12	3	20	46	63	72	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM Peak 0730 - 0830 (290), AM PHF=0.84 PM Peak 1515 - 1615 (1), PM PHF=0.25

* Saturday, September 09, 2006=0, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM Peak 0000 - 0100 (0), AM PHF=-1.#J PM Peak 0000 - 0100 (0), PM PHF=-1.#J

* Sunday, September 10, 2006=2, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM Peak 0100 - 0200 (2), AM PHF=0.25 PM Peak 0000 - 0100 (0), PM PHF=-1.#J

* Monday, September 11, 2006=1, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM Peak 0600 - 0700 (1), AM PHF=0.25 PM Peak 0000 - 0100 (0), PM PHF=-1.#J

* Tuesday, September 12, 2006=0, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM Peak 0000 - 0100 (0), AM PHF=-1.#J PM Peak 0000 - 0100 (0), PM PHF=-1.#J

*** Wednesday, September 13, 2006=0 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

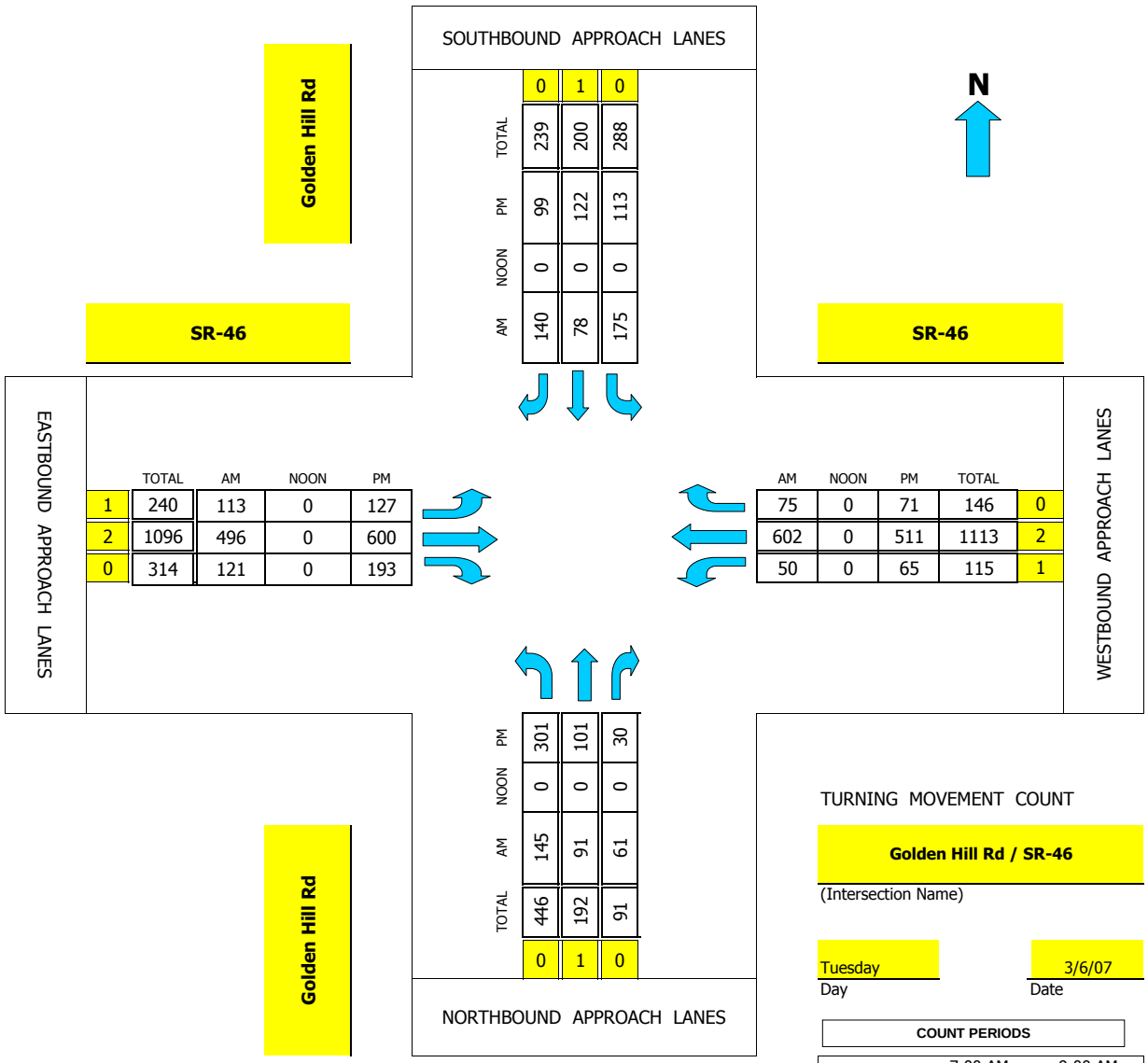
Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of Golden Hill Rd/SR-46

Project #: 07-8040-001



TURNING MOVEMENT COUNT

Golden Hill Rd / SR-46

(Intersection Name)

Tuesday — Day

3/6/07 — Date

COUNT PERIODS		
am	7:00 AM -	9:00 AM
noon	11:00 AM -	1:00 PM
pm	4:00 PM -	6:00 PM

AM PEAK HOUR	745 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	500 PM

APPENDIX B:
INTERSECTION LEVEL OF SERVICE CALCULATIONS

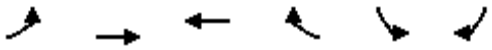
EXISTING INTERSECTION LOS CALCULATIONS

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	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3438	1429	1597	3406						1367	1223
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3438	1429	1597	3406						1367	1223
Volume (vph)	0	530	338	476	653	0	0	0	0	113	0	57
Peak-hour factor, PHF	1.00	0.87	0.87	0.92	0.92	0.92	1.00	1.00	1.00	0.90	0.90	0.90
Adj. Flow (vph)	0	609	389	517	710	0	0	0	0	126	0	63
RTOR Reduction (vph)	0	0	193	0	0	0	0	0	0	0	0	54
Lane Group Flow (vph)	0	609	196	517	710	0	0	0	0	0	126	9
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		30.0	30.0	38.0	72.1						13.5	13.5
Effective Green, g (s)		30.6	30.6	38.8	73.4						13.6	13.6
Actuated g/C Ratio		0.32	0.32	0.41	0.77						0.14	0.14
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1107	460	652	2632						196	175
v/s Ratio Prot		c0.18		c0.32	0.21							
v/s Ratio Perm			0.14								0.09	0.01
v/c Ratio		0.55	0.43	0.79	0.27						0.64	0.05
Uniform Delay, d1		26.5	25.3	24.6	3.1						38.4	35.1
Progression Factor		1.00	1.00	1.34	0.19						1.00	1.00
Incremental Delay, d2		2.0	2.9	5.0	0.2						7.0	0.1
Delay (s)		28.5	28.2	38.1	0.8						45.4	35.3
Level of Service		C	C	D	A						D	D
Approach Delay (s)		28.4			16.5			0.0			42.0	
Approach LOS		C			B			A			D	

Intersection Summary				
HCM Average Control Delay	23.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

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				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1399	3374			3200		1570	1404				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1399	3374			3200		1570	1404				
Volume (vph)	71	566	0	0	894	119	221	0	476	0	0	0
Peak-hour factor, PHF	0.87	0.87	0.87	1.00	0.92	0.92	0.79	0.79	0.79	1.00	1.00	1.00
Adj. Flow (vph)	82	651	0	0	972	129	280	0	603	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	235	0	0	0	0
Lane Group Flow (vph)	82	651	0	0	1101	0	280	368	0	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	8.8	60.8			46.9		24.0	24.0				
Effective Green, g (s)	8.8	61.9			49.1		25.1	25.1				
Actuated g/C Ratio	0.09	0.65			0.52		0.26	0.26				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	130	2198			1654		415	371				
v/s Ratio Prot	c0.06	0.19			c0.34		0.18	c0.26				
v/s Ratio Perm												
v/c Ratio	0.63	0.30			0.67		0.67	0.99				
Uniform Delay, d1	41.5	7.1			16.9		31.3	34.8				
Progression Factor	1.46	0.00			1.00		1.00	1.00				
Incremental Delay, d2	8.1	0.3			2.1		5.1	44.2				
Delay (s)	68.9	0.3			19.0		36.4	79.0				
Level of Service	E	A			B		D	E				
Approach Delay (s)		8.0			19.0			65.5			0.0	
Approach LOS		A			B			E			A	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		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)	1719	3223	3155		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3223	3155		1719	1538
Volume (vph)	236	806	810	191	143	237
Peak-hour factor, PHF	0.87	0.87	0.92	0.92	0.86	0.86
Adj. Flow (vph)	271	926	880	208	166	276
RTOR Reduction (vph)	0	0	15	0	0	219
Lane Group Flow (vph)	271	926	1073	0	166	57
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	12%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	19.0	88.0	36.1		17.2	17.2
Effective Green, g (s)	18.5	88.0	39.4		18.1	18.1
Actuated g/C Ratio	0.21	1.00	0.45		0.21	0.21
Clearance Time (s)	3.5		7.3		4.9	4.9
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	361	3223	1413		354	316
v/s Ratio Prot	c0.16	0.29	c0.34		c0.10	
v/s Ratio Perm						0.04
v/c Ratio	0.75	0.29	0.76		0.47	0.18
Uniform Delay, d1	32.6	0.0	20.3		30.7	28.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	8.8	0.1	2.5		1.2	0.3
Delay (s)	41.4	0.1	22.8		31.9	29.2
Level of Service	D	A	C		C	C
Approach Delay (s)		9.4	22.8		30.2	
Approach LOS		A	C		C	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

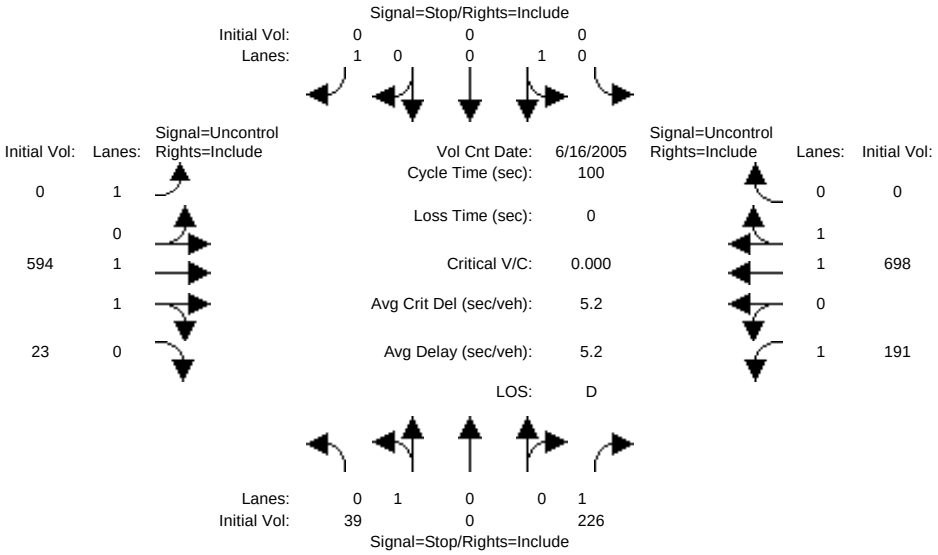
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.94		1.00	0.98			1.00			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1719	2995		1719	3128			1748			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (perm)	1719	2995		1719	3128			1748			1673	
Volume (vph)	113	551	338	50	609	75	345	192	14	175	78	140
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.80	0.80	0.80	0.70	0.70	0.70
Adj. Flow (vph)	130	633	389	54	662	82	431	240	18	250	111	200
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	130	1022	0	54	744	0	0	689	0	0	561	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	16.1	58.4		8.4	50.7			50.2			30.5	
Effective Green, g (s)	15.6	61.7		7.9	54.0			51.1			31.4	
Actuated g/C Ratio	0.09	0.37		0.05	0.32			0.30			0.19	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	160	1099		81	1005			531			313	
v/s Ratio Prot	c0.08	c0.34		0.03	0.24			c0.39			c0.34	
v/s Ratio Perm												
v/c Ratio	0.81	0.93		0.67	0.74			1.30			1.79	
Uniform Delay, d1	74.8	51.1		78.8	50.8			58.5			68.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	24.8	13.3		14.9	3.0			147.3			369.1	
Delay (s)	99.6	64.4		93.7	53.8			205.8			437.5	
Level of Service	F	E		F	D			F			F	
Approach Delay (s)		68.4			56.5			205.8			437.5	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	159.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	168.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #5: SR 46E/Union Rd

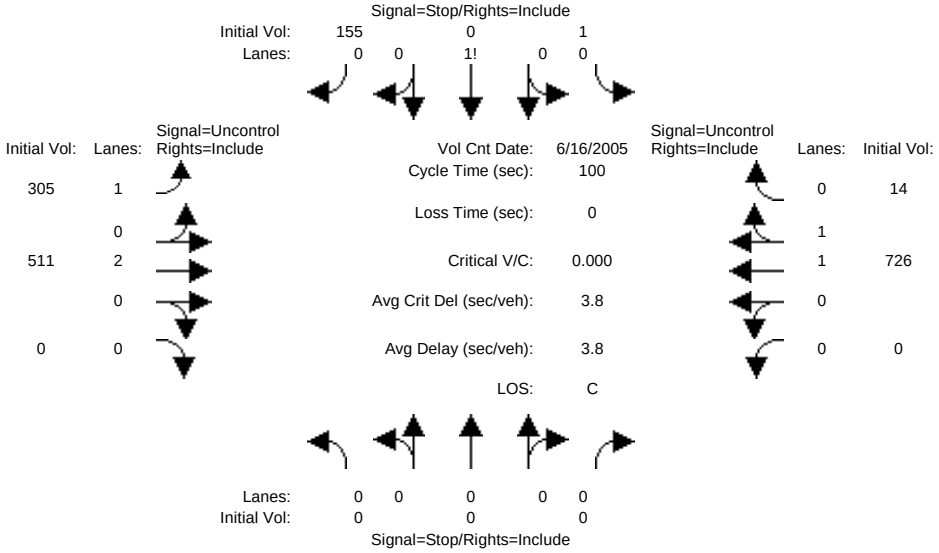


Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertiime AM												
Base Vol:	39	0	226	0	0	0	0	594	23	191	698	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	0	226	0	0	0	0	594	23	191	698	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	39	0	226	0	0	0	0	594	23	191	698	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.83	0.95	0.83	0.95	0.95	0.95	0.95	0.83	0.83	0.87	0.87	0.95
PHF Volume:	47	0	273	0	0	0	0	719	28	219	799	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	47	0	273	0	0	0	0	719	28	219	799	0
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1569	1968	373	1595	1982	399	xxxx	xxxx	xxxxx	747	xxxx	xxxxx
Potent Cap.:	104	63	630	73	62	606	xxxx	xxxx	xxxxx	871	xxxx	xxxxx
Move Cap.:	83	48	630	33	47	606	xxxx	xxxx	xxxxx	871	xxxx	xxxxx
Volume/Cap:	0.57	0.00	0.43	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.25	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	2.2	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	15.0	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	10.5	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	*	*	*	B	*	*
Movement:	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT
Shared Cap.:	83	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	2.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	93.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	26.6			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	D			*			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #6: SR 46E/Airport Rd

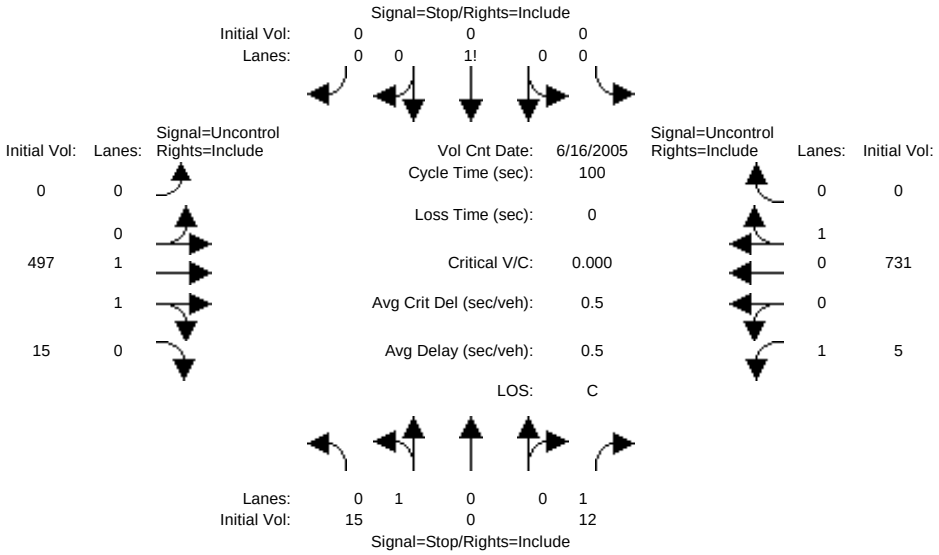


Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	1	0	155	305	511	0	0	726	14
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	1	0	155	305	511	0	0	726	14
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	155	305	511	0	0	726	14
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.85	0.95	0.85	0.83	0.83	0.95	0.95	0.87	0.87
PHF Volume:	0	0	0	1	0	183	369	618	0	0	831	16
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	183	369	618	0	0	831	16
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1886	2195	423	847	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	64	46	585	799	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	41	25	585	799	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.03	0.00	0.31	0.46	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.5	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	13.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	538	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	1.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	15.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			15.1			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #7: SR 46E/Mill Road

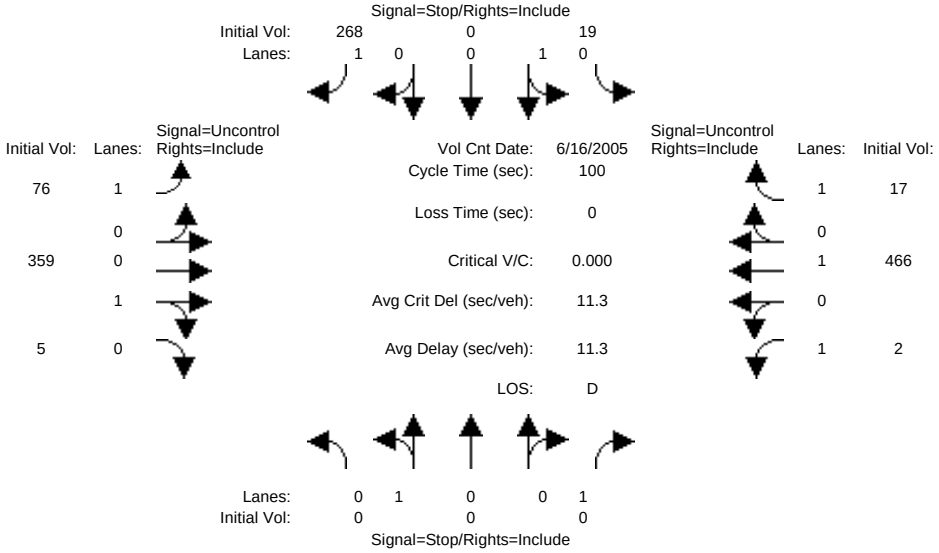


Street Name:	Mill Road							SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R	
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM													
Base Vol:	15	0	12	0	0	0	0	497	15	5	731	0	
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Initial Bse:	15	0	12	0	0	0	0	497	15	5	731	0	
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0	
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0	
Initial Fut:	15	0	12	0	0	0	0	497	15	5	731	0	
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	
PHF Volume:	17	0	14	0	0	0	0	569	17	6	836	0	
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0	
FinalVolume:	17	0	14	0	0	0	0	569	17	6	836	0	
Critical Gap Module:													
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	
Capacity Module:													
Cnflict Vol:	1425	1425	293	1132	1434	836	xxxx	xxxx	xxxxx	586	xxxx	xxxxx	
Potent Cap.:	151	137	751	182	135	370	xxxx	xxxx	xxxxx	999	xxxx	xxxxx	
Move Cap.:	150	136	751	178	134	370	xxxx	xxxx	xxxxx	999	xxxx	xxxxx	
Volume/Cap:	0.11	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx	
Level Of Service Module:													
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	9.9	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx	
LOS by Move:	*	*	A	*	*	*	*	*	*	A	*	*	
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	
Shared Cap.:	150	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	
SharedQueue:	0.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	
Shrd ConDel:	32.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	
Shared LOS:	D	*	*	*	*	*	*	*	*	*	*	*	
ApproachDel:	22.2			xxxxxx			xxxxxx			xxxxxx			
ApproachLOS:	C			*			*			*			

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	19	0	268	76	359	5	2	466	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	19	0	268	76	359	5	2	466	17
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	19	0	268	76	359	5	2	466	17
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.59	0.95	0.59	0.83	0.83	0.95	0.95	0.87	0.87
PHF Volume:	0	0	0	32	0	455	92	434	5	2	533	19
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	32	0	455	92	434	5	2	533	19
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	6.4	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1396	1178	437	1158	1161	533	553	xxxx	xxxxx	440	xxxx	xxxxx
Potent Cap.:	120	192	624	219	197	551	1028	xxxx	xxxxx	1131	xxxx	xxxxx
Move Cap.:	19	175	624	203	179	551	1028	xxxx	xxxxx	1131	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.16	0.00	0.83	0.09	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	8.4	0.3	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	35.4	8.8	xxxx	xxxxx	8.2	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	E	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	0	xxxx	xxxxx	203	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	26.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	D	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			34.8			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

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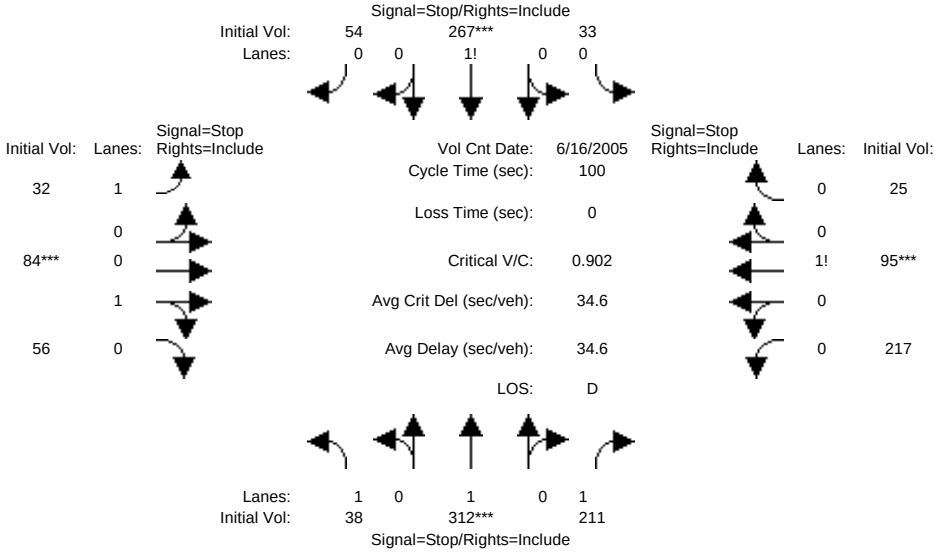
Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing AM

Intersection #9: Golden Hill/Union

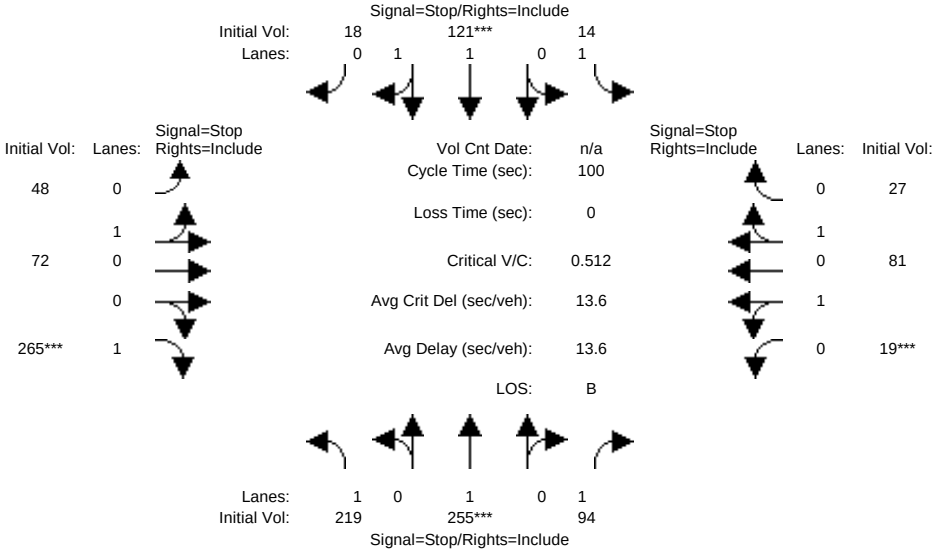


Street Name:	Golden Hill Road						Union Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	38	264	211	33	243	54	32	84	56	217	95	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38	264	211	33	243	54	32	84	56	217	95	25
Added Vol:	0	48	0	0	24	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	38	312	211	33	267	54	32	84	56	217	95	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	43	357	241	38	305	62	37	96	64	248	109	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	43	357	241	38	305	62	37	96	64	248	109	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	43	357	241	38	305	62	37	96	64	248	109	29
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	0.09	0.76	0.15	1.00	0.60	0.40	0.65	0.28	0.07
Final Sat.:	425	454	498	42	339	69	370	241	161	279	122	32
Capacity Analysis Module:												
Vol/Sat:	0.10	0.79	0.48	0.90	0.90	0.90	0.10	0.40	0.40	0.89	0.89	0.89
Crit Moves:		****			****			****			****	
Delay/Veh:	11.9	32.6	16.1	47.8	47.8	47.8	12.8	16.1	16.1	46.3	46.3	46.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.9	32.6	16.1	47.8	47.8	47.8	12.8	16.1	16.1	46.3	46.3	46.3
LOS by Move:	B	D	C	E	E	E	B	C	C	E	E	E
ApproachDel:		25.0			47.8			15.5			46.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		25.0			47.8			15.5			46.3	
LOS by Appr:		C			E			C			E	
AllWayAvgQ:	0.1	2.8	0.9	4.6	4.6	4.6	0.1	0.6	0.6	4.2	4.2	4.2

Paso Robles

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing AM

Intersection #10: Buena Vista/Dallons

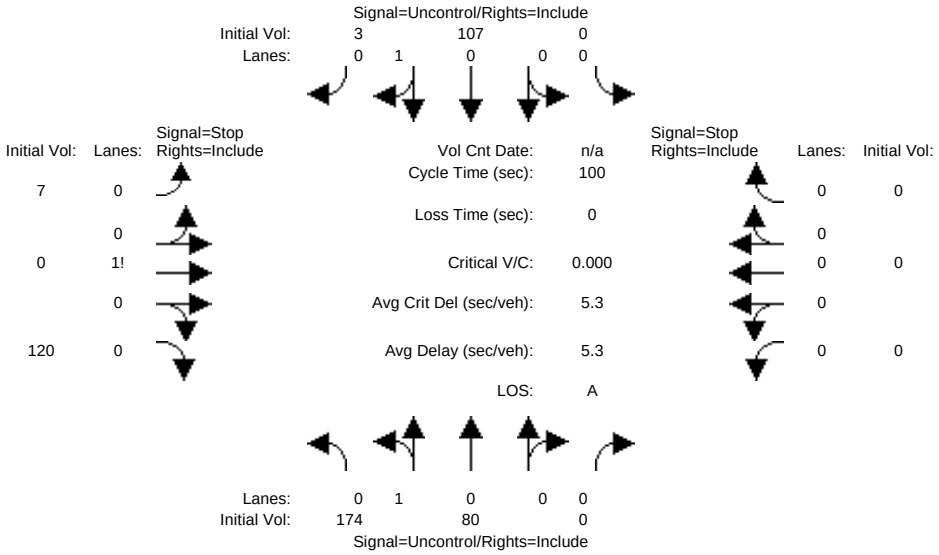


Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	219	109	94	7	48	18	48	72	265	19	81	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	219	109	94	7	48	18	48	72	265	19	81	13
Added Vol:	0	146	0	7	73	0	0	0	0	0	0	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	219	255	94	14	121	18	48	72	265	19	81	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	231	268	99	15	127	19	51	76	279	20	85	28
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	231	268	99	15	127	19	51	76	279	20	85	28
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	231	268	99	15	127	19	51	76	279	20	85	28
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.74	0.26	0.40	0.60	1.00	0.30	1.28	0.42
Final Sat.:	488	525	578	415	779	117	198	297	569	137	601	207
Capacity Analysis Module:												
Vol/Sat:	0.47	0.51	0.17	0.04	0.16	0.16	0.26	0.26	0.49	0.15	0.14	0.14
Crit Moves:		****			****				****	****		
Delay/Veh:	15.9	15.8	9.9	11.1	11.6	11.4	11.9	11.9	14.1	11.2	11.0	10.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	15.9	15.8	9.9	11.1	11.6	11.4	11.9	11.9	14.1	11.2	11.0	10.6
LOS by Move:	C	C	A	B	B	B	B	B	B	B	B	B
ApproachDel:		14.9			11.5			13.4			10.9	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		14.9			11.5			13.4			10.9	
LOS by Appr:		B			B			B			B	
AllWayAvgQ:	0.8	0.9	0.2	0.0	0.2	0.2	0.3	0.3	0.8	0.1	0.1	0.1

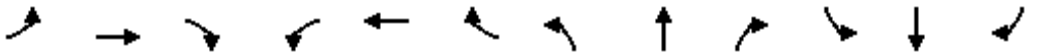
Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #11: Golden Hill Rd/Dallons Rd



Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:												
Base Vol:	160	80	0	0	107	3	7	0	113	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	80	0	0	107	3	7	0	113	0	0	0
Added Vol:	14	0	0	0	0	0	0	0	7	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	174	80	0	0	107	3	7	0	120	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	183	84	0	0	113	3	7	0	126	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	183	84	0	0	113	3	7	0	126	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	116	xxxx	xxxxx	xxxx	xxxx	xxxxx	565	565	114	xxxx	xxxx	xxxxx
Potent Cap.:	1486	xxxx	xxxxx	xxxx	xxxx	xxxxx	490	437	944	xxxx	xxxx	xxxxx
Move Cap.:	1486	xxxx	xxxxx	xxxx	xxxx	xxxxx	438	377	944	xxxx	xxxx	xxxxx
Volume/Cap:	0.12	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	0.00	0.13	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.4	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	887	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.8	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.8			xxxxxx		
ApproachLOS:	*			*			A			*		

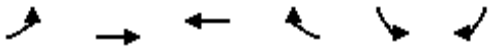


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	0.96	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3438	1475	1504	3343						1399	1404
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3438	1475	1504	3343						1399	1404
Volume (vph)	0	524	236	548	861	0	0	0	0	200	0	110
Peak-hour factor, PHF	1.00	0.93	0.93	0.91	0.91	0.91	1.00	1.00	1.00	0.74	0.74	0.74
Adj. Flow (vph)	0	563	254	602	946	0	0	0	0	270	0	149
RTOR Reduction (vph)	0	0	154	0	0	0	0	0	0	0	0	115
Lane Group Flow (vph)	0	563	100	602	946	0	0	0	0	0	270	34
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		21.7	21.7	38.0	63.8						21.8	21.8
Effective Green, g (s)		22.3	22.3	38.8	65.1						21.9	21.9
Actuated g/C Ratio		0.23	0.23	0.41	0.69						0.23	0.23
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		807	346	614	2291						323	324
v/s Ratio Prot		c0.16		c0.40	0.28							
v/s Ratio Perm			0.07								0.19	0.02
v/c Ratio		0.70	0.29	0.98	0.41						0.84	0.11
Uniform Delay, d1		33.3	29.8	27.7	6.6						34.8	28.8
Progression Factor		1.00	1.00	1.24	0.37						1.00	1.00
Incremental Delay, d2		5.0	2.1	22.9	0.3						16.8	0.1
Delay (s)		38.2	32.0	57.3	2.7						51.7	29.0
Level of Service		D	C	E	A						D	C
Approach Delay (s)		36.3			23.9			0.0			43.6	
Approach LOS		D			C			A			D	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1504	3282			3085		1570	1429				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1504	3282			3085		1570	1429				
Volume (vph)	95	629	0	0	1074	159	334	0	545	0	0	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.97	0.97	0.97	1.00	1.00	1.00
Adj. Flow (vph)	102	676	0	0	1180	175	344	0	562	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	222	0	0	0	0
Lane Group Flow (vph)	102	676	0	0	1355	0	344	340	0	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	9.1	61.7			47.5		23.1	23.1				
Effective Green, g (s)	9.1	62.8			49.7		24.2	24.2				
Actuated g/C Ratio	0.10	0.66			0.52		0.25	0.25				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	144	2170			1614		400	364				
v/s Ratio Prot	c0.07	0.21			c0.44		0.22	c0.24				
v/s Ratio Perm												
v/c Ratio	0.71	0.31			0.84		0.86	0.93				
Uniform Delay, d1	41.7	6.9			19.3		33.8	34.6				
Progression Factor	1.30	0.00			1.00		1.00	1.00				
Incremental Delay, d2	10.7	0.2			5.4		17.9	31.2				
Delay (s)	65.0	0.2			24.7		51.7	65.8				
Level of Service	E	A			C		D	E				
Approach Delay (s)		8.7			24.7			60.5			0.0	
Approach LOS		A			C			E			A	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	3223	3097		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3223	3097		1719	1538
Volume (vph)	129	1046	1084	71	86	149
Peak-hour factor, PHF	0.93	0.93	0.91	0.91	0.72	0.72
Adj. Flow (vph)	139	1125	1191	78	119	207
RTOR Reduction (vph)	0	0	3	0	0	172
Lane Group Flow (vph)	139	1125	1266	0	119	35
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	16%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	14.2	107.3	60.4		17.0	17.0
Effective Green, g (s)	13.7	107.3	63.7		17.9	17.9
Actuated g/C Ratio	0.13	1.00	0.59		0.17	0.17
Clearance Time (s)	3.5		7.3		4.9	4.9
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	219	3223	1839		287	257
v/s Ratio Prot	c0.08	c0.35	c0.41		0.07	
v/s Ratio Perm						0.02
v/c Ratio	0.63	0.35	0.69		0.41	0.13
Uniform Delay, d1	44.4	0.0	15.0		40.0	38.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.2	0.1	2.1		1.2	0.3
Delay (s)	50.6	0.1	17.1		41.2	38.4
Level of Service	D	A	B		D	D
Approach Delay (s)		5.6	17.1		39.4	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	107.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

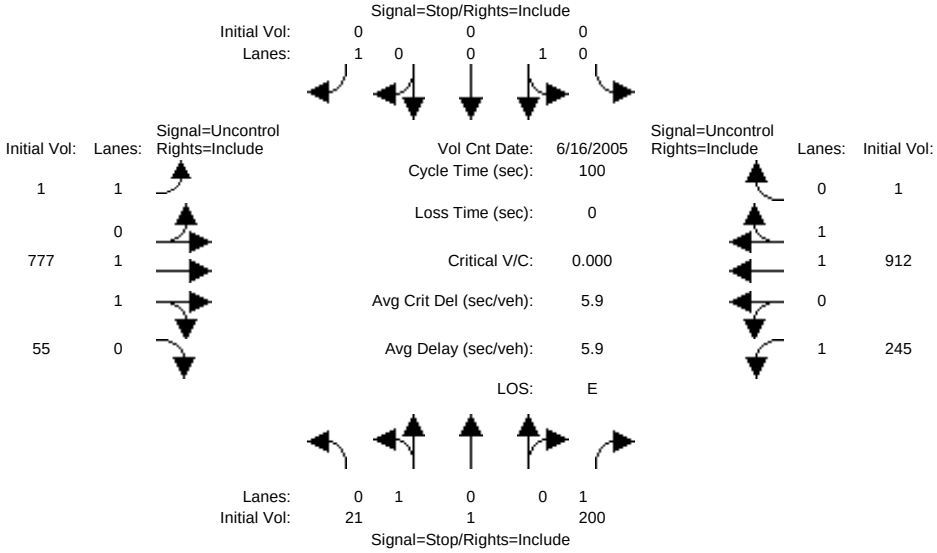
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.99			0.99			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1719	3008		1719	3010			1730			1694	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (perm)	1719	3008		1719	3010			1730			1694	
Volume (vph)	127	735	340	40	856	75	242	101	29	113	122	99
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.81	0.81	0.81	0.88	0.88	0.88
Adj. Flow (vph)	137	790	366	44	941	82	299	125	36	128	139	112
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	137	1156	0	44	1023	0	0	460	0	0	379	0
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	17.2	70.4		7.6	60.8			48.2			30.4	
Effective Green, g (s)	16.7	73.7		7.1	64.1			49.1			31.3	
Actuated g/C Ratio	0.09	0.42		0.04	0.36			0.28			0.18	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	162	1251		69	1089			479			299	
v/s Ratio Prot	c0.08	c0.38		0.03	0.34			c0.27			c0.22	
v/s Ratio Perm												
v/c Ratio	0.85	0.92		0.64	0.94			0.96			1.27	
Uniform Delay, d1	79.0	49.1		83.8	54.7			63.1			73.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	30.2	12.8		13.3	16.1			31.2			144.2	
Delay (s)	109.2	61.8		97.1	70.8			94.3			217.2	
Level of Service	F	E		F	E			F			F	
Approach Delay (s)		66.9			71.9			94.3			217.2	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	90.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	177.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #5: SR 46E/Union Rd

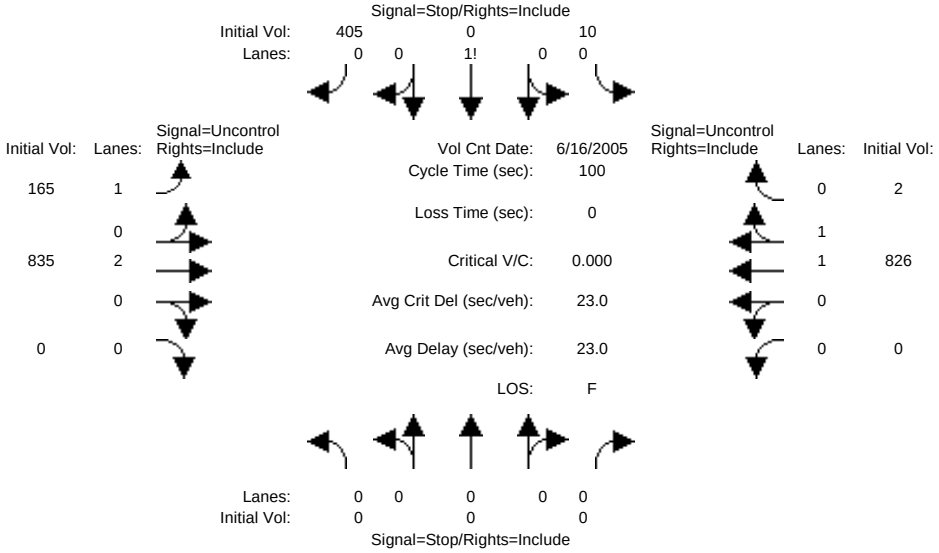



```
Street Name:             Union Rd                        SR 46E
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM
Base Vol:      21    1   200     0    0     0     1  777    55   245  912     1
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   21    1   200     0    0     0     1  777    55   245  912     1
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   21    1   200     0    0     0     1  777    55   245  912     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.79 0.95  0.79  0.95 0.95  0.95  0.95 0.88  0.88  0.86 0.86  0.95
PHF Volume:    27    1   254     0    0     0     1  879    62   283 1055     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   27    1   254     0    0     0     1  879    62   283 1055     1
Critical Gap Module:
Critical Gp:  6.8  6.5   6.9   7.5  6.5   6.9   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 2007 2535   471  2065 2566   528  1056 xxxx xxxxx   942 xxxx xxxxx
Potent Cap.:   53   28   545    32   26   500   667 xxxx xxxxx   736 xxxx xxxxx
Move Cap.:     37   17   545    12   16   500   667 xxxx xxxxx   736 xxxx xxxxx
Volume/Cap:  0.72 0.06  0.47  0.00 0.00  0.00  0.00 xxxx  xxxx  0.38 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   2.4  xxxx xxxx xxxxx   0.0 xxxx xxxxx   1.8 xxxx xxxxx
Control Del:xxxxx xxxx  17.2 xxxxx xxxx xxxxx  10.4 xxxx xxxxx  12.9 xxxx xxxxx
LOS by Move:   *    *     C     *    *     *     B    *     *     B    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   35 xxxx xxxxx     0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  2.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:253.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    F    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      40.5           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        E              *                *                *
```


Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #6: SR 46E/Airport Rd

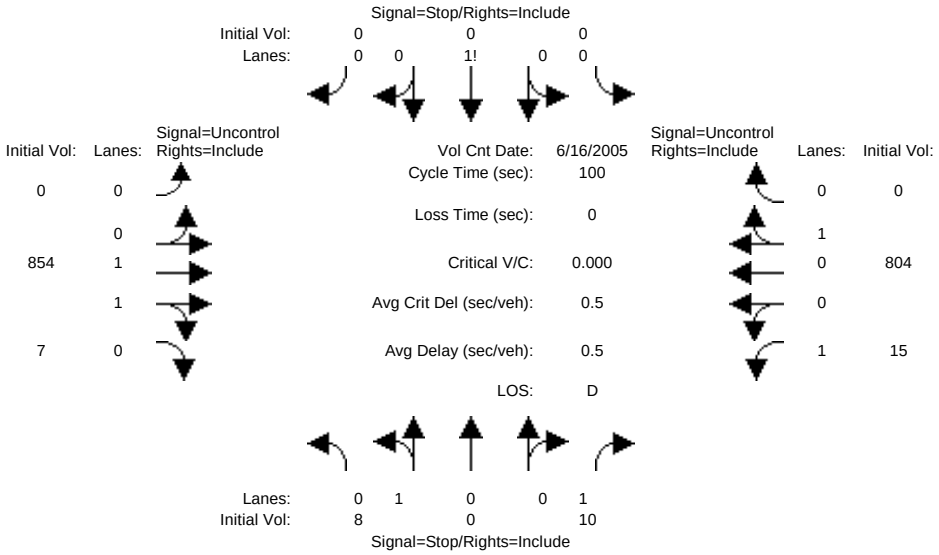


Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	0	0	0	10	0	405	165	835	0	0	826	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	405	165	835	0	0	826	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	405	165	835	0	0	826	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.82	0.95	0.82	0.88	0.88	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	12	0	496	187	945	0	0	955	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	12	0	496	187	945	0	0	955	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1803	2275	479	958	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	72	41	538	726	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	58	30	538	726	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.21	0.00	0.92	0.26	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	449	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	18.0	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	113	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			113.2			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #7: SR 46E/Mill Road

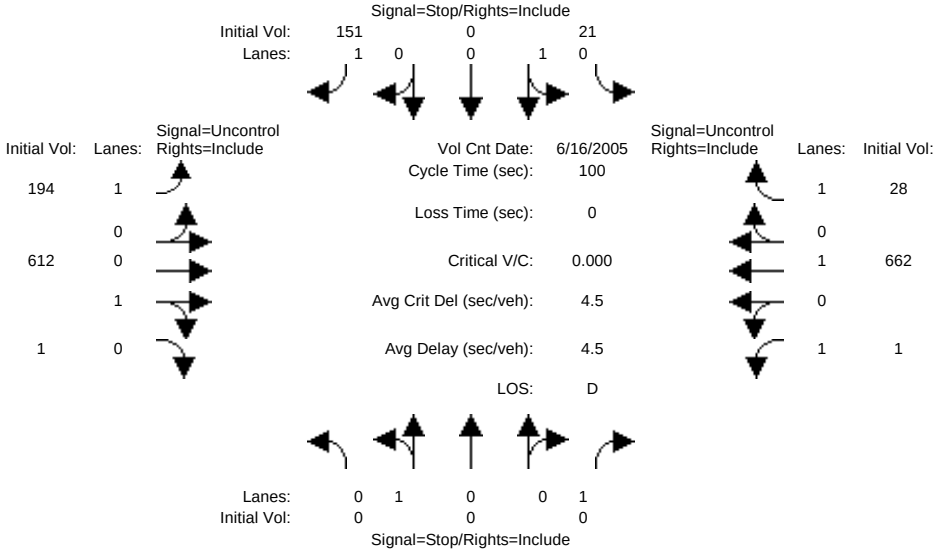


Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	8	0	10	0	0	0	0	854	7	15	804	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	0	10	0	0	0	0	854	7	15	804	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	0	10	0	0	0	0	854	7	15	804	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	9	0	11	0	0	0	0	977	8	17	920	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	9	0	11	0	0	0	0	977	8	17	920	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1935	1935	493	1443	1939	920	xxxx	xxxx	xxxxx	985	xxxx	xxxxx
Potent Cap.:	73	67	580	111	66	331	xxxx	xxxx	xxxxx	709	xxxx	xxxxx
Move Cap.:	72	65	580	107	65	331	xxxx	xxxx	xxxxx	709	xxxx	xxxxx
Volume/Cap:	0.13	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	11.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	10.2	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	72	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	62.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	34.0			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	D			*			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #8: SR 46E/Jardine Road

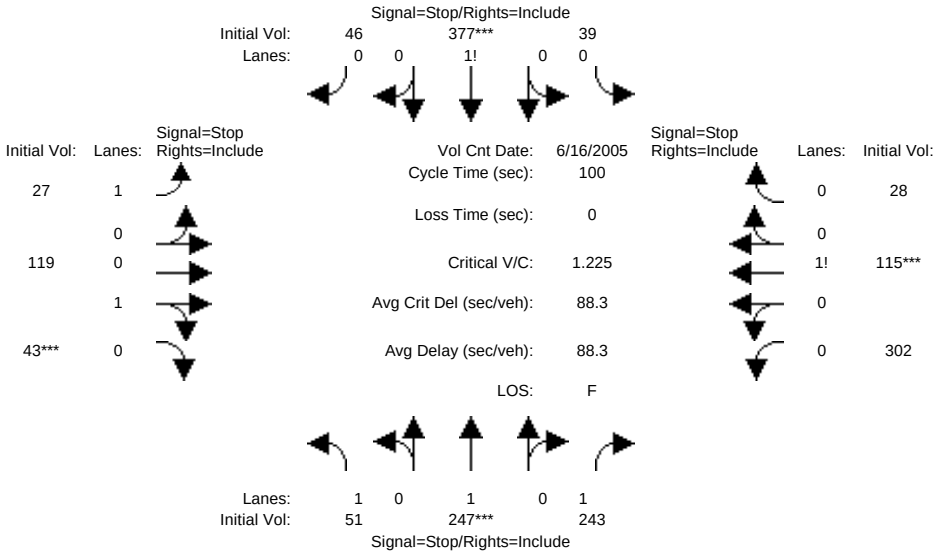


Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	0	0	0	21	0	151	194	612	1	1	662	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	21	0	151	194	612	1	1	662	28
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	21	0	151	194	612	1	1	662	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.84	0.84	0.84	0.88	0.88	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	25	0	181	220	693	1	1	766	32
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	25	0	181	220	693	1	1	766	32
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	6.4	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2007	1933	693	1900	1901	766	798	xxxx	xxxxx	694	xxxx	xxxxx
Potent Cap.:	45	67	447	77	70	406	833	xxxx	xxxxx	911	xxxx	xxxxx
Move Cap.:	20	49	447	61	51	406	833	xxxx	xxxxx	911	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.41	0.00	0.44	0.26	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	2.2	1.1	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	20.8	10.9	xxxx	xxxxx	9.0	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	B	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	61	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	1.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	99.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	F	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			30.4			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing PM

Intersection #9: Golden Hill/Union

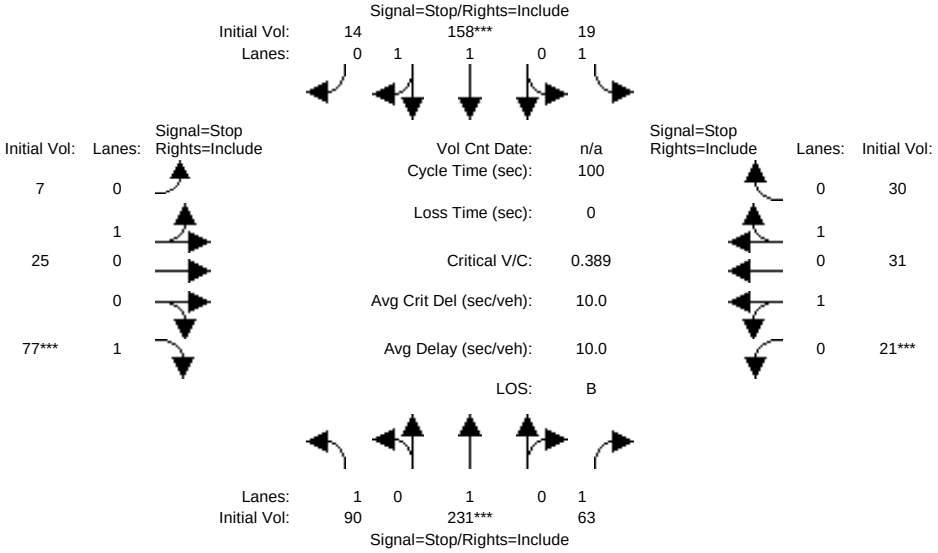


Street Name:	Golden Hill Road						Union Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	51	199	243	39	353	46	27	119	43	302	115	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	51	199	243	39	353	46	27	119	43	302	115	28
Added Vol:	0	48	0	0	24	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	51	247	243	39	377	46	27	119	43	302	115	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	58	283	278	45	431	53	31	136	49	346	132	32
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	58	283	278	45	431	53	31	136	49	346	132	32
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	58	283	278	45	431	53	31	136	49	346	132	32
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	0.08	0.82	0.10	1.00	0.73	0.27	0.68	0.26	0.06
Final Sat.:	405	430	469	36	352	43	373	295	107	288	110	27
Capacity Analysis Module:												
Vol/Sat:	0.14	0.66	0.59	1.23	1.23	1.23	0.08	0.46	0.46	1.20	1.20	1.20
Crit Moves:		****			****				****		****	
Delay/Veh:	13.0	25.6	20.8	146.7	147	146.7	13.1	18.8	18.8	137.8	138	137.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	13.0	25.6	20.8	146.7	147	146.7	13.1	18.8	18.8	137.8	138	137.8
LOS by Move:	B	D	C	F	F	F	B	C	C	F	F	F
ApproachDel:		22.3			146.7			18.0			137.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		22.3			146.7			18.0			137.8	
LOS by Appr:		C			F			C			F	
AllWayAvgQ:	0.2	1.7	1.4	16.2	16.2	16.2	0.1	0.8	0.8	14.9	14.9	14.9

Paso Robles

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing PM

Intersection #10: Buena Vista/Dallons

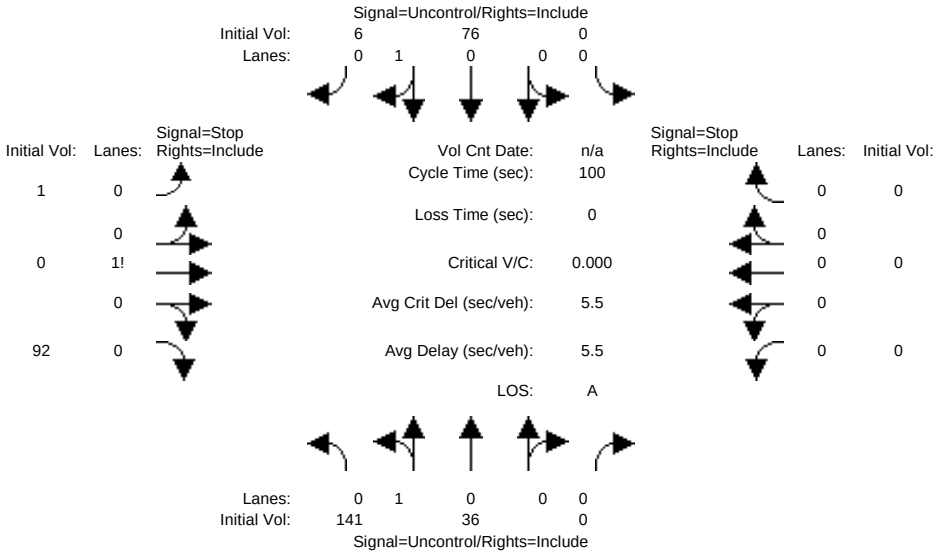


Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	90	85	63	12	85	14	7	25	77	21	31	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	85	63	12	85	14	7	25	77	21	31	16
Added Vol:	0	146	0	7	73	0	0	0	0	0	0	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	90	231	63	19	158	14	7	25	77	21	31	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	95	243	66	20	166	15	7	26	81	22	33	32
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	95	243	66	20	166	15	7	26	81	22	33	32
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	95	243	66	20	166	15	7	26	81	22	33	32
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.84	0.16	0.22	0.78	1.00	0.51	0.76	0.73
Final Sat.:	574	625	707	530	1064	95	118	423	618	269	415	434
Capacity Analysis Module:												
Vol/Sat:	0.17	0.39	0.09	0.04	0.16	0.15	0.06	0.06	0.13	0.08	0.08	0.07
Crit Moves:		****			****				****	****		
Delay/Veh:	10.0	11.6	8.1	9.4	9.6	9.6	9.3	9.3	8.9	9.6	9.3	8.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.0	11.6	8.1	9.4	9.6	9.6	9.3	9.3	8.9	9.6	9.3	8.7
LOS by Move:	A	B	A	A	A	A	A	A	A	A	A	A
ApproachDel:		10.7			9.6			9.0			9.2	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		10.7			9.6			9.0			9.2	
LOS by Appr:		B			A			A			A	
AllWayAvgQ:	0.2	0.6	0.1	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1

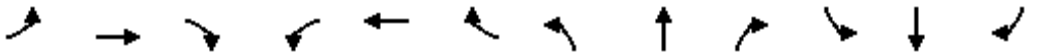
Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #11: Golden Hill Rd/Dallons Rd



Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:												
Base Vol:	127	36	0	0	76	6	1	0	85	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	127	36	0	0	76	6	1	0	85	0	0	0
Added Vol:	14	0	0	0	0	0	0	0	7	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	141	36	0	0	76	6	1	0	92	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	148	38	0	0	80	6	1	0	97	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	148	38	0	0	80	6	1	0	97	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	86	xxxx	xxxxx	xxxx	xxxx	xxxxx	418	418	83	xxxx	xxxx	xxxxx
Potent Cap.:	1523	xxxx	xxxxx	xxxx	xxxx	xxxxx	595	529	982	xxxx	xxxx	xxxxx
Move Cap.:	1523	xxxx	xxxxx	xxxx	xxxx	xxxxx	547	473	982	xxxx	xxxx	xxxxx
Volume/Cap:	0.10	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	0.10	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	974	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.1	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.1			xxxxxx		
ApproachLOS:	*			*			A			*		

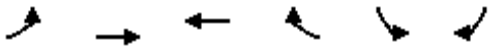


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.72	1.00						0.95	1.00
Satd. Flow (prot)		3438	1468	1167	3343						1393	1404
Flt Permitted		1.00	1.00	0.72	1.00						0.95	1.00
Satd. Flow (perm)		3438	1468	1167	3343						1393	1404
Volume (vph)	0	563	302	817	912	0	0	0	0	241	1	151
Peak-hour factor, PHF	1.00	0.90	0.90	0.90	0.90	0.90	1.00	1.00	1.00	0.84	0.84	0.84
Adj. Flow (vph)	0	626	336	908	1013	0	0	0	0	287	1	180
RTOR Reduction (vph)	0	0	181	0	0	0	0	0	0	0	0	118
Lane Group Flow (vph)	0	626	155	908	1013	0	0	0	0	0	288	62
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		18.7	18.7	45.0	67.8						22.8	22.8
Effective Green, g (s)		19.3	19.3	45.8	69.1						22.9	22.9
Actuated g/C Ratio		0.19	0.19	0.46	0.69						0.23	0.23
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		664	283	534	2310						319	322
v/s Ratio Prot		c0.18		c0.78	0.30							
v/s Ratio Perm			0.11								0.21	0.04
v/c Ratio		0.94	0.55	1.70	0.44						0.90	0.19
Uniform Delay, d1		39.8	36.4	27.1	6.8						37.5	31.1
Progression Factor		1.00	1.00	1.36	0.34						1.00	1.00
Incremental Delay, d2		23.4	7.5	315.9	0.1						27.2	0.3
Delay (s)		63.2	43.9	352.8	2.4						64.6	31.4
Level of Service		E	D	F	A						E	C
Approach Delay (s)		56.5			168.0			0.0			51.8	
Approach LOS		E			F			A			D	

Intersection Summary			
HCM Average Control Delay	119.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

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			*0.91		1.00	1.00				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1467	3252			2980		1556	1430				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1467	3252			2980		1556	1430				
Volume (vph)	90	714	0	0	1377	160	351	1	577	0	0	0
Peak-hour factor, PHF	0.90	0.90	1.00	1.00	0.90	0.90	0.94	0.94	0.94	1.00	1.00	1.00
Adj. Flow (vph)	100	793	0	0	1530	178	373	1	614	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	180	0	0	0	0
Lane Group Flow (vph)	100	793	0	0	1708	0	373	435	0	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	10.0	62.8			47.7		27.0	27.0				
Effective Green, g (s)	10.0	63.9			49.9		28.1	28.1				
Actuated g/C Ratio	0.10	0.64			0.50		0.28	0.28				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	147	2078			1487		437	402				
v/s Ratio Prot	c0.07	0.24			c0.57		0.24	c0.30				
v/s Ratio Perm												
v/c Ratio	0.68	0.38			1.15		0.85	1.08				
Uniform Delay, d1	43.5	8.6			25.0		34.0	35.9				
Progression Factor	1.31	0.02			1.00		1.00	1.00				
Incremental Delay, d2	4.7	0.2			75.2		15.9	68.9				
Delay (s)	61.7	0.4			100.2		49.9	104.8				
Level of Service	E	A			F		D	F				
Approach Delay (s)		7.2			100.2			84.1			0.0	
Approach LOS		A			F			F			A	

Intersection Summary			
HCM Average Control Delay	72.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	3195	3152		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3195	3152		1719	1538
Volume (vph)	116	1176	1388	71	86	149
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.89	0.89
Adj. Flow (vph)	129	1307	1542	79	97	167
RTOR Reduction (vph)	0	0	2	0	0	139
Lane Group Flow (vph)	129	1307	1619	0	97	28
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	13%	14%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	13.6	106.8	60.5		17.4	17.4
Effective Green, g (s)	13.1	106.8	63.8		17.9	17.9
Actuated g/C Ratio	0.12	1.00	0.60		0.17	0.17
Clearance Time (s)	3.5		7.3		4.5	4.5
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	211	3195	1883		288	258
v/s Ratio Prot	c0.08	c0.41	c0.51		0.06	
v/s Ratio Perm						0.02
v/c Ratio	0.61	0.41	0.86		0.34	0.11
Uniform Delay, d1	44.4	0.0	17.8		39.2	37.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.4	0.1	4.3		0.8	0.2
Delay (s)	49.9	0.1	22.1		40.0	37.9
Level of Service	D	A	C		D	D
Approach Delay (s)		4.6	22.1		38.7	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	106.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

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		1.00	0.95			1.00			1.00	
Frt	1.00	0.96		1.00	0.99			0.99			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1719	3082		1719	3102			1731			1708	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (perm)	1719	3082		1719	3102			1731			1708	
Volume (vph)	127	866	340	40	1160	75	242	101	37	113	122	99
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.82	0.82	0.82
Adj. Flow (vph)	141	962	378	44	1289	83	260	109	40	138	149	121
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	141	1340	0	44	1372	0	0	409	0	0	408	0
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	4.9	42.3		3.9	41.3			32.7			31.8	
Effective Green, g (s)	4.4	45.6		3.4	44.6			33.6			32.7	
Actuated g/C Ratio	0.03	0.35		0.03	0.34			0.26			0.25	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	58	1070		45	1054			443			425	
v/s Ratio Prot	c0.08	0.43		0.03	c0.44			c0.24			c0.24	
v/s Ratio Perm												
v/c Ratio	2.43	1.25		0.98	1.30			0.92			0.96	
Uniform Delay, d1	63.5	42.8		63.9	43.4			47.6			48.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	693.0	121.4		124.1	142.8			25.1			33.5	
Delay (s)	756.4	164.2		188.0	186.1			72.7			82.2	
Level of Service	F	F		F	F			E			F	
Approach Delay (s)		220.6			186.2			72.7			82.2	
Approach LOS		F			F			E			F	

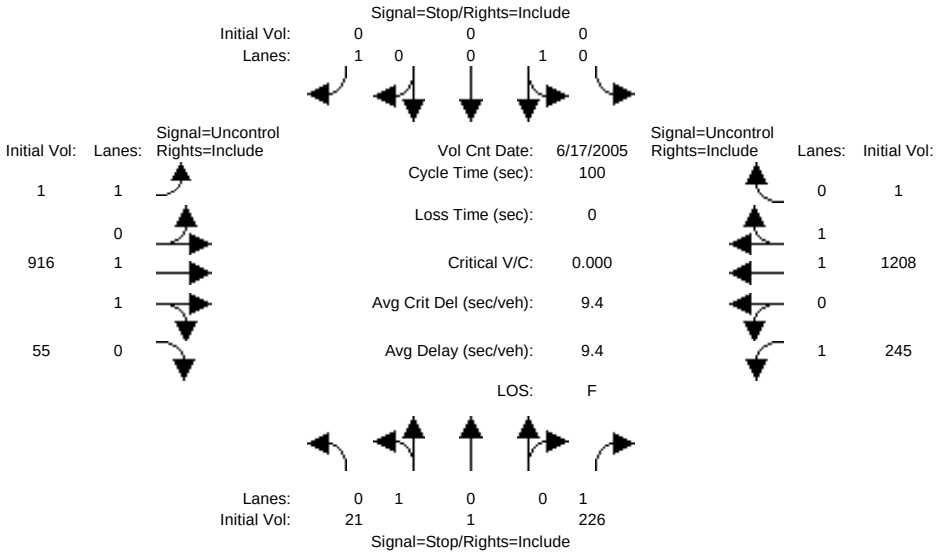
Intersection Summary			
HCM Average Control Delay	176.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	131.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing Fri PM

Intersection #5: SR 46E/Union Rd

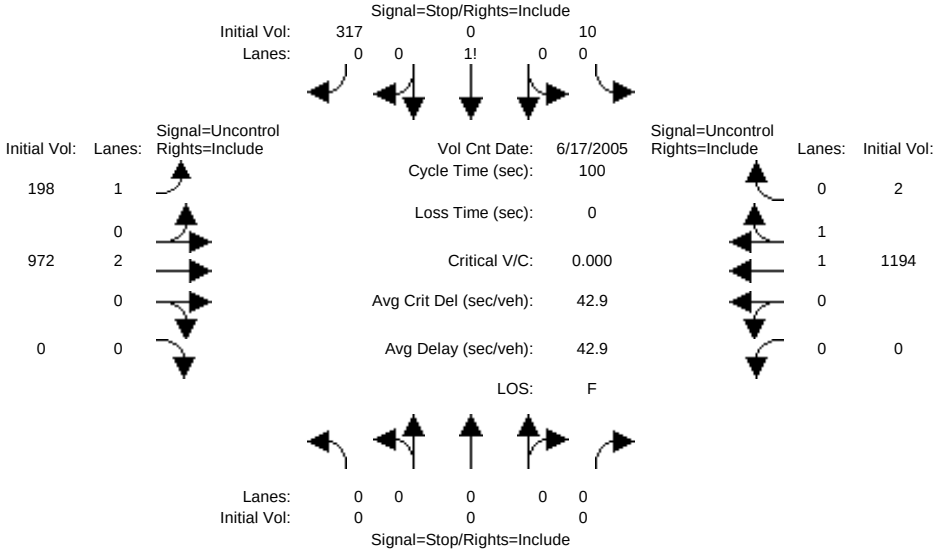


Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	21	1	226	0	0	0	1	916	55	245	1208	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	226	0	0	0	1	916	55	245	1208	1
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	1	226	0	0	0	1	916	55	245	1208	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.86	0.86	0.86	0.86	0.86
PHF Volume:	25	1	267	0	0	0	1	1071	64	287	1413	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	25	1	267	0	0	0	1	1071	64	287	1413	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2385	3093	568	2525	3124	707	1414	xxxx	xxxxx	1136	xxxx	xxxxx
Potent Cap.:	29	12	471	14	11	382	488	xxxx	xxxxx	623	xxxx	xxxxx
Move Cap.:	19	6	471	3	6	382	488	xxxx	xxxxx	623	xxxx	xxxxx
Volume/Cap:	1.33	0.18	0.57	0.00	0.00	0.00	0.00	xxxx	xxxx	0.46	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	3.5	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	2.4	xxxx	xxxxx
Control Del:	xxxxx	xxxx	22.2	xxxxx	xxxx	xxxxx	12.4	xxxx	xxxxx	15.6	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	B	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	17	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	3.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	725.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	84.6			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing Fri PM

Intersection #6: SR 46E/Airport Rd

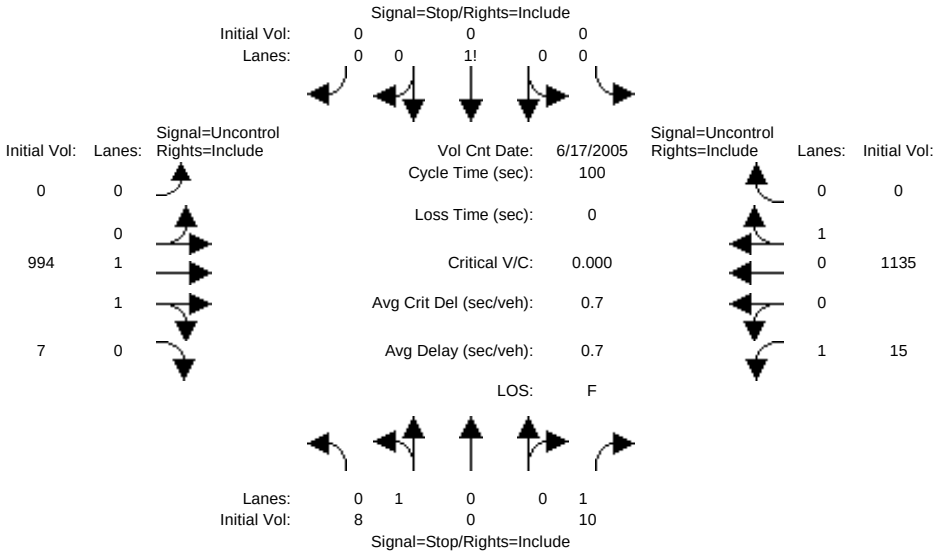


Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	0	0	0	10	0	317	198	972	0	0	1194	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	317	198	972	0	0	1194	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	317	198	972	0	0	1194	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.86	0.95	0.86	0.86	0.86	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	12	0	371	232	1137	0	0	1396	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	12	0	371	232	1137	0	0	1396	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2429	2998	699	1399	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	27	14	387	495	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	17	7	387	495	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.68	0.00	0.96	0.47	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.5	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	18.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	C	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	234	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	24.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	342	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			342.1			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing Fri PM

Intersection #7: SR 46E/Mill Road

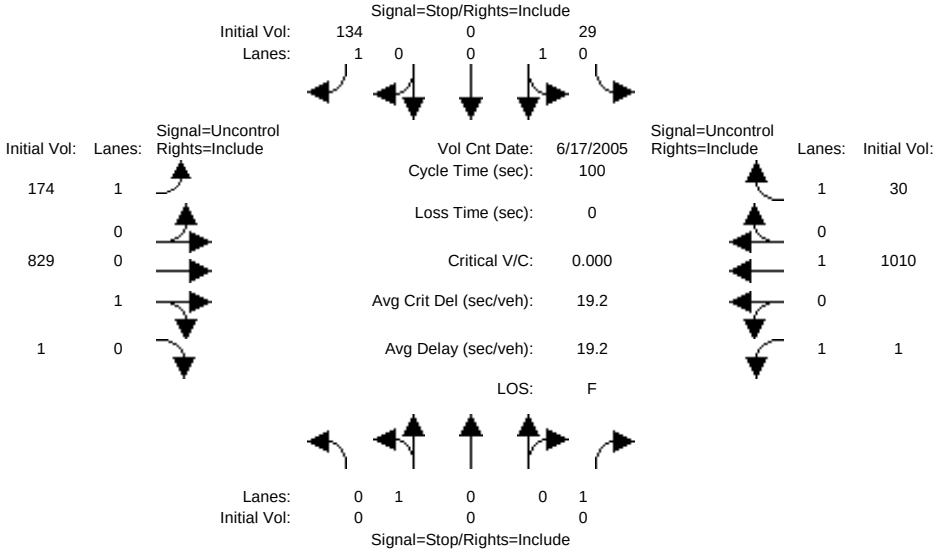


Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	8	0	10	0	0	0	0	994	7	15	1135	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	0	10	0	0	0	0	994	7	15	1135	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	0	10	0	0	0	0	994	7	15	1135	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	9	0	11	0	0	0	0	1137	8	17	1299	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	9	0	11	0	0	0	0	1137	8	17	1299	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2474	2474	573	1902	2478	1299	xxxx	xxxx	xxxxx	1145	xxxx	xxxxx
Potent Cap.:	33	30	523	53	30	199	xxxx	xxxx	xxxxx	617	xxxx	xxxxx
Move Cap.:	33	29	523	51	29	199	xxxx	xxxx	xxxxx	617	xxxx	xxxxx
Volume/Cap:	0.28	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	12.0	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.0	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	33	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	153.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	74.8			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Paso Robles

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing Fri PM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	0	0	0	29	0	134	174	829	1	1	1010	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	134	174	829	1	1	1010	30
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	29	0	134	174	829	1	1	1010	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.69	0.69	0.69	0.86	0.86	0.86	0.86	0.86	0.86
PHF Volume:	0	0	0	42	0	193	204	970	1	1	1181	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	42	0	193	204	970	1	1	1181	35
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	6.4	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2675	2596	970	2561	2561	1181	1216	xxxx	xxxxx	971	xxxx	xxxxx
Potent Cap.:	15	25	310	29	27	234	580	xxxx	xxxxx	718	xxxx	xxxxx
Move Cap.:	2	16	310	21	17	234	580	xxxx	xxxxx	718	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	1.95	0.00	0.83	0.35	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	6.4	1.6	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	66.7	14.5	xxxx	xxxxx	10.0	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	B	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	21	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	5.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	828.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	F	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			202.3			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

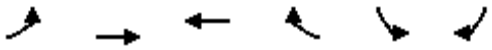
EXISTING PLUS PROJECT INTERSECTION LOS CALCULATIONS

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	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3438	1429	1597	3406						1367	1223
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3438	1429	1597	3406						1367	1223
Volume (vph)	0	597	338	519	708	0	0	0	0	121	0	57
Peak-hour factor, PHF	1.00	0.87	0.87	0.92	0.92	0.92	1.00	1.00	1.00	0.90	0.90	0.90
Adj. Flow (vph)	0	686	389	564	770	0	0	0	0	134	0	63
RTOR Reduction (vph)	0	0	172	0	0	0	0	0	0	0	0	54
Lane Group Flow (vph)	0	686	217	564	770	0	0	0	0	0	134	9
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		29.5	29.5	38.0	71.6						14.0	14.0
Effective Green, g (s)		30.1	30.1	38.8	72.9						14.1	14.1
Actuated g/C Ratio		0.32	0.32	0.41	0.77						0.15	0.15
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1089	453	652	2614						203	182
v/s Ratio Prot		c0.20		c0.35	0.23							
v/s Ratio Perm			0.15								0.10	0.01
v/c Ratio		0.63	0.48	0.87	0.29						0.66	0.05
Uniform Delay, d1		27.7	26.1	25.7	3.3						38.2	34.7
Progression Factor		1.00	1.00	1.31	0.19						1.00	1.00
Incremental Delay, d2		2.8	3.6	8.2	0.2						7.8	0.1
Delay (s)		30.5	29.7	41.8	0.8						46.0	34.8
Level of Service		C	C	D	A						D	C
Approach Delay (s)		30.2			18.1			0.0			42.4	
Approach LOS		C			B			A			D	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1399	3374			3205		1570	1404				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1399	3374			3205		1570	1404				
Volume (vph)	71	641	0	0	991	126	221	0	528	0	0	0
Peak-hour factor, PHF	0.87	0.87	0.87	1.00	0.92	0.92	0.79	0.79	0.79	1.00	1.00	1.00
Adj. Flow (vph)	82	737	0	0	1077	137	280	0	668	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	206	0	0	0	0
Lane Group Flow (vph)	82	737	0	0	1214	0	280	462	0	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	8.8	60.8			46.9		24.0	24.0				
Effective Green, g (s)	8.8	61.9			49.1		25.1	25.1				
Actuated g/C Ratio	0.09	0.65			0.52		0.26	0.26				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	130	2198			1656		415	371				
v/s Ratio Prot	c0.06	0.22			c0.38		0.18	c0.33				
v/s Ratio Perm												
v/c Ratio	0.63	0.34			0.73		0.67	1.25				
Uniform Delay, d1	41.5	7.4			17.9		31.3	35.0				
Progression Factor	1.43	0.00			1.00		1.00	1.00				
Incremental Delay, d2	7.5	0.3			2.9		5.1	131.1				
Delay (s)	66.9	0.3			20.8		36.4	166.0				
Level of Service	E	A			C		D	F				
Approach Delay (s)		7.0			20.8			127.7			0.0	
Approach LOS		A			C			F			A	

Intersection Summary			
HCM Average Control Delay	51.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		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)	1719	3223	3161		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3223	3161		1719	1538
Volume (vph)	236	932	914	191	143	237
Peak-hour factor, PHF	0.87	0.87	0.92	0.92	0.86	0.86
Adj. Flow (vph)	271	1071	993	208	166	276
RTOR Reduction (vph)	0	0	13	0	0	219
Lane Group Flow (vph)	271	1071	1188	0	166	57
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	12%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	20.1	95.6	41.0		18.8	18.8
Effective Green, g (s)	19.6	95.6	44.3		19.7	19.7
Actuated g/C Ratio	0.21	1.00	0.46		0.21	0.21
Clearance Time (s)	3.5		7.3		4.9	4.9
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	352	3223	1465		354	317
v/s Ratio Prot	c0.16	0.33	c0.38		c0.10	
v/s Ratio Perm						0.04
v/c Ratio	0.77	0.33	0.81		0.47	0.18
Uniform Delay, d1	35.9	0.0	22.0		33.4	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.0	0.1	3.6		1.2	0.3
Delay (s)	45.9	0.1	25.7		34.5	31.6
Level of Service	D	A	C		C	C
Approach Delay (s)		9.3	25.7		32.7	
Approach LOS		A	C		C	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

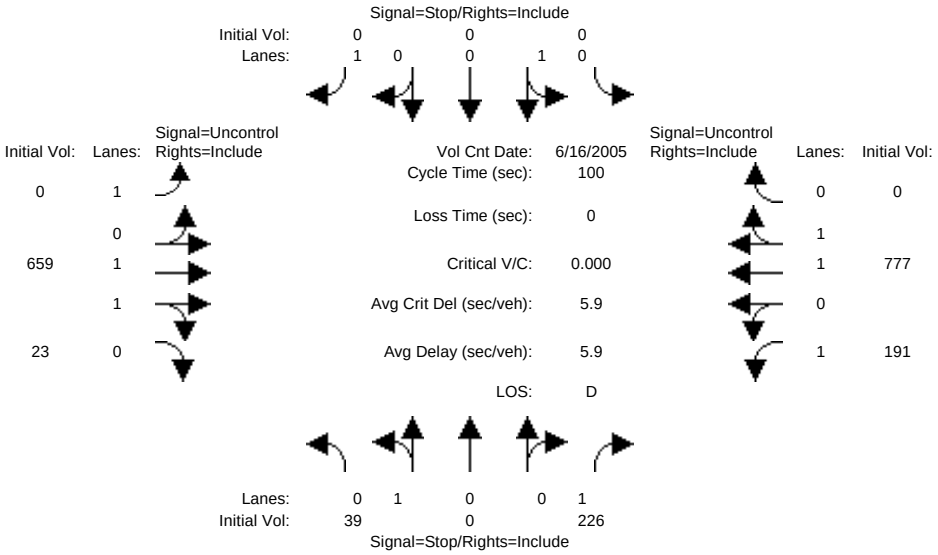
c Critical Lane Group

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		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.94		1.00	0.96			1.00			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1719	2994		1719	3081			1760			1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (perm)	1719	2994		1719	3081			1760			1671	
Volume (vph)	281	525	322	48	581	184	331	313	13	267	183	287
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.80	0.80	0.80	0.70	0.70	0.70
Adj. Flow (vph)	323	603	370	52	632	200	414	391	16	381	261	410
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	323	973	0	52	832	0	0	821	0	0	1052	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	20.0	62.6		8.3	50.9			50.1			30.4	
Effective Green, g (s)	19.5	65.9		7.8	54.2			51.0			31.3	
Actuated g/C Ratio	0.11	0.38		0.05	0.32			0.30			0.18	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	195	1147		78	971			522			304	
v/s Ratio Prot	c0.19	c0.32		0.03	0.27			c0.47			c0.63	
v/s Ratio Perm												
v/c Ratio	1.66	0.85		0.67	0.86			1.57			3.46	
Uniform Delay, d1	76.2	48.5		80.8	55.3			60.5			70.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	317.1	6.0		15.4	7.5			266.9			1115.5	
Delay (s)	393.3	54.5		96.2	62.8			327.4			1185.9	
Level of Service	F	D		F	E			F			F	
Approach Delay (s)		138.9			64.8			327.4			1185.9	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	432.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	172.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail AM

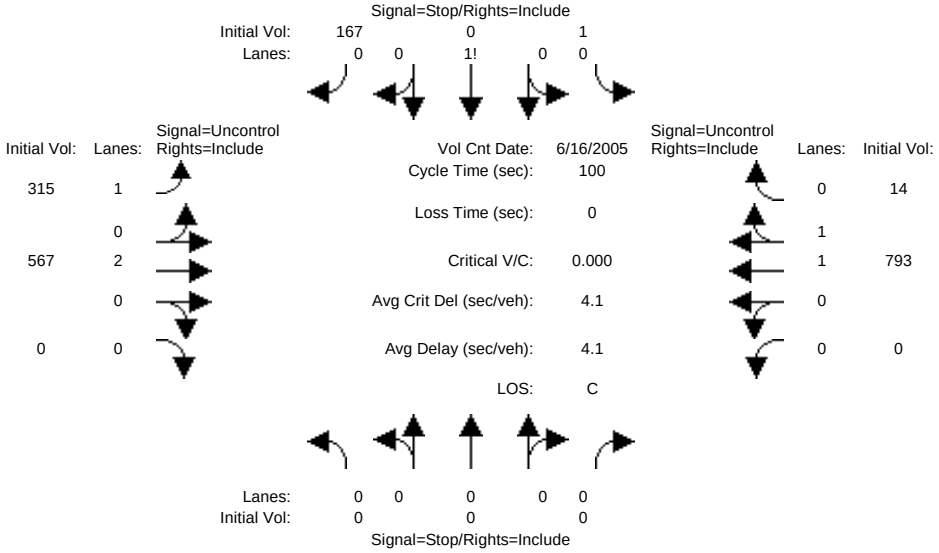
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertiime AM												
Base Vol:	39	0	226	0	0	0	0	594	23	191	698	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	0	226	0	0	0	0	594	23	191	698	0
Added Vol:	0	0	0	0	0	0	0	65	0	0	79	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	39	0	226	0	0	0	0	659	23	191	777	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.83	0.95	0.83	0.95	0.95	0.95	0.95	0.83	0.83	0.87	0.87	0.95
PHF Volume:	47	0	273	0	0	0	0	797	28	219	889	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	47	0	273	0	0	0	0	797	28	219	889	0
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1693	2137	413	1725	2151	445	xxxx	xxxx	xxxxx	825	xxxx	xxxxx
Potent Cap.:	86	50	594	58	49	567	xxxx	xxxx	xxxxx	814	xxxx	xxxxx
Move Cap.:	68	36	594	25	36	567	xxxx	xxxx	xxxxx	814	xxxx	xxxxx
Volume/Cap:	0.69	0.00	0.46	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.27	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	2.4	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	16.1	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.0	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	*	*	*	B	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	68	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	3.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	135.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	33.6			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	D			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail AM

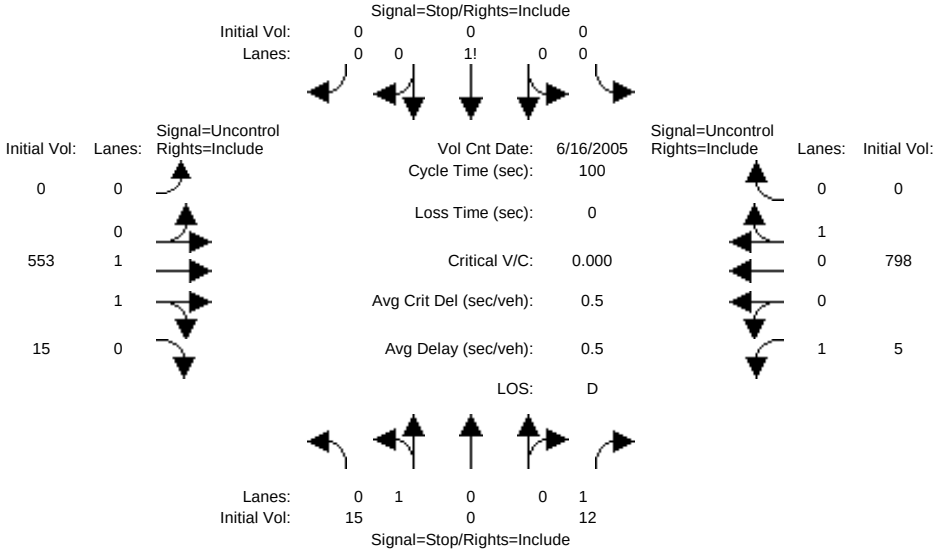
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	1	0	155	305	511	0	0	726	14
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	1	0	155	305	511	0	0	726	14
Added Vol:	0	0	0	0	0	12	10	56	0	0	67	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	167	315	567	0	0	793	14
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.85	0.95	0.85	0.83	0.83	0.95	0.95	0.87	0.87
PHF Volume:	0	0	0	1	0	198	381	686	0	0	907	16
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	198	381	686	0	0	907	16
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2021	2364	462	923	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	52	36	552	748	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	31	18	552	748	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.04	0.00	0.36	0.51	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.9	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	14.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	502	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	1.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	16.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			16.8			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail AM

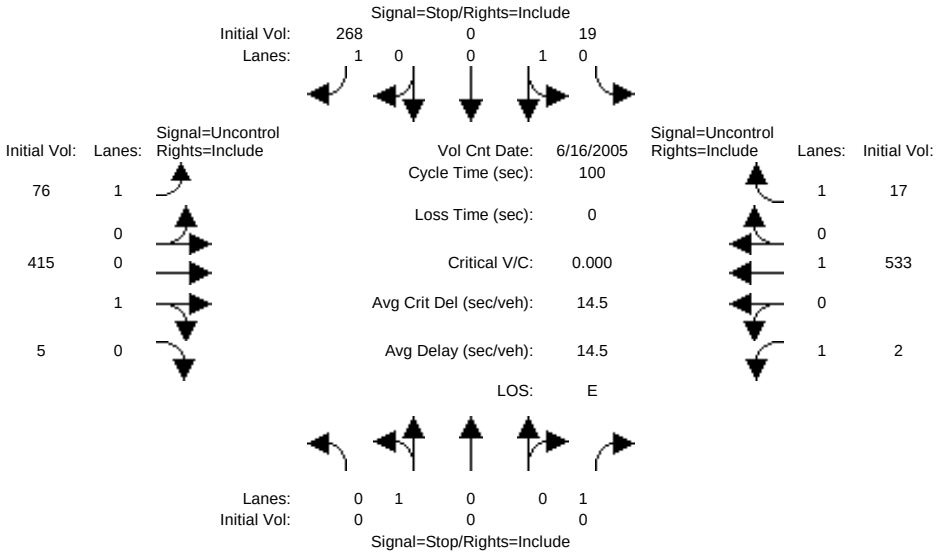
Intersection #7: SR 46E/Mill Road



Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	15	0	12	0	0	0	0	497	15	5	731	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	15	0	12	0	0	0	0	497	15	5	731	0
Added Vol:	0	0	0	0	0	0	0	56	0	0	67	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	15	0	12	0	0	0	0	553	15	5	798	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	17	0	14	0	0	0	0	633	17	6	913	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	17	0	14	0	0	0	0	633	17	6	913	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1566	1566	325	1241	1574	913	xxxx	xxxx	xxxxx	650	xxxx	xxxxx
Potent Cap.:	124	112	721	153	111	334	xxxx	xxxx	xxxxx	946	xxxx	xxxxx
Move Cap.:	123	112	721	150	110	334	xxxx	xxxx	xxxxx	946	xxxx	xxxxx
Volume/Cap:	0.14	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	10.1	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.8	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	123	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	38.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	E	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	26.1			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	D			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail AM

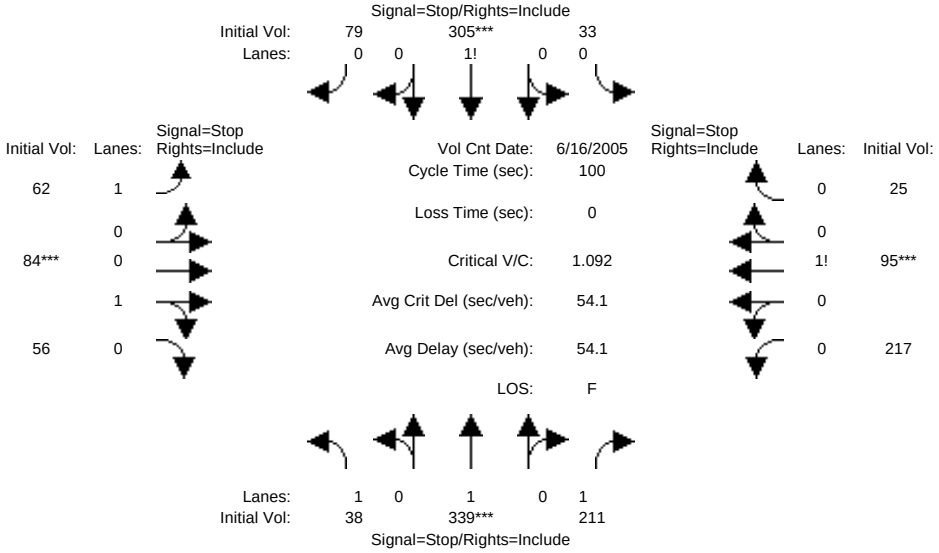
Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	19	0	268	76	359	5	2	466	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	19	0	268	76	359	5	2	466	17
Added Vol:	0	0	0	0	0	0	0	56	0	0	67	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	19	0	268	76	415	5	2	533	17
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.59	0.95	0.59	0.83	0.83	0.95	0.95	0.87	0.87
PHF Volume:	0	0	0	32	0	455	92	502	5	2	610	19
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	32	0	455	92	502	5	2	610	19
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	6.4	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1540	1322	505	1303	1305	610	629	xxxx	xxxxx	507	xxxx	xxxxx
Potent Cap.:	95	158	571	179	162	498	963	xxxx	xxxxx	1068	xxxx	xxxxx
Move Cap.:	8	142	571	166	146	498	963	xxxx	xxxxx	1068	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.19	0.00	0.91	0.10	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	10.6	0.3	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	50.6	9.1	xxxx	xxxxx	8.4	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	0	xxxx	xxxxx	166	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	31.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	D	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			49.4			xxxxxx			xxxxxx		
ApproachLOS:	*			E			*			*		

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Retail AM

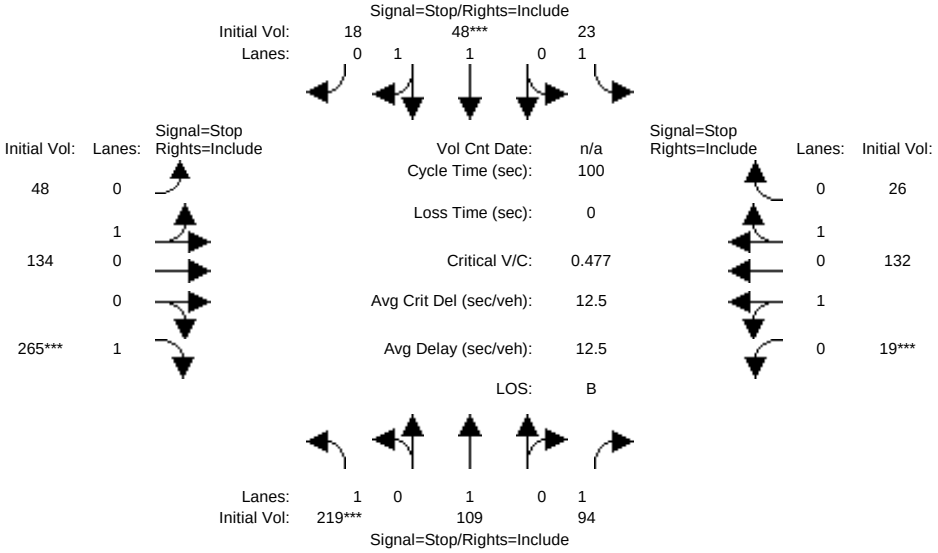
Intersection #9: Golden Hill/Union



Street Name:	Golden Hill Road						Union Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	38	264	211	33	243	54	32	84	56	217	95	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38	264	211	33	243	54	32	84	56	217	95	25
Added Vol:	0	75	0	0	62	25	30	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	38	339	211	33	305	79	62	84	56	217	95	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	43	388	241	38	349	90	71	96	64	248	109	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	43	388	241	38	349	90	71	96	64	248	109	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	43	388	241	38	349	90	71	96	64	248	109	29
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	0.08	0.73	0.19	1.00	0.60	0.40	0.65	0.28	0.07
Final Sat.:	412	438	478	35	320	83	368	240	160	269	118	31
Capacity Analysis Module:												
Vol/Sat:	0.11	0.89	0.50	1.09	1.09	1.09	0.19	0.40	0.40	0.92	0.92	0.92
Crit Moves:		****			****			****			****	
Delay/Veh:	12.4	47.4	17.5	98.7	98.7	98.7	14.5	17.0	17.0	56.0	56.0	56.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	12.4	47.4	17.5	98.7	98.7	98.7	14.5	17.0	17.0	56.0	56.0	56.0
LOS by Move:	B	E	C	F	F	F	B	C	C	F	F	F
ApproachDel:		34.4			98.7			16.2			56.0	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		34.4			98.7			16.2			56.0	
LOS by Appr:		D			F			C			F	
AllWayAvgQ:	0.1	4.4	1.0	10.6	10.6	10.6	0.2	0.6	0.6	5.1	5.1	5.1

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Retail AM

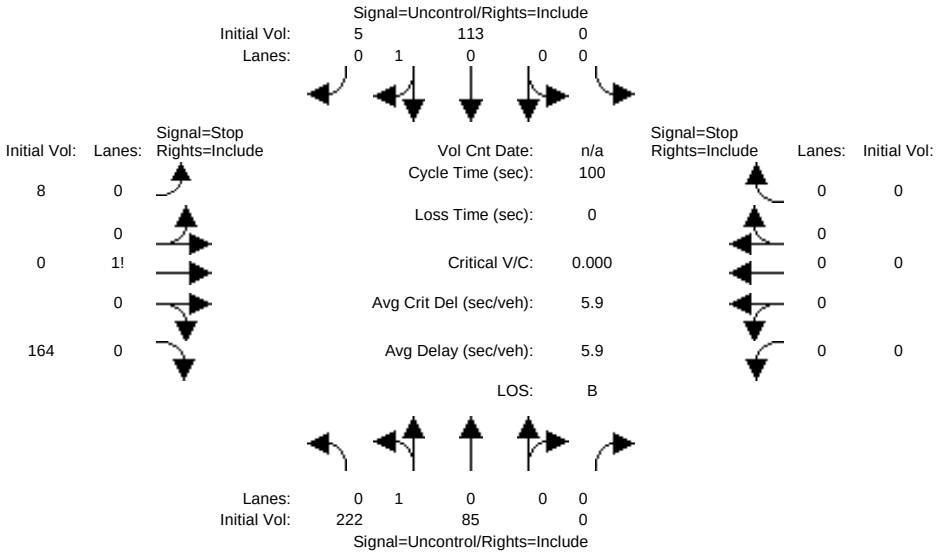
Intersection #10: Buena Vista/Dallons



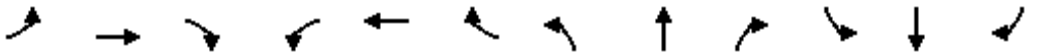
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	219	109	94	7	48	18	48	72	265	19	81	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	219	109	94	7	48	18	48	72	265	19	81	13
Added Vol:	0	0	0	16	0	0	0	62	0	0	51	13
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	219	109	94	23	48	18	48	134	265	19	132	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	231	115	99	24	51	19	51	141	279	20	139	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	231	115	99	24	51	19	51	141	279	20	139	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	231	115	99	24	51	19	51	141	279	20	139	27
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.45	0.55	0.26	0.74	1.00	0.21	1.50	0.29
Final Sat.:	483	514	570	415	652	252	141	394	613	107	758	153
Capacity Analysis Module:												
Vol/Sat:	0.48	0.22	0.17	0.06	0.08	0.08	0.36	0.36	0.46	0.19	0.18	0.18
Crit Moves:	****				****				****	****		
Delay/Veh:	15.9	11.2	9.9	11.2	10.7	10.4	12.6	12.6	12.7	11.0	10.8	10.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	15.9	11.2	9.9	11.2	10.7	10.4	12.6	12.6	12.7	11.0	10.8	10.6
LOS by Move:	C	B	A	B	B	B	B	B	B	B	B	B
ApproachDel:		13.4			10.7			12.7			10.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		13.4			10.7			12.7			10.8	
LOS by Appr:		B			B			B			B	
AllWayAvgQ:	0.8	0.3	0.2	0.1	0.1	0.1	0.5	0.5	0.7	0.2	0.2	0.2

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail AM

Intersection #11: Golden Hill Rd/Dallons Rd



Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:												
Base Vol:	160	80	0	0	107	3	7	0	113	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	80	0	0	107	3	7	0	113	0	0	0
Added Vol:	62	5	0	0	6	2	1	0	51	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	222	85	0	0	113	5	8	0	164	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	234	89	0	0	119	5	8	0	173	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	234	89	0	0	119	5	8	0	173	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	124	xxxx	xxxxx	xxxx	xxxx	xxxxx	678	678	122	xxxx	xxxx	xxxxx
Potent Cap.:	1475	xxxx	xxxxx	xxxx	xxxx	xxxxx	421	376	935	xxxx	xxxx	xxxxx
Move Cap.:	1475	xxxx	xxxxx	xxxx	xxxx	xxxxx	362	308	935	xxxx	xxxx	xxxxx
Volume/Cap:	0.16	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	0.00	0.18	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.6	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	871	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.8	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.2	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	B	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			10.2			xxxxxx		
ApproachLOS:	*			*			B			*		

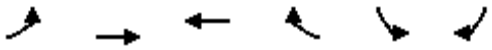


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	0.96	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3438	1474	1504	3343						1399	1404
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3438	1474	1504	3343						1399	1404
Volume (vph)	0	609	236	615	948	0	0	0	0	210	0	110
Peak-hour factor, PHF	1.00	0.93	0.93	0.91	0.91	0.91	1.00	1.00	1.00	0.74	0.74	0.74
Adj. Flow (vph)	0	655	254	676	1042	0	0	0	0	284	0	149
RTOR Reduction (vph)	0	0	133	0	0	0	0	0	0	0	0	98
Lane Group Flow (vph)	0	655	121	676	1042	0	0	0	0	0	284	51
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		21.0	21.0	38.0	63.1						22.5	22.5
Effective Green, g (s)		21.6	21.6	38.8	64.4						22.6	22.6
Actuated g/C Ratio		0.23	0.23	0.41	0.68						0.24	0.24
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		782	335	614	2266						333	334
v/s Ratio Prot		c0.19		c0.45	0.31							
v/s Ratio Perm			0.08								0.20	0.04
v/c Ratio		0.84	0.36	1.10	0.46						0.85	0.15
Uniform Delay, d1		35.0	30.9	28.1	7.2						34.6	28.6
Progression Factor		1.00	1.00	1.21	0.36						1.00	1.00
Incremental Delay, d2		10.4	3.0	55.6	0.3						18.6	0.2
Delay (s)		45.4	33.9	89.5	2.9						53.2	28.9
Level of Service		D	C	F	A						D	C
Approach Delay (s)		42.2			37.0			0.0			44.8	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1504	3282			3093		1570	1429				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1504	3282			3093		1570	1429				
Volume (vph)	95	724	0	0	1227	169	334	0	611	0	0	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.97	0.97	0.97	1.00	1.00	1.00
Adj. Flow (vph)	102	778	0	0	1348	186	344	0	630	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	188	0	0	0	0
Lane Group Flow (vph)	102	778	0	0	1534	0	344	442	0	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	9.1	60.8			46.6		24.0	24.0				
Effective Green, g (s)	9.1	61.9			48.8		25.1	25.1				
Actuated g/C Ratio	0.10	0.65			0.51		0.26	0.26				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	144	2138			1589		415	378				
v/s Ratio Prot	c0.07	0.24			c0.50		0.22	c0.31				
v/s Ratio Perm												
v/c Ratio	0.71	0.36			0.97		0.83	1.17				
Uniform Delay, d1	41.7	7.6			22.3		32.9	35.0				
Progression Factor	1.28	0.01			1.00		1.00	1.00				
Incremental Delay, d2	8.3	0.2			15.7		13.9	100.6				
Delay (s)	61.8	0.3			38.0		46.9	135.6				
Level of Service	E	A			D		D	F				
Approach Delay (s)		7.5			38.0			104.3			0.0	
Approach LOS		A			D			F			A	

Intersection Summary			
HCM Average Control Delay	49.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	3223	3099		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3223	3099		1719	1538
Volume (vph)	129	1207	1248	71	86	149
Peak-hour factor, PHF	0.93	0.93	0.91	0.91	0.72	0.72
Adj. Flow (vph)	139	1298	1371	78	119	207
RTOR Reduction (vph)	0	0	2	0	0	170
Lane Group Flow (vph)	139	1298	1447	0	119	37
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	16%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	14.3	108.8	60.4		18.4	18.4
Effective Green, g (s)	13.8	108.8	63.7		19.3	19.3
Actuated g/C Ratio	0.13	1.00	0.59		0.18	0.18
Clearance Time (s)	3.5		7.3		4.9	4.9
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	218	3223	1814		305	273
v/s Ratio Prot	c0.08	c0.40	c0.47		0.07	
v/s Ratio Perm						0.02
v/c Ratio	0.64	0.40	0.80		0.39	0.13
Uniform Delay, d1	45.1	0.0	17.5		39.5	37.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	0.1	3.8		1.0	0.3
Delay (s)	51.4	0.1	21.3		40.5	38.0
Level of Service	D	A	C		D	D
Approach Delay (s)		5.1	21.3		38.9	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	108.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

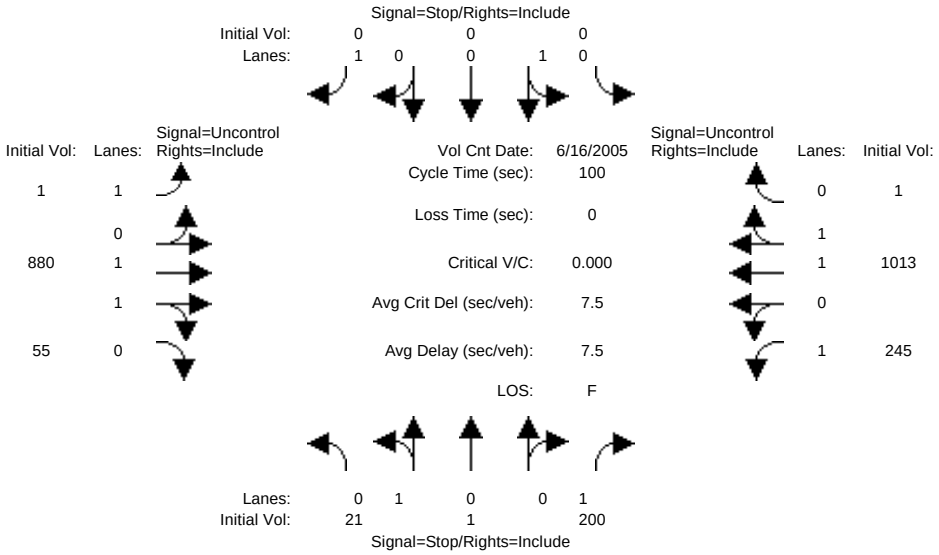
c Critical Lane Group

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		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1719	3007		1719	2969			1754			1674	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (perm)	1719	3007		1719	2969			1754			1674	
Volume (vph)	348	694	321	38	809	225	228	251	27	259	279	323
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.81	0.81	0.81	0.88	0.88	0.88
Adj. Flow (vph)	374	746	345	42	889	247	281	310	33	294	317	367
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	374	1091	0	42	1136	0	0	624	0	0	978	0
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	20.0	73.1		7.6	60.7			50.0			30.4	
Effective Green, g (s)	19.5	76.4		7.1	64.0			50.9			31.3	
Actuated g/C Ratio	0.11	0.42		0.04	0.35			0.28			0.17	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	184	1264		67	1046			491			288	
v/s Ratio Prot	c0.22	0.36		0.02	c0.38			c0.36			c0.58	
v/s Ratio Perm												
v/c Ratio	2.03	0.86		0.63	1.09			1.27			3.40	
Uniform Delay, d1	81.1	47.9		86.0	58.8			65.4			75.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	483.2	8.0		12.4	54.2			137.2			1086.9	
Delay (s)	564.3	55.8		98.4	113.1			202.6			1162.1	
Level of Service	F	E		F	F			F			F	
Approach Delay (s)		185.6			112.6			202.6			1162.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	392.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	181.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail PM

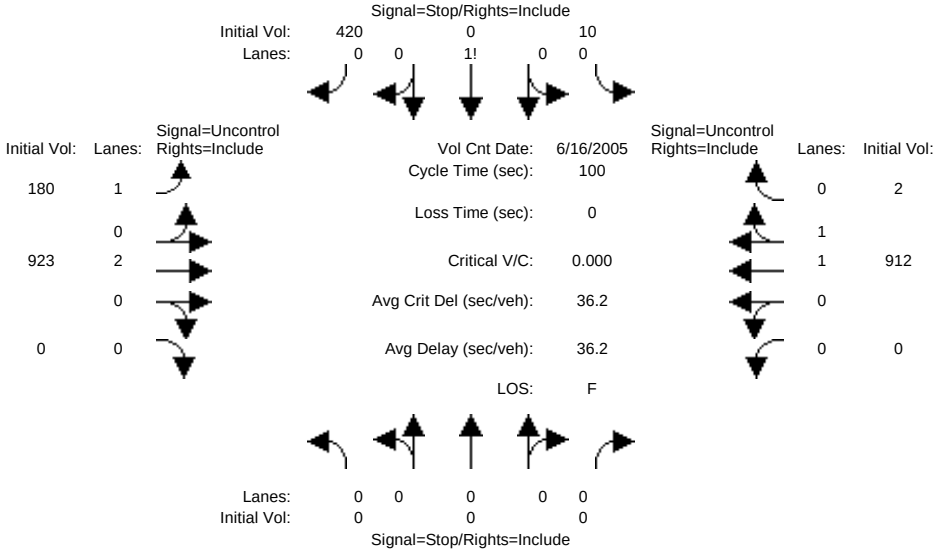
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	21	1	200	0	0	0	1	777	55	245	912	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	200	0	0	0	1	777	55	245	912	1
Added Vol:	0	0	0	0	0	0	0	103	0	0	101	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	1	200	0	0	0	1	880	55	245	1013	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.79	0.95	0.79	0.95	0.95	0.95	0.95	0.88	0.88	0.86	0.86	0.95
PHF Volume:	27	1	254	0	0	0	1	996	62	283	1172	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	27	1	254	0	0	0	1	996	62	283	1172	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2182	2769	529	2240	2799	586	1173	xxxx	xxxxx	1058	xxxx	xxxxx
Potent Cap.:	40	20	499	24	19	458	603	xxxx	xxxxx	666	xxxx	xxxxx
Move Cap.:	27	11	499	7	11	458	603	xxxx	xxxxx	666	xxxx	xxxxx
Volume/Cap:	0.99	0.09	0.51	0.00	0.00	0.00	0.00	xxxx	xxxx	0.43	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	2.8	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	2.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	19.4	xxxxx	xxxx	xxxxx	11.0	xxxx	xxxxx	14.4	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	B	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	25	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	3.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	429.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	59.8			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail PM

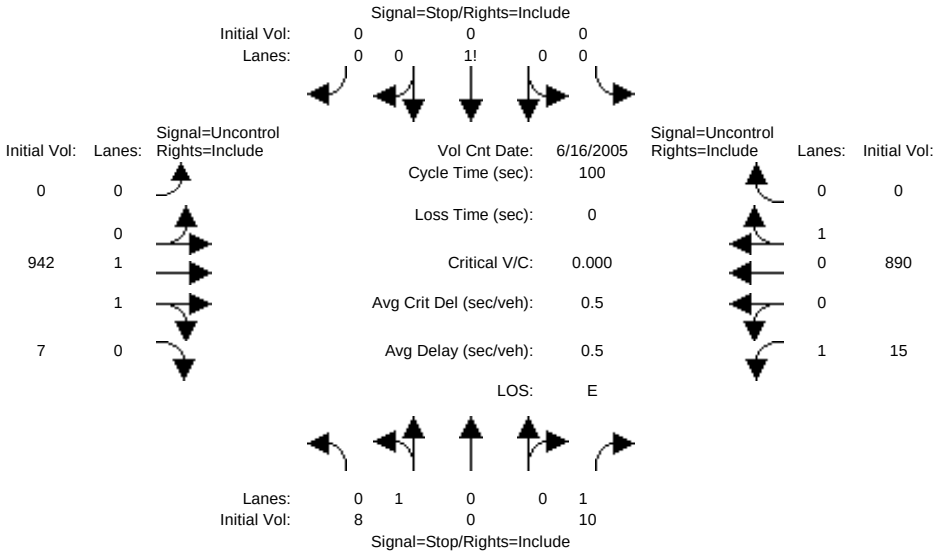
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	0	0	0	10	0	405	165	835	0	0	826	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	405	165	835	0	0	826	2
Added Vol:	0	0	0	0	0	15	15	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	420	180	923	0	0	912	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.82	0.95	0.82	0.88	0.88	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	12	0	514	204	1045	0	0	1055	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	12	0	514	204	1045	0	0	1055	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1986	2508	529	1057	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	55	29	500	666	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	42	20	500	666	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.29	0.00	1.03	0.31	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	398	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	24.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	190	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			189.8			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail PM

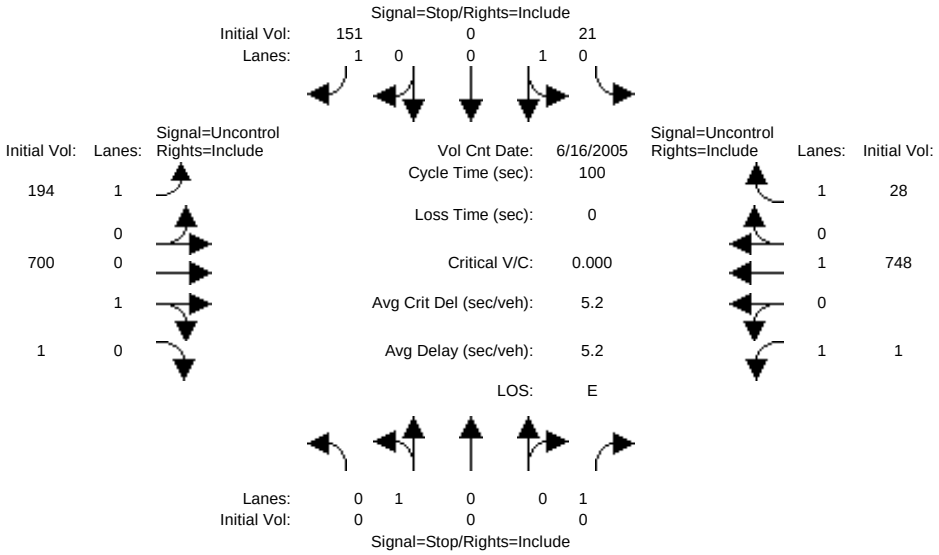
Intersection #7: SR 46E/Mill Road



Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	8	0	10	0	0	0	0	854	7	15	804	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	0	10	0	0	0	0	854	7	15	804	0
Added Vol:	0	0	0	0	0	0	0	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	0	10	0	0	0	0	942	7	15	890	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	9	0	11	0	0	0	0	1078	8	17	1018	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	9	0	11	0	0	0	0	1078	8	17	1018	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2134	2134	543	1592	2138	1018	xxxx	xxxx	xxxxx	1086	xxxx	xxxxx
Potent Cap.:	55	50	544	88	50	291	xxxx	xxxx	xxxxx	650	xxxx	xxxxx
Move Cap.:	54	49	544	84	48	291	xxxx	xxxx	xxxxx	650	xxxx	xxxxx
Volume/Cap:	0.17	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	11.8	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	10.7	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	54	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	85.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	44.4			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	E			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail PM

Intersection #8: SR 46E/Jardine Road

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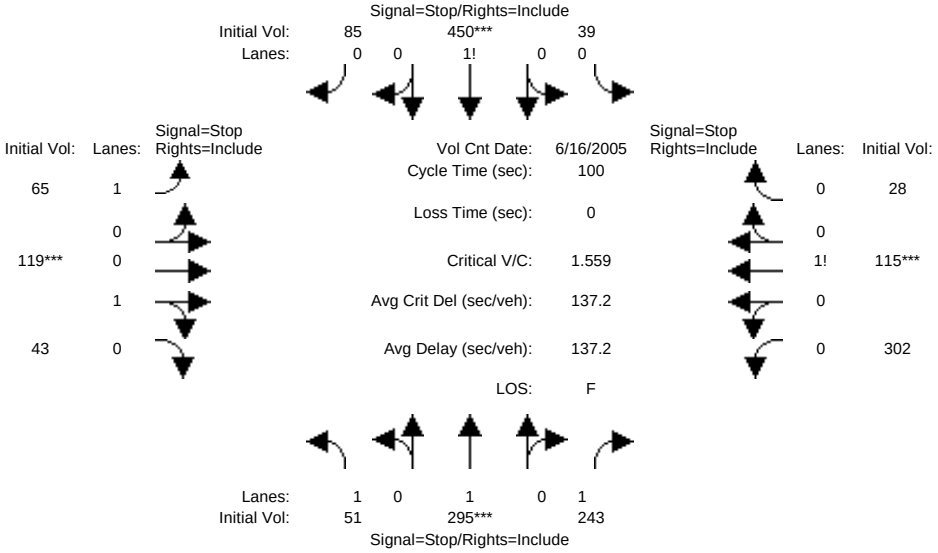
Street Name:           Jardine Road                    SR 46 E
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM
Base Vol:       0    0     0    21    0   151   194  612     1     1  662    28
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    21    0   151   194  612     1     1  662    28
Added Vol:      0    0     0     0    0     0     0   88     0     0   86     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    21    0   151   194  700     1     1  748    28
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.84 0.84  0.84  0.88 0.88  0.95  0.95 0.86  0.86
PHF Volume:     0    0     0    25    0   181   220  792     1     1  865    32
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    25    0   181   220  792     1     1  865    32
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   6.4  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 2206 2132   793  2099 2100   865   898 xxxx xxxxx   793 xxxx xxxxx
Potent Cap.:   32   50   392    58   52   356   765 xxxx xxxxx   837 xxxx xxxxx
Move Cap.:     12   36   392    45   37   356   765 xxxx xxxxx   837 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.56 0.00  0.51  0.29 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   2.7   1.2 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx  25.1  11.6 xxxx xxxxx   9.3 xxxx xxxxx
LOS by Move:   *    *     *     *    *     D     B    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0 xxxx xxxxx    45 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx 159.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     F    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx            41.5           xxxxxx           xxxxxx
ApproachLOS:         *              E                *                *
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Retail PM

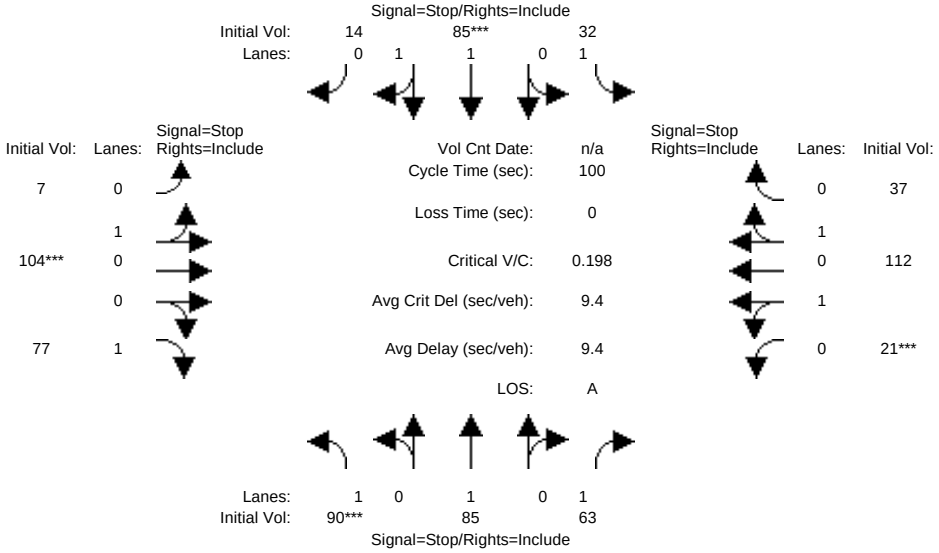
Intersection #9: Golden Hill/Union



Street Name:	Golden Hill Road						Union Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	51	199	243	39	353	46	27	119	43	302	115	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	51	199	243	39	353	46	27	119	43	302	115	28
Added Vol:	0	96	0	0	97	39	38	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	51	295	243	39	450	85	65	119	43	302	115	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	58	338	278	45	515	97	74	136	49	346	132	32
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	58	338	278	45	515	97	74	136	49	346	132	32
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	58	338	278	45	515	97	74	136	49	346	132	32
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	0.07	0.78	0.15	1.00	0.73	0.27	0.68	0.26	0.06
Final Sat.:	399	424	462	29	330	62	370	292	106	280	107	26
Capacity Analysis Module:												
Vol/Sat:	0.15	0.80	0.60	1.56	1.56	1.56	0.20	0.47	0.47	1.23	1.23	1.23
Crit Moves:		****			****			****			****	
Delay/Veh:	13.2	36.9	21.5	285.0	285	285.0	14.8	19.2	19.2	151.2	151	151.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	13.2	36.9	21.5	285.0	285	285.0	14.8	19.2	19.2	151.2	151	151.2
LOS by Move:	B	E	C	F	F	F	B	C	C	F	F	F
ApproachDel:		28.5			285.0			17.9			151.2	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		28.5			285.0			17.9			151.2	
LOS by Appr:		D			F			C			F	
AllWayAvgQ:	0.2	3.0	1.4	32.0	32.0	32.0	0.2	0.8	0.8	16.0	16.0	16.0

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Retail PM

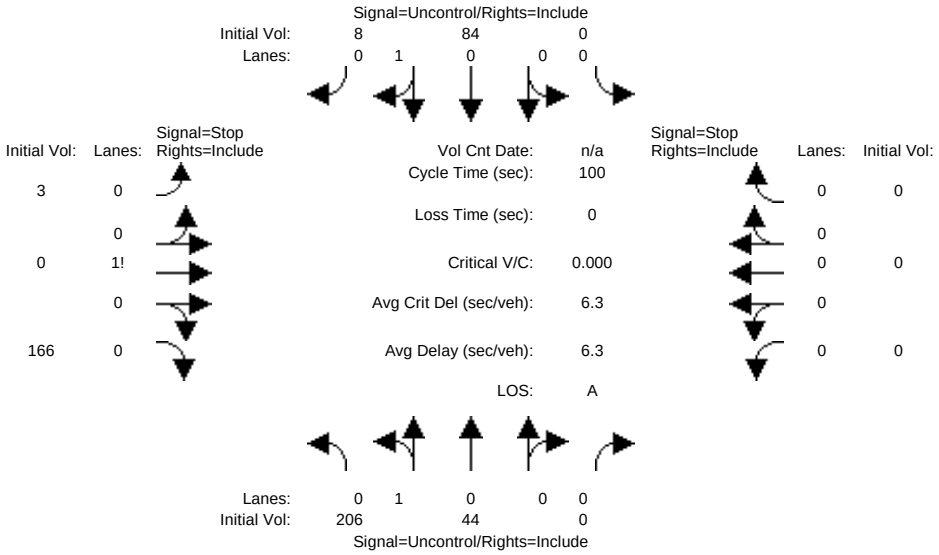
Intersection #10: Buena Vista/Dallons



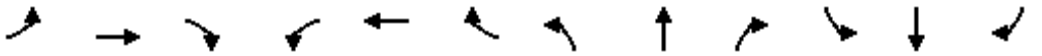
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	90	85	63	12	85	14	7	25	77	21	31	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	85	63	12	85	14	7	25	77	21	31	16
Added Vol:	0	0	0	20	0	0	0	79	0	0	81	21
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	90	85	63	32	85	14	7	104	77	21	112	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	95	89	66	34	89	15	7	109	81	22	118	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	95	89	66	34	89	15	7	109	81	22	118	39
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	95	89	66	34	89	15	7	109	81	22	118	39
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.72	0.28	0.06	0.94	1.00	0.25	1.32	0.43
Final Sat.:	535	578	649	510	955	160	37	554	670	143	787	271
Capacity Analysis Module:												
Vol/Sat:	0.18	0.15	0.10	0.07	0.09	0.09	0.20	0.20	0.12	0.15	0.15	0.14
Crit Moves:	****				****			****			****	
Delay/Veh:	10.4	9.6	8.5	9.8	9.3	9.2	9.9	9.9	8.4	9.6	9.4	9.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.4	9.6	8.5	9.8	9.3	9.2	9.9	9.9	8.4	9.6	9.4	9.1
LOS by Move:	B	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:		9.6			9.4			9.3			9.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		9.6			9.4			9.3			9.3	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.1

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail PM

Intersection #11: Golden Hill Rd/Dallons Rd



Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:												
Base Vol:	127	36	0	0	76	6	1	0	85	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	127	36	0	0	76	6	1	0	85	0	0	0
Added Vol:	79	8	0	0	8	2	2	0	81	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	206	44	0	0	84	8	3	0	166	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	217	46	0	0	88	8	3	0	175	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	217	46	0	0	88	8	3	0	175	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	97	xxxx	xxxxx	xxxx	xxxx	xxxxx	573	573	93	xxxx	xxxx	xxxxx
Potent Cap.:	1509	xxxx	xxxxx	xxxx	xxxx	xxxxx	485	433	970	xxxx	xxxx	xxxxx
Move Cap.:	1509	xxxx	xxxxx	xxxx	xxxx	xxxxx	424	362	970	xxxx	xxxx	xxxxx
Volume/Cap:	0.14	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	0.00	0.18	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	948	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.7	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.7	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.7			xxxxxx		
ApproachLOS:	*			*			A			*		

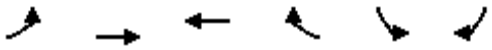


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.72	1.00						0.95	1.00
Satd. Flow (prot)		3438	1468	1167	3343						1388	1404
Flt Permitted		1.00	1.00	0.72	1.00						0.95	1.00
Satd. Flow (perm)		3438	1468	1167	3343						1388	1404
Volume (vph)	0	648	302	884	999	0	0	0	0	251	0	151
Peak-hour factor, PHF	1.00	0.90	0.90	0.90	0.90	0.90	1.00	1.00	1.00	0.84	0.84	0.84
Adj. Flow (vph)	0	720	336	982	1110	0	0	0	0	299	0	180
RTOR Reduction (vph)	0	0	158	0	0	0	0	0	0	0	0	97
Lane Group Flow (vph)	0	720	178	982	1110	0	0	0	0	0	299	83
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		18.4	18.4	45.0	67.5						23.1	23.1
Effective Green, g (s)		19.0	19.0	45.8	68.8						23.2	23.2
Actuated g/C Ratio		0.19	0.19	0.46	0.69						0.23	0.23
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		653	279	534	2300						322	326
v/s Ratio Prot		c0.21		c0.84	0.33							
v/s Ratio Perm			0.12								0.22	0.06
v/c Ratio		1.10	0.64	1.84	0.48						0.93	0.26
Uniform Delay, d1		40.5	37.3	27.1	7.3						37.6	31.3
Progression Factor		1.00	1.00	1.35	0.38						1.00	1.00
Incremental Delay, d2		66.7	10.7	378.2	0.1						31.8	0.4
Delay (s)		107.2	48.0	414.8	2.8						69.4	31.8
Level of Service		F	D	F	A						E	C
Approach Delay (s)		88.4			196.2			0.0			55.3	
Approach LOS		F			F			A			E	

Intersection Summary					
HCM Average Control Delay	146.2	HCM Level of Service	F		
HCM Volume to Capacity ratio	1.44				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	92.6%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

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			*0.91		1.00	1.00				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1467	3252			2984		1556	1429				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1467	3252			2984		1556	1429				
Volume (vph)	90	809	0	0	1530	170	351	0	643	0	0	0
Peak-hour factor, PHF	0.90	0.90	1.00	1.00	0.90	0.90	0.94	0.94	0.94	1.00	1.00	1.00
Adj. Flow (vph)	100	899	0	0	1700	189	373	0	684	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	155	0	0	0	0
Lane Group Flow (vph)	100	899	0	0	1889	0	373	529	0	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	10.1	62.8			47.6		27.0	27.0				
Effective Green, g (s)	10.1	63.9			49.8		28.1	28.1				
Actuated g/C Ratio	0.10	0.64			0.50		0.28	0.28				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	148	2078			1486		437	402				
v/s Ratio Prot	c0.07	0.28			c0.63		0.24	c0.37				
v/s Ratio Perm												
v/c Ratio	0.68	0.43			1.27		0.85	1.32				
Uniform Delay, d1	43.4	9.0			25.1		34.0	35.9				
Progression Factor	1.31	0.09			1.00		1.00	1.00				
Incremental Delay, d2	1.1	0.1			127.5		15.9	159.3				
Delay (s)	57.9	0.9			152.6		49.9	195.2				
Level of Service	E	A			F		D	F				
Approach Delay (s)		6.6			152.6			143.9			0.0	
Approach LOS		A			F			F			A	

Intersection Summary			
HCM Average Control Delay	113.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	3195	3153		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3195	3153		1719	1538
Volume (vph)	116	1337	1552	71	86	149
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.89	0.89
Adj. Flow (vph)	129	1486	1724	79	97	167
RTOR Reduction (vph)	0	0	2	0	0	137
Lane Group Flow (vph)	129	1486	1801	0	97	30
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	13%	14%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	13.7	108.4	60.5		18.9	18.9
Effective Green, g (s)	13.2	108.4	63.8		19.4	19.4
Actuated g/C Ratio	0.12	1.00	0.59		0.18	0.18
Clearance Time (s)	3.5		7.3		4.5	4.5
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	209	3195	1856		308	275
v/s Ratio Prot	c0.08	c0.47	c0.57		0.06	
v/s Ratio Perm						0.02
v/c Ratio	0.62	0.47	0.97		0.31	0.11
Uniform Delay, d1	45.2	0.0	21.4		38.7	37.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.6	0.1	14.5		0.7	0.2
Delay (s)	50.8	0.1	35.9		39.4	37.5
Level of Service	D	A	D		D	D
Approach Delay (s)		4.2	35.9		38.2	
Approach LOS		A	D		D	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	108.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

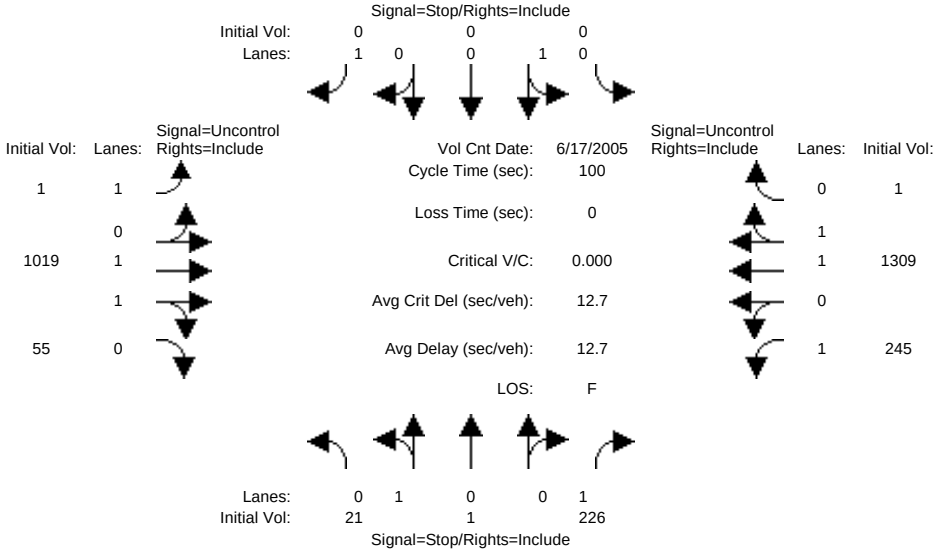
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.96		1.00	0.97			0.99			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1719	3082		1719	3083			1754			1692	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (perm)	1719	3082		1719	3083			1754			1692	
Volume (vph)	348	825	321	38	1113	225	228	251	35	259	279	323
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.82	0.82	0.82
Adj. Flow (vph)	387	917	357	42	1237	250	245	270	38	316	340	394
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	387	1274	0	42	1487	0	0	553	0	0	1050	0
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	4.9	42.3		3.9	41.3			34.0			32.0	
Effective Green, g (s)	4.4	45.6		3.4	44.6			34.9			32.9	
Actuated g/C Ratio	0.03	0.34		0.03	0.34			0.26			0.25	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	57	1058		44	1035			461			419	
v/s Ratio Prot	c0.23	0.41		0.02	c0.48			c0.32			c0.62	
v/s Ratio Perm												
v/c Ratio	6.79	1.20		0.95	1.44			1.20			2.51	
Uniform Delay, d1	64.2	43.6		64.6	44.1			49.0			50.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2641.8	101.0		116.6	202.1			109.1			684.8	
Delay (s)	2706.0	144.6		181.3	246.2			158.1			734.7	
Level of Service	F	F		F	F			F			F	
Approach Delay (s)		741.4			244.4			158.1			734.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	514.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.87		
Actuated Cycle Length (s)	132.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	122.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail Fri PM

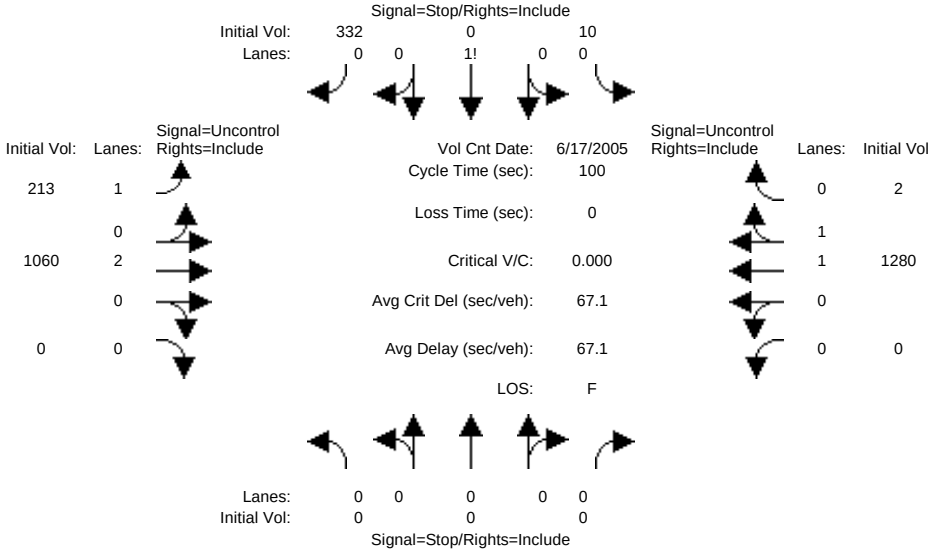
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	21	1	226	0	0	0	1	916	55	245	1208	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	226	0	0	0	1	916	55	245	1208	1
Added Vol:	0	0	0	0	0	0	0	103	0	0	101	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	1	226	0	0	0	1	1019	55	245	1309	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.86	0.86	0.86	0.86	0.86
PHF Volume:	25	1	267	0	0	0	1	1192	64	287	1531	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	25	1	267	0	0	0	1	1192	64	287	1531	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2565	3331	628	2703	3363	766	1532	xxxx	xxxxx	1256	xxxx	xxxxx
Potent Cap.:	22	8	431	10	8	350	440	xxxx	xxxxx	561	xxxx	xxxxx
Move Cap.:	13	4	431	2	4	350	440	xxxx	xxxxx	561	xxxx	xxxxx
Volume/Cap:	1.89	0.29	0.62	0.00	0.00	0.00	0.00	xxxx	xxxx	0.51	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	4.1	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	2.9	xxxx	xxxxx
Control Del:	xxxxx	xxxx	26.1	xxxxx	xxxx	xxxxx	13.2	xxxx	xxxxx	17.9	xxxx	xxxxx
LOS by Move:	*	*	D	*	*	*	B	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	12	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	1180	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	128.5			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail Fri PM

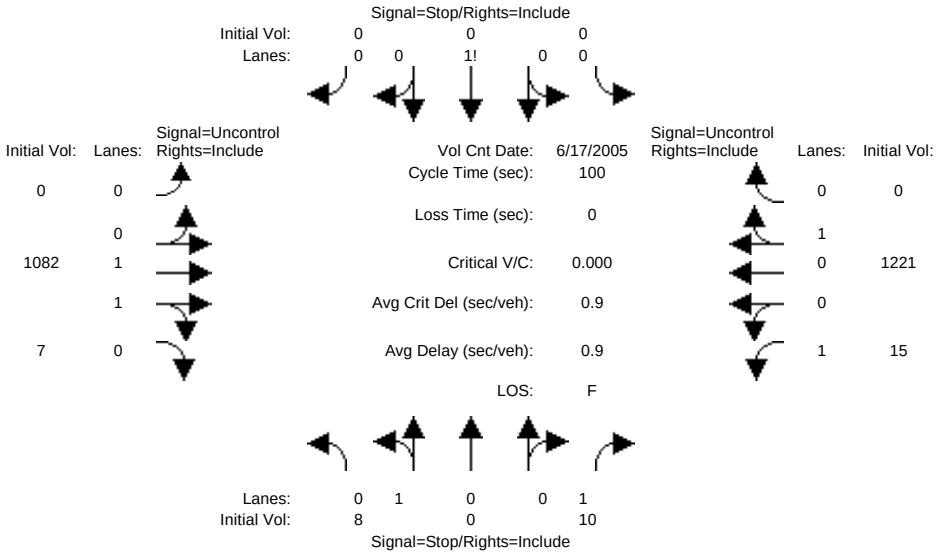
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	0	0	0	10	0	317	198	972	0	0	1194	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	317	198	972	0	0	1194	2
Added Vol:	0	0	0	0	0	15	15	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	332	213	1060	0	0	1280	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.86	0.95	0.86	0.86	0.86	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	12	0	388	249	1240	0	0	1497	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	12	0	388	249	1240	0	0	1497	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2616	3236	750	1499	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	20	10	358	453	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	11	4	358	453	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	1.02	0.00	1.08	0.55	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	3.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	22.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	C	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	190	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	31.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	555	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			554.9			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail Fri PM

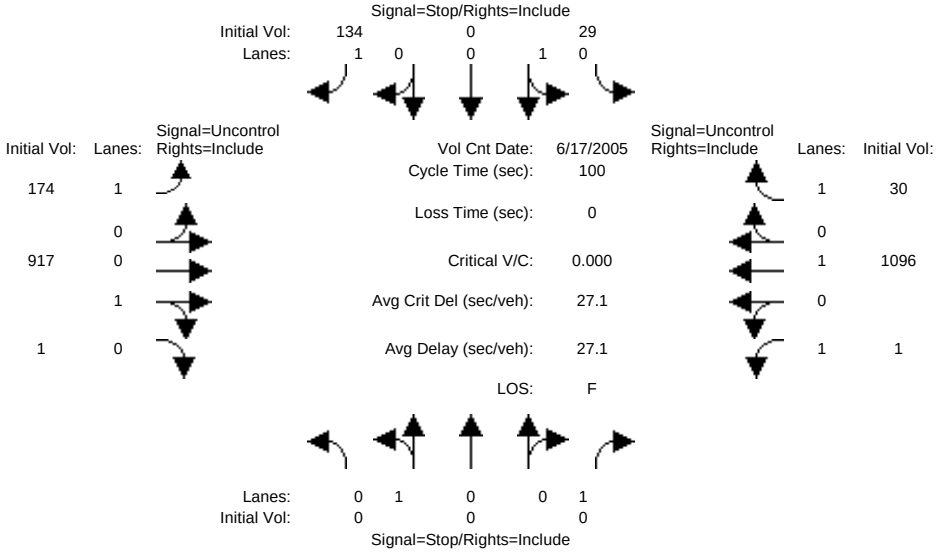
Intersection #7: SR 46E/Mill Road



Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	8	0	10	0	0	0	0	994	7	15	1135	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	0	10	0	0	0	0	994	7	15	1135	0
Added Vol:	0	0	0	0	0	0	0	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	0	10	0	0	0	0	1082	7	15	1221	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
PHF Volume:	9	0	11	0	0	0	0	1238	8	17	1397	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	9	0	11	0	0	0	0	1238	8	17	1397	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2673	2673	623	2050	2677	1397	xxxx	xxxx	xxxxx	1246	xxxx	xxxxx
Potent Cap.:	25	23	490	42	22	174	xxxx	xxxx	xxxxx	566	xxxx	xxxxx
Move Cap.:	24	22	490	40	22	174	xxxx	xxxx	xxxxx	566	xxxx	xxxxx
Volume/Cap:	0.38	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	12.5	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.6	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	24	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	1.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	224.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	106.5			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

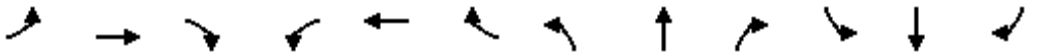
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Retail Fri PM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	0	0	0	29	0	134	174	829	1	1	1010	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	134	174	829	1	1	1010	30
Added Vol:	0	0	0	0	0	0	0	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	29	0	134	174	917	1	1	1096	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.69	0.69	0.69	0.86	0.86	0.86	0.86	0.86	0.86
PHF Volume:	0	0	0	42	0	193	204	1073	1	1	1282	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	42	0	193	204	1073	1	1	1282	35
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	6.4	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2878	2799	1073	2764	2765	1282	1317	xxxx	xxxxx	1074	xxxx	xxxxx
Potent Cap.:	10	19	270	22	20	204	532	xxxx	xxxxx	657	xxxx	xxxxx
Move Cap.:	0	12	270	15	12	204	532	xxxx	xxxxx	657	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	2.74	0.00	0.95	0.38	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	7.9	1.8	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	98.4	15.9	xxxx	xxxxx	10.5	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	C	*	*	B	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	0	xxxx	xxxxx	15	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	6.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	1299	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	F	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			311.9			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

MITIGATED EXISITNG PLUS PROJECT INTERSECTION LOS CALCULATIONS



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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.95		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4547		3099	3406						1367	1223
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4547		3099	3406						1367	1223
Volume (vph)	0	597	338	519	708	0	0	0	0	121	0	57
Peak-hour factor, PHF	1.00	0.87	0.87	0.92	0.92	0.92	1.00	1.00	1.00	0.90	0.90	0.90
Adj. Flow (vph)	0	686	389	564	770	0	0	0	0	134	0	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	54
Lane Group Flow (vph)	0	1075	0	564	770	0	0	0	0	0	134	9
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		45.7		22.2	72.0						13.6	13.6
Effective Green, g (s)		46.3		23.0	73.3						13.7	13.7
Actuated g/C Ratio		0.49		0.24	0.77						0.14	0.14
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		2216		750	2628						197	176
v/s Ratio Prot		c0.24		c0.18	0.23							
v/s Ratio Perm											0.10	0.01
v/c Ratio		0.49		0.75	0.29						0.68	0.05
Uniform Delay, d1		16.3		33.4	3.2						38.6	35.0
Progression Factor		1.00		0.62	0.70						1.00	1.00
Incremental Delay, d2		0.8		3.6	0.2						9.3	0.1
Delay (s)		17.1		24.4	2.5						47.8	35.2
Level of Service		B		C	A						D	D
Approach Delay (s)		17.1			11.7			0.0			43.8	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1399	3374			5800			1570	1404			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1399	3374			5800			1570	1404			
Volume (vph)	71	641	0	0	991	126	221	0	528	0	0	0
Peak-hour factor, PHF	0.87	0.87	0.87	1.00	0.92	0.92	0.79	0.79	0.79	1.00	1.00	1.00
Adj. Flow (vph)	82	737	0	0	1077	137	280	0	668	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	107	0	0	0
Lane Group Flow (vph)	82	737	0	0	1214	0	0	280	561	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	8.0	46.0			32.9			38.8	38.8			
Effective Green, g (s)	8.0	47.1			35.1			39.9	39.9			
Actuated g/C Ratio	0.08	0.50			0.37			0.42	0.42			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	118	1673			2143			659	590			
v/s Ratio Prot	c0.06	0.22			c0.21			0.18				
v/s Ratio Perm									c0.40			
v/c Ratio	0.69	0.44			0.57			0.42	0.95			
Uniform Delay, d1	42.3	15.5			23.9			19.4	26.6			
Progression Factor	0.98	0.32			1.00			1.00	1.00			
Incremental Delay, d2	14.6	0.7			1.1			0.8	25.8			
Delay (s)	56.1	5.6			25.0			20.2	52.4			
Level of Service	E	A			C			C	D			
Approach Delay (s)		10.7			25.0			42.9			0.0	
Approach LOS		B			C			D			A	

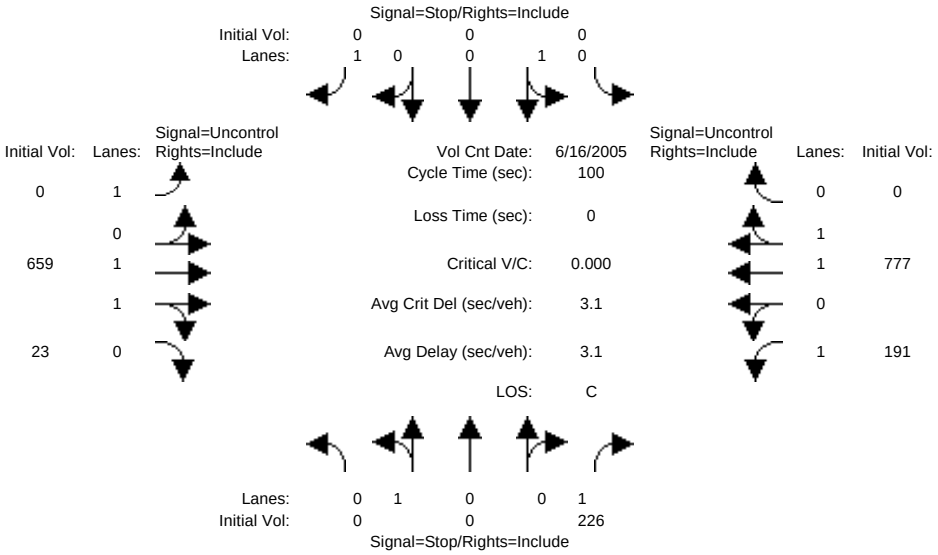
Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3112	1484	3335	3167	1487	3335	3416		3335	1810	1512
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3112	1484	3335	3167	1487	3335	3416		3335	1810	1512
Volume (vph)	281	525	322	48	581	184	370	313	13	267	183	287
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.80	0.80	0.80	0.70	0.70	0.70
Adj. Flow (vph)	323	603	370	52	632	200	462	391	16	381	261	410
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	323	603	370	52	632	200	462	407	0	381	261	410
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	13.6	34.0	34.0	5.0	25.4	25.4	18.3	33.5		16.8	32.0	32.0
Effective Green, g (s)	13.1	37.3	37.3	4.5	28.7	28.7	19.2	34.4		17.7	32.9	32.9
Actuated g/C Ratio	0.12	0.34	0.34	0.04	0.26	0.26	0.17	0.31		0.16	0.30	0.30
Clearance Time (s)	3.5	7.3	7.3	3.5	7.3	7.3	4.9	4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.5	3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	398	1056	504	137	827	388	583	1069		537	542	453
v/s Ratio Prot	c0.10	0.19		0.02	0.20		c0.14	0.12		0.11	0.14	
v/s Ratio Perm			c0.25			0.13						c0.27
v/c Ratio	0.81	0.57	0.73	0.38	0.76	0.52	0.79	0.38		0.71	0.48	0.91
Uniform Delay, d1	47.2	29.7	31.9	51.3	37.5	34.7	43.4	29.4		43.7	31.5	37.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	11.3	0.8	5.5	0.6	4.2	1.2	7.5	0.3		4.4	0.8	21.6
Delay (s)	58.5	30.5	37.4	52.0	41.7	35.8	50.9	29.7		48.1	32.3	58.6
Level of Service	E	C	D	D	D	D	D	C		D	C	E
Approach Delay (s)		39.5			41.0			41.0			48.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	109.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail AM

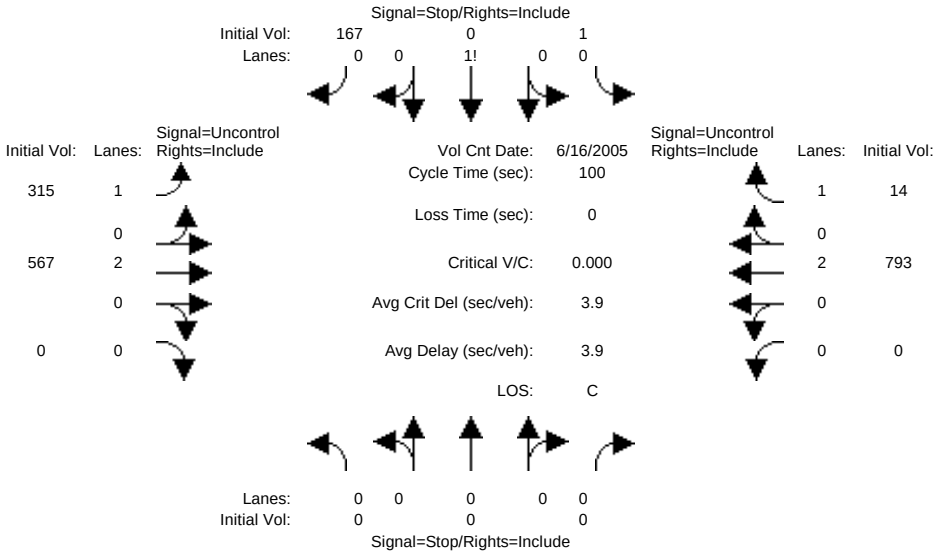
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertiime AM												
Base Vol:	39	0	226	0	0	0	0	594	23	191	698	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	0	226	0	0	0	0	594	23	191	698	0
Added Vol:	0	0	0	0	0	0	0	65	0	0	79	0
Union LT Re:	-39	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	226	0	0	0	0	659	23	191	777	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.83	0.95	0.83	0.95	0.95	0.95	0.95	0.83	0.83	0.87	0.87	0.95
PHF Volume:	0	0	273	0	0	0	0	797	28	219	889	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	273	0	0	0	0	797	28	219	889	0
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1693	2137	413	1725	2151	445	xxxx	xxxx	xxxxx	825	xxxx	xxxxx
Potent Cap.:	86	50	594	58	49	567	xxxx	xxxx	xxxxx	814	xxxx	xxxxx
Move Cap.:	68	36	594	25	36	567	xxxx	xxxx	xxxxx	814	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.46	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.27	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	2.4	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	16.1	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.0	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	*	*	*	B	*	*
Movement:	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	16.1			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	C			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail AM

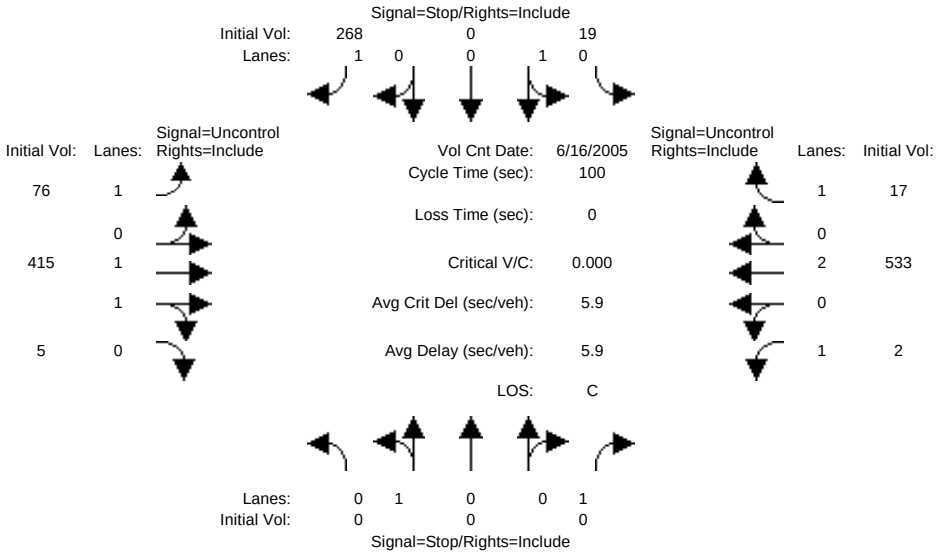
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	1	0	155	305	511	0	0	726	14
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	1	0	155	305	511	0	0	726	14
Added Vol:	0	0	0	0	0	12	10	56	0	0	67	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	167	315	567	0	0	793	14
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.85	0.95	0.85	0.83	0.83	0.95	0.95	0.87	0.87
PHF Volume:	0	0	0	1	0	198	381	686	0	0	907	16
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	198	381	686	0	0	907	16
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2013	2356	454	923	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	52	36	559	748	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	31	18	559	748	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	0	0	xxxxx	135	95	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.01	0.00	0.35	0.51	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.9	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	14.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	549	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	1.6	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	15.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			15.2			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail AM

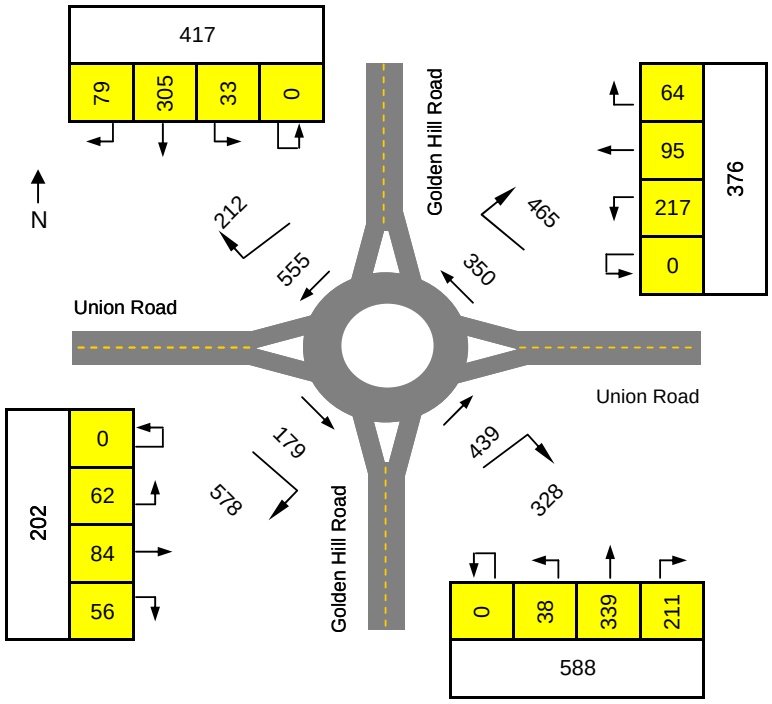
Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	19	0	268	76	359	5	2	466	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	19	0	268	76	359	5	2	466	17
Added Vol:	0	0	0	0	0	0	0	56	0	0	67	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	19	0	268	76	415	5	2	533	17
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.59	0.95	0.59	0.83	0.83	0.95	0.95	0.87	0.87
PHF Volume:	0	0	0	32	0	455	92	502	5	2	610	19
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	32	0	455	92	502	5	2	610	19
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	998	1322	254	1049	1305	305	629	xxxx	xxxxx	507	xxxx	xxxxx
Potent Cap.:	201	158	752	226	162	697	963	xxxx	xxxxx	1068	xxxx	xxxxx
Move Cap.:	65	142	752	209	146	697	963	xxxx	xxxxx	1068	xxxx	xxxxx
Total Cap:	141	335	xxxxx	455	367	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.07	0.00	0.65	0.10	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	4.9	0.3	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	19.3	9.1	xxxx	xxxxx	8.4	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	455	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	13.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	B	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			19.0			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)					1		
Period (hr)	0.25	Date	6/16/2005	E-W	Union Road		
PHF	0.92	Time	AM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	588	179	1113	0.57	7	A	100
South	417	350	1021	0.44	6	A	50
East	202	555	910	0.24	5	A	25
West	376	439	973	0.42	6	A	50
All	1583				7	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4706		2918	3343						1399	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4706		2918	3343						1399	1404
Volume (vph)	0	609	236	615	948	0	0	0	0	210	0	110
Peak-hour factor, PHF	1.00	0.93	0.93	0.91	0.91	0.91	1.00	1.00	1.00	0.74	0.74	0.74
Adj. Flow (vph)	0	655	254	676	1042	0	0	0	0	284	0	149
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	110
Lane Group Flow (vph)	0	909	0	676	1042	0	0	0	0	0	284	39
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		32.8		27.2	64.1						21.5	21.5
Effective Green, g (s)		33.4		28.0	65.4						21.6	21.6
Actuated g/C Ratio		0.35		0.29	0.69						0.23	0.23
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1655		860	2301						318	319
v/s Ratio Prot		c0.19		c0.23	0.31							
v/s Ratio Perm											0.20	0.03
v/c Ratio		0.55		0.79	0.45						0.89	0.12
Uniform Delay, d1		24.8		30.8	6.7						35.6	29.2
Progression Factor		1.00		0.23	0.87						1.00	1.00
Incremental Delay, d2		1.3		3.7	0.5						25.5	0.2
Delay (s)		26.1		10.7	6.4						61.1	29.3
Level of Service		C		B	A						E	C
Approach Delay (s)		26.1			8.1			0.0			50.1	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1504	3282			5598			1570	1429			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1504	3282			5598			1570	1429			
Volume (vph)	95	724	0	0	1227	169	334	0	611	0	0	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.97	0.97	0.97	1.00	1.00	1.00
Adj. Flow (vph)	102	778	0	0	1348	186	344	0	630	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	114	0	0	0
Lane Group Flow (vph)	102	778	0	0	1534	0	0	344	516	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	9.2	50.2			35.9			34.6	34.6			
Effective Green, g (s)	9.2	51.3			38.1			35.7	35.7			
Actuated g/C Ratio	0.10	0.54			0.40			0.38	0.38			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	146	1772			2245			590	537			
v/s Ratio Prot	c0.07	0.24			c0.27			0.22				
v/s Ratio Perm									c0.36			
v/c Ratio	0.70	0.44			0.68			0.58	0.96			
Uniform Delay, d1	41.6	13.2			23.5			23.7	29.0			
Progression Factor	0.68	0.96			1.00			1.00	1.00			
Incremental Delay, d2	11.7	0.6			1.7			2.0	29.3			
Delay (s)	40.0	13.2			25.2			25.7	58.3			
Level of Service	D	B			C			C	E			
Approach Delay (s)		16.4			25.2			46.8			0.0	
Approach LOS		B			C			D			A	

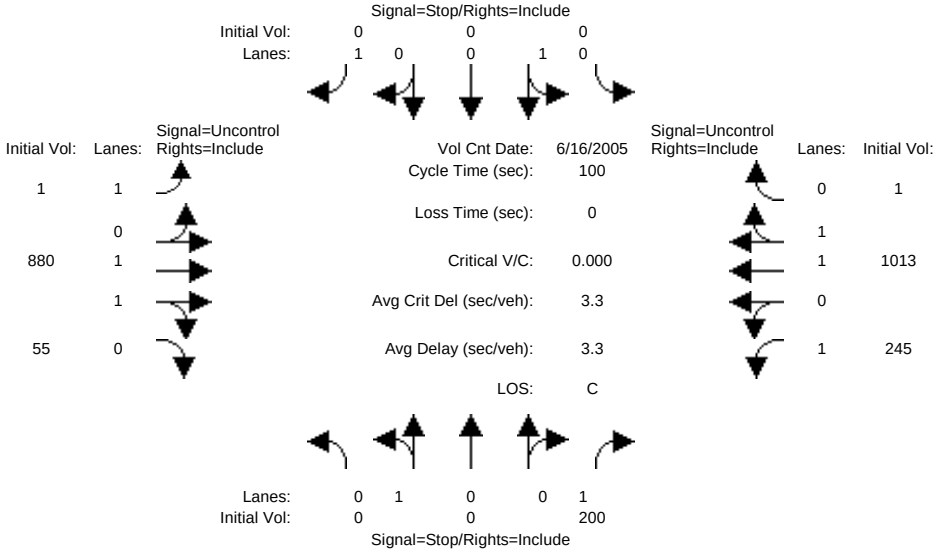
Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3139	1461	3335	3034	1466	3335	3381		3335	1810	1504
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3139	1461	3335	3034	1466	3335	3381		3335	1810	1504
Volume (vph)	348	694	321	38	809	225	250	251	27	259	279	323
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.81	0.81	0.81	0.88	0.88	0.88
Adj. Flow (vph)	374	746	345	42	889	247	309	310	33	294	317	367
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	198
Lane Group Flow (vph)	374	746	345	42	889	247	309	343	0	294	317	169
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	14.9	49.1	49.1	3.5	37.7	37.7	13.1	24.5		12.0	23.4	23.4
Effective Green, g (s)	14.4	52.4	52.4	3.0	41.0	41.0	14.0	25.4		12.9	24.3	24.3
Actuated g/C Ratio	0.13	0.48	0.48	0.03	0.37	0.37	0.13	0.23		0.12	0.22	0.22
Clearance Time (s)	3.5	7.3	7.3	3.5	7.3	7.3	4.9	4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	438	1499	698	91	1134	548	426	783		392	401	333
v/s Ratio Prot	c0.11	0.24		0.01	c0.29		c0.09	0.10		0.09	c0.18	
v/s Ratio Perm			0.24			0.17						0.11
v/c Ratio	0.85	0.50	0.49	0.46	0.78	0.45	0.73	0.44		0.75	0.79	0.51
Uniform Delay, d1	46.6	19.6	19.6	52.6	30.4	25.9	46.0	36.0		46.8	40.3	37.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.4	1.2	2.5	1.3	5.5	2.7	5.1	0.4		7.0	10.2	1.2
Delay (s)	61.0	20.8	22.1	53.9	35.9	28.5	51.1	36.4		53.8	50.5	38.7
Level of Service	E	C	C	D	D	C	D	D		D	D	D
Approach Delay (s)		31.4			35.0			43.4			47.1	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	109.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail PM

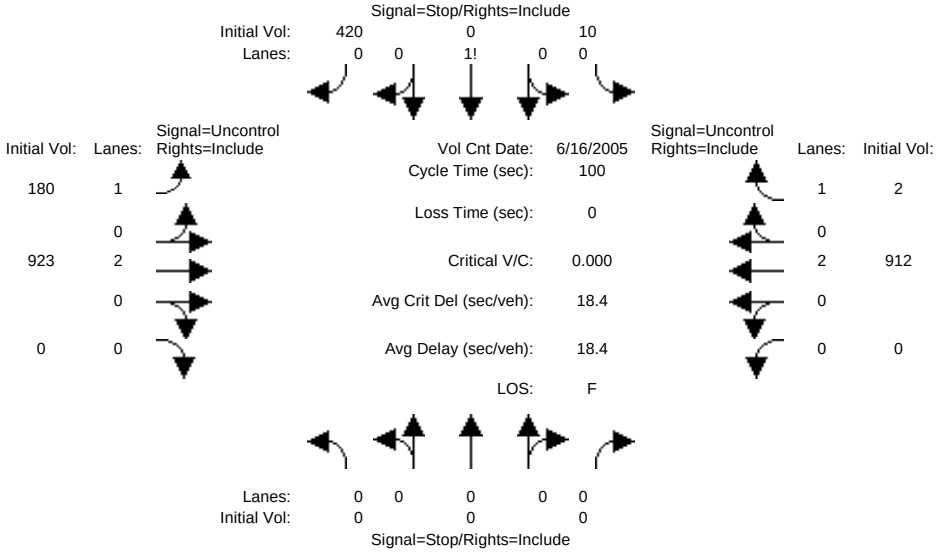
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	21	1	200	0	0	0	1	777	55	245	912	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	200	0	0	0	1	777	55	245	912	1
Added Vol:	0	0	0	0	0	0	0	103	0	0	101	0
Union LT Re:	-21	-1	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	200	0	0	0	1	880	55	245	1013	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.79	0.95	0.79	0.95	0.95	0.95	0.95	0.88	0.88	0.86	0.86	0.95
PHF Volume:	0	0	254	0	0	0	1	996	62	283	1172	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	254	0	0	0	1	996	62	283	1172	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2182	2769	529	2239	2799	586	1173	xxxx	xxxxx	1058	xxxx	xxxxx
Potent Cap.:	40	20	499	24	19	458	603	xxxx	xxxxx	666	xxxx	xxxxx
Move Cap.:	27	11	499	8	11	458	603	xxxx	xxxxx	666	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.51	0.00	0.00	0.00	0.00	xxxx	xxxx	0.43	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	2.8	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	2.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	19.4	xxxxx	xxxx	xxxxx	11.0	xxxx	xxxxx	14.4	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	B	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	19.4			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	C			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail PM

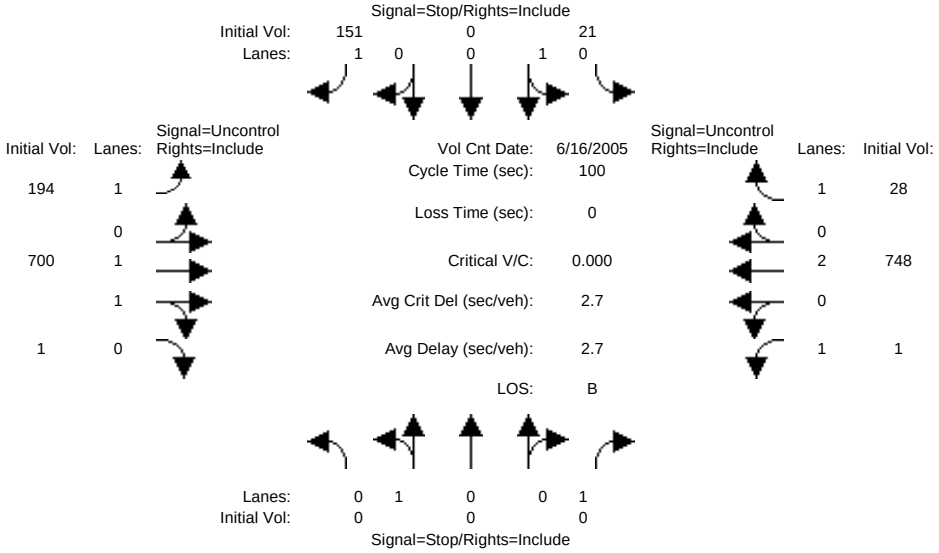
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	0	0	0	10	0	405	165	835	0	0	826	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	405	165	835	0	0	826	2
Added Vol:	0	0	0	0	0	15	15	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	420	180	923	0	0	912	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.82	0.95	0.82	0.88	0.88	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	12	0	514	204	1045	0	0	1055	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	12	0	514	204	1045	0	0	1055	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1985	2507	527	1057	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	55	29	501	666	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	42	20	501	666	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	0	92	xxxxx	215	132	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.06	0.00	1.03	0.31	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	486	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	16.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	94.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			94.3			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail PM

Intersection #8: SR 46E/Jardine Road

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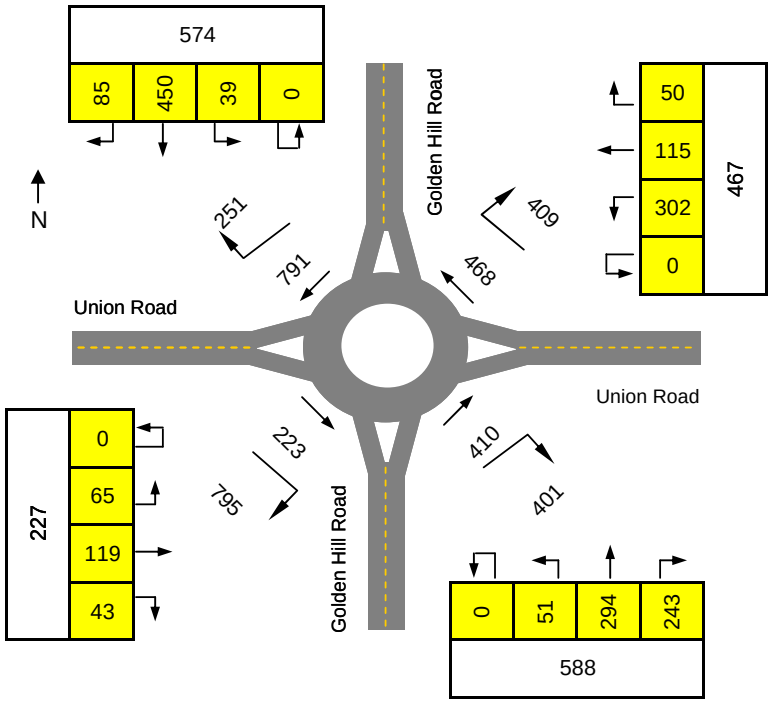
Street Name:           Jardine Road                    SR 46 E
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM
Base Vol:       0    0     0    21    0   151   194  612     1     1  662    28
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    21    0   151   194  612     1     1  662    28
Added Vol:      0    0     0     0    0     0     0   88     0     0   86     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    21    0   151   194  700     1     1  748    28
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.84 0.84  0.84  0.88 0.88  0.95  0.95 0.86  0.86
PHF Volume:     0    0     0    25    0   181   220  792     1     1  865    32
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    25    0   181   220  792     1     1  865    32
Critical Gap Module:
Critical Gp:  7.5  6.5   6.9   6.8  6.5   6.9   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1667 2132   397  1703 2100   433   898 xxxx xxxxx   793 xxxx xxxxx
Potent Cap.:   65   50   608    84   52   577   765 xxxx xxxxx   837 xxxx xxxxx
Move Cap.:     34   36   608    66   37   577   765 xxxx xxxxx   837 xxxx xxxxx
Total Cap:    123  127 xxxxx   254  171 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.10 0.00  0.31  0.29 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   1.3   1.2 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx  14.1  11.6 xxxx xxxxx   9.3 xxxx xxxxx
LOS by Move:   *    *     *     *    *     B     B    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0 xxxx xxxxx   254 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx  20.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     C    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx            14.9           xxxxxx           xxxxxx
ApproachLOS:         *              B                *                *
```


ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)					1		
Period (hr)	0.25	Date	6/16/2005	E-W	Union Road		
PHF	0.92	Time	PM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	588	223	1090	0.59	8	A	100
South	574	468	957	0.65	11	B	125
East	227	791	783	0.32	7	A	25
West	467	410	989	0.51	7	A	75
All	1856				8	A	



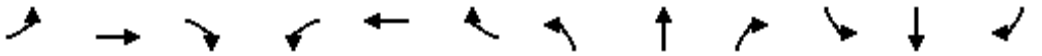
Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***



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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.95		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.72	1.00						0.95	1.00
Satd. Flow (prot)		4668		2265	3343						1388	1404
Flt Permitted		1.00		0.72	1.00						0.95	1.00
Satd. Flow (perm)		4668		2265	3343						1388	1404
Volume (vph)	0	648	302	884	999	0	0	0	0	251	0	151
Peak-hour factor, PHF	1.00	0.90	0.90	0.90	0.90	0.90	1.00	1.00	1.00	0.84	0.84	0.84
Adj. Flow (vph)	0	720	336	982	1110	0	0	0	0	299	0	180
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	97
Lane Group Flow (vph)	0	1056	0	982	1110	0	0	0	0	0	299	83
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		23.2		40.2	67.5						23.1	23.1
Effective Green, g (s)		23.8		41.0	68.8						23.2	23.2
Actuated g/C Ratio		0.24		0.41	0.69						0.23	0.23
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1111		929	2300						322	326
v/s Ratio Prot		c0.23		c0.43	0.33							
v/s Ratio Perm											0.22	0.06
v/c Ratio		0.95		1.06	0.48						0.93	0.26
Uniform Delay, d1		37.5		29.5	7.3						37.6	31.3
Progression Factor		1.00		0.59	0.52						1.00	1.00
Incremental Delay, d2		17.4		39.2	0.5						31.8	0.4
Delay (s)		55.0		56.6	4.3						69.4	31.8
Level of Service		D		E	A						E	C
Approach Delay (s)		55.0			28.8			0.0			55.3	
Approach LOS		D			C			A			E	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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			*0.91			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1467	3252			5966			1556	1429			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1467	3252			5966			1556	1429			
Volume (vph)	90	809	0	0	1530	170	351	0	643	0	0	0
Peak-hour factor, PHF	0.90	0.90	1.00	1.00	0.90	0.90	0.94	0.94	0.94	1.00	1.00	1.00
Adj. Flow (vph)	100	899	0	0	1700	189	373	0	684	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	89	0	0	0
Lane Group Flow (vph)	100	899	0	0	1889	0	0	373	595	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	10.1	50.9			35.7			38.9	38.9			
Effective Green, g (s)	10.1	52.0			37.9			40.0	40.0			
Actuated g/C Ratio	0.10	0.52			0.38			0.40	0.40			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	148	1691			2261			622	572			
v/s Ratio Prot	c0.07	0.28			c0.32			0.24				
v/s Ratio Perm									c0.42			
v/c Ratio	0.68	0.53			0.84			0.60	1.04			
Uniform Delay, d1	43.4	15.9			28.2			23.7	30.0			
Progression Factor	1.83	0.21			1.00			1.00	1.00			
Incremental Delay, d2	4.1	0.4			3.8			2.1	48.3			
Delay (s)	83.6	3.7			32.1			25.8	78.3			
Level of Service	F	A			C			C	E			
Approach Delay (s)		11.7			32.1			59.7			0.0	
Approach LOS		B			C			E			A	

Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

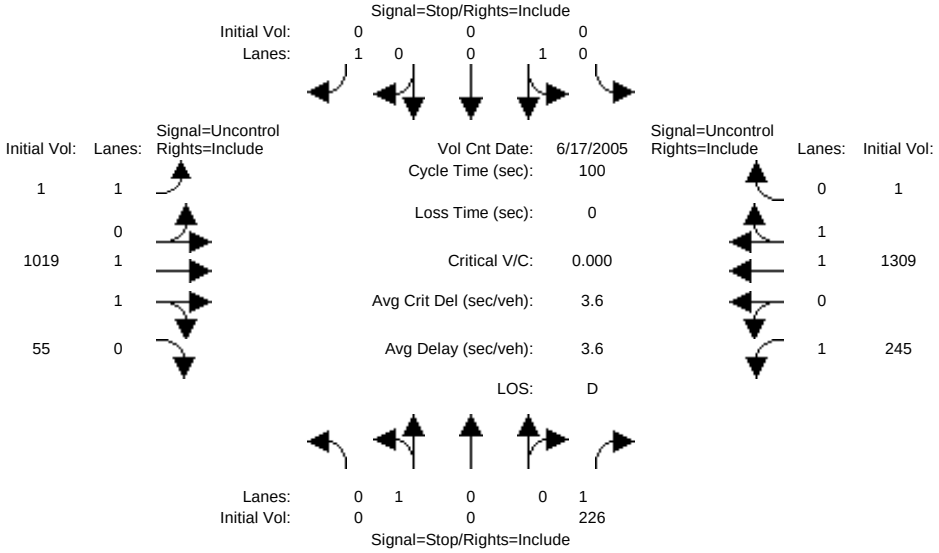
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3139	1538	3335	3112	1538	3335	3374		3335	1810	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3139	1538	3335	3112	1538	3335	3374		3335	1810	1538
Volume (vph)	348	825	321	38	1113	225	250	251	35	259	279	323
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.82	0.82	0.82
Adj. Flow (vph)	387	917	357	42	1237	250	269	270	38	316	340	394
RTOR Reduction (vph)	0	0	181	0	0	151	0	10	0	0	0	158
Lane Group Flow (vph)	387	917	176	42	1237	99	269	298	0	316	340	236
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	14.6	52.5	52.5	3.6	41.5	41.5	12.4	25.5		12.4	25.5	25.5
Effective Green, g (s)	14.1	55.8	55.8	3.1	44.8	44.8	11.9	26.4		11.9	26.4	26.4
Actuated g/C Ratio	0.12	0.49	0.49	0.03	0.40	0.40	0.11	0.23		0.11	0.23	0.23
Clearance Time (s)	3.5	7.3	7.3	3.5	7.3	7.3	3.5	4.9		3.5	4.9	4.9
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	2.0	3.5		2.0	3.5	3.5
Lane Grp Cap (vph)	415	1547	758	91	1232	609	351	787		351	422	359
v/s Ratio Prot	c0.12	0.29		0.01	c0.40		0.08	0.09		c0.09	c0.19	
v/s Ratio Perm			0.11			0.06						0.15
v/c Ratio	0.93	0.59	0.23	0.46	1.00	0.16	0.77	0.38		0.90	0.81	0.66
Uniform Delay, d1	49.1	20.6	16.4	54.2	34.2	22.1	49.3	36.5		50.1	41.0	39.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	27.5	0.6	0.2	1.3	26.6	0.1	8.7	0.4		24.5	11.0	4.5
Delay (s)	76.6	21.2	16.6	55.6	60.8	22.2	58.0	36.9		74.6	52.0	43.8
Level of Service	E	C	B	E	E	C	E	D		E	D	D
Approach Delay (s)		33.1			54.4			46.7			55.7	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	113.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail Fri PM

Intersection #5: SR 46E/Union Rd

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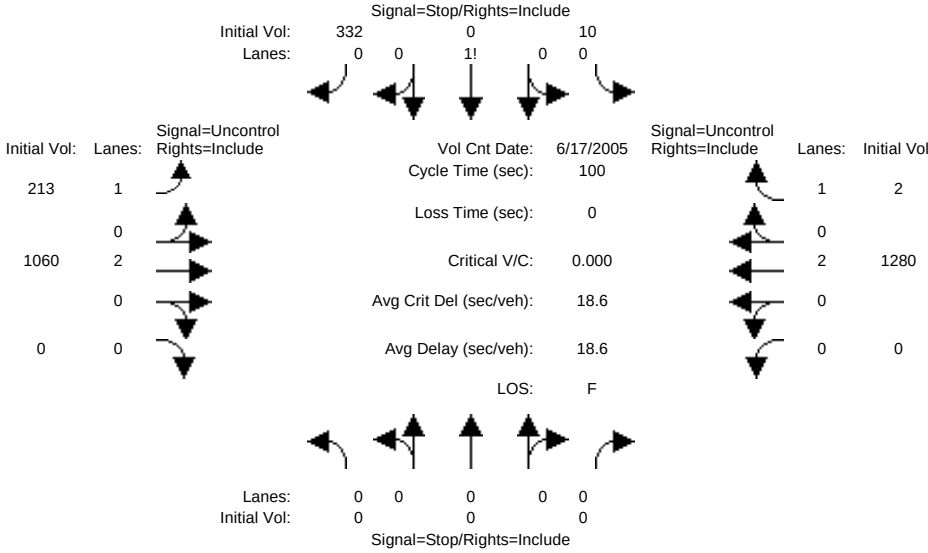
Street Name:             Union Rd                        SR 46E
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM
Base Vol:      21    1   226     0    0     0     1  916    55   245 1208     1
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   21    1   226     0    0     0     1  916    55   245 1208     1
Added Vol:      0    0     0     0    0     0     0  103     0     0  101     0
Union LT Re:  -21   -1     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0   226     0    0     0     1 1019    55   245 1309     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.85 0.85  0.85  0.95 0.95  0.95  0.95 0.86  0.86  0.86 0.86  0.86
PHF Volume:     0    0   267     0    0     0     1 1192    64   287 1531     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0   267     0    0     0     1 1192    64   287 1531     1
Critical Gap Module:
Critical Gp:  6.8  6.5   6.9   7.5  6.5   6.9   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 2565 3331   628  2703 3363   766  1532 xxxx xxxxx  1256 xxxx xxxxx
Potent Cap.:   22    8   431    10    8   350   440 xxxx xxxxx   561 xxxx xxxxx
Move Cap.:     13    4   431     2    4   350   440 xxxx xxxxx   561 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.62  0.00 0.00  0.00  0.00 xxxx  xxxx  0.51 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   4.1  xxxx xxxx xxxxx   0.0 xxxx xxxxx   2.9 xxxx xxxxx
Control Del:xxxxx xxxx  26.1 xxxxx xxxx xxxxx  13.2 xxxx xxxxx  17.9 xxxx xxxxx
LOS by Move:    *    *     D     *    *     *     B    *     *     C    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0 xxxx xxxxx     0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      26.1           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        D              *                *                *
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail Fri PM

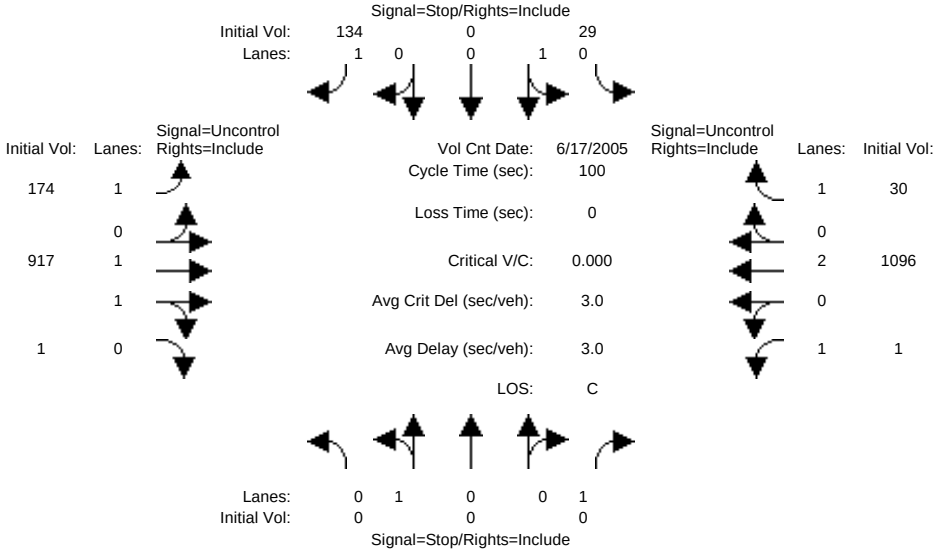
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	0	0	0	10	0	317	198	972	0	0	1194	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	317	198	972	0	0	1194	2
Added Vol:	0	0	0	0	0	15	15	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	332	213	1060	0	0	1280	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.86	0.95	0.86	0.86	0.86	0.95	0.95	0.86	0.86
PHF Volume:	0	0	0	12	0	388	249	1240	0	0	1497	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	12	0	388	249	1240	0	0	1497	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2615	3235	749	1499	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	20	10	359	453	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	11	4	359	453	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	0	0	xxxxx	113	62	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.10	0.00	1.08	0.55	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	3.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	22.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	C	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	338	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	16.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	143	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			143.4			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

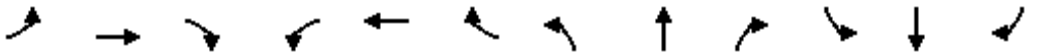
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Retail Fri PM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Volume Module: >> Count Date: 17 Jun 2005 << Summertime Fri PM												
Base Vol:	0	0	0	29	0	134	174	829	1	1	1010	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	134	174	829	1	1	1010	30
Added Vol:	0	0	0	0	0	0	0	88	0	0	86	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	29	0	134	174	917	1	1	1096	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.69	0.69	0.69	0.86	0.86	0.86	0.86	0.86	0.86
PHF Volume:	0	0	0	42	0	193	204	1073	1	1	1282	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	42	0	193	204	1073	1	1	1282	35
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2123	2799	537	2227	2765	641	1317	xxxx	xxxxx	1074	xxxx	xxxxx
Potent Cap.:	29	19	494	37	20	422	532	xxxx	xxxxx	657	xxxx	xxxxx
Move Cap.:	11	12	494	26	12	422	532	xxxx	xxxxx	657	xxxx	xxxxx
Total Cap:	30	24	xxxxx	176	111	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.24	0.00	0.46	0.38	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	2.3	1.8	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	20.5	15.9	xxxx	xxxxx	10.5	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	C	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	0	xxxx	xxxxx	176	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	31.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	D	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			22.5			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

NEAR-TERM CUMULATIVE INTERSECTION LOS CALCULATIONS

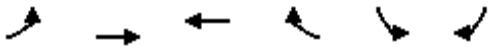


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3438	1429	1597	3406						1373	1223
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3438	1429	1597	3406						1373	1223
Volume (vph)	0	710	338	638	763	0	0	0	0	176	1	57
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	747	356	672	803	0	0	0	0	185	1	60
RTOR Reduction (vph)	0	0	153	0	0	0	0	0	0	0	0	49
Lane Group Flow (vph)	0	747	203	672	803	0	0	0	0	0	186	11
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		26.0	26.0	38.0	68.1						17.5	17.5
Effective Green, g (s)		26.6	26.6	38.8	69.4						17.6	17.6
Actuated g/C Ratio		0.28	0.28	0.41	0.73						0.19	0.19
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		963	400	652	2488						254	227
v/s Ratio Prot		c0.22		c0.42	0.24							
v/s Ratio Perm			0.14								0.14	0.01
v/c Ratio		0.78	0.51	1.03	0.32						0.73	0.05
Uniform Delay, d1		31.5	28.7	28.1	4.5						36.5	31.8
Progression Factor		1.00	1.00	1.27	0.25						1.00	1.00
Incremental Delay, d2		6.1	4.6	35.1	0.2						10.4	0.1
Delay (s)		37.6	33.3	70.6	1.4						46.9	31.9
Level of Service		D	C	E	A						D	C
Approach Delay (s)		36.2			32.9			0.0			43.2	
Approach LOS		D			C			A			D	

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1399	3374			3209		1570	1404				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1399	3374			3209		1570	1404				
Volume (vph)	71	809	0	0	1166	143	221	0	1098	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	852	0	0	1227	151	233	0	1156	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	75	852	0	0	1378	0	233	1156	0	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	8.6	60.8			47.1		24.0	24.0				
Effective Green, g (s)	8.6	61.9			49.3		25.1	25.1				
Actuated g/C Ratio	0.09	0.65			0.52		0.26	0.26				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	127	2198			1665		415	371				
v/s Ratio Prot	c0.05	0.25			c0.43		0.15	c0.82				
v/s Ratio Perm												
v/c Ratio	0.59	0.39			0.83		0.56	3.12				
Uniform Delay, d1	41.5	7.7			19.3		30.2	35.0				
Progression Factor	1.34	0.09			1.00		1.00	1.00				
Incremental Delay, d2	4.4	0.3			4.9		2.5	959.2				
Delay (s)	60.0	1.0			24.2		32.7	994.2				
Level of Service	E	A			C		C	F				
Approach Delay (s)		5.8			24.2			832.9			0.0	
Approach LOS		A			C			F			A	

Intersection Summary			
HCM Average Control Delay	323.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	118.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		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)	1719	3223	3163		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3223	3163		1719	1538
Volume (vph)	236	1671	1106	215	186	237
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	248	1759	1164	226	196	249
RTOR Reduction (vph)	0	0	0	0	0	194
Lane Group Flow (vph)	248	1759	1390	0	196	55
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	12%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	21.4	114.3	52.7		24.5	24.5
Effective Green, g (s)	20.9	114.3	56.0		25.4	25.4
Actuated g/C Ratio	0.18	1.00	0.49		0.22	0.22
Clearance Time (s)	3.5		7.3		4.9	4.9
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	314	3223	1550		382	342
v/s Ratio Prot	c0.14	c0.55	c0.44		0.11	
v/s Ratio Perm						0.04
v/c Ratio	0.79	0.55	0.90		0.51	0.16
Uniform Delay, d1	44.6	0.0	26.5		39.0	35.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.8	0.2	7.4		1.4	0.3
Delay (s)	57.4	0.2	33.9		40.4	36.1
Level of Service	E	A	C		D	D
Approach Delay (s)		7.3	33.9		38.0	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	114.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.

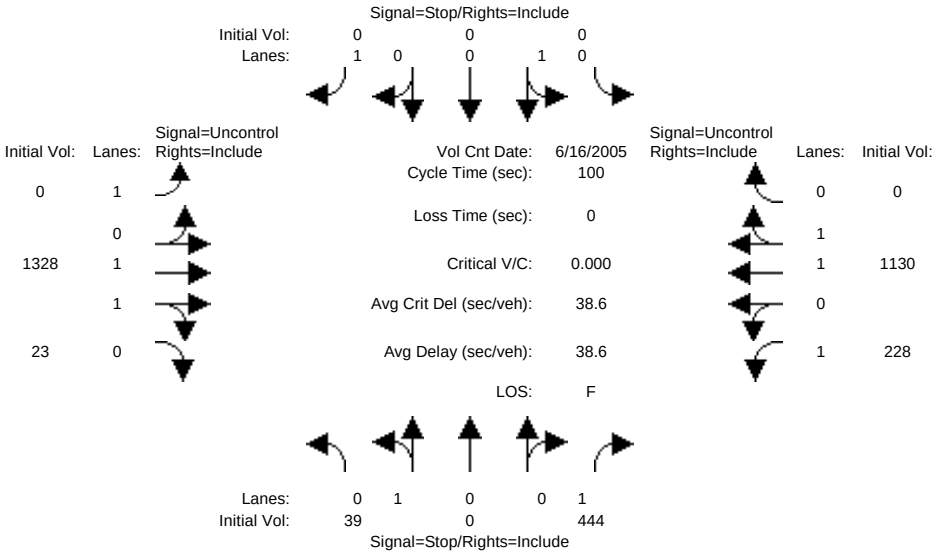
c Critical Lane Group

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		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.96		1.00	0.96			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1719	3046		1719	3059			1739			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (perm)	1719	3046		1719	3059			1739			1673	
Volume (vph)	612	966	331	113	740	313	332	602	180	328	231	342
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	644	1017	348	119	779	329	349	634	189	345	243	360
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	644	1365	0	119	1108	0	0	1172	0	0	948	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	20.0	64.0		16.0	60.0			50.0			30.4	
Effective Green, g (s)	19.5	67.3		15.5	63.3			50.9			31.3	
Actuated g/C Ratio	0.11	0.37		0.09	0.35			0.28			0.17	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	185	1133		147	1070			489			289	
v/s Ratio Prot	c0.37	c0.45		0.07	0.36			c0.67			c0.57	
v/s Ratio Perm												
v/c Ratio	3.48	1.20		0.81	1.04			2.40			3.28	
Uniform Delay, d1	80.8	56.8		81.3	58.8			65.1			74.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1130.0	100.7		25.6	37.1			634.8			1035.0	
Delay (s)	1210.7	157.5		106.9	96.0			699.8			1109.9	
Level of Service	F	F		F	F			F			F	
Approach Delay (s)		495.2			97.0			699.8			1109.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	557.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.21		
Actuated Cycle Length (s)	181.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	149.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul AM

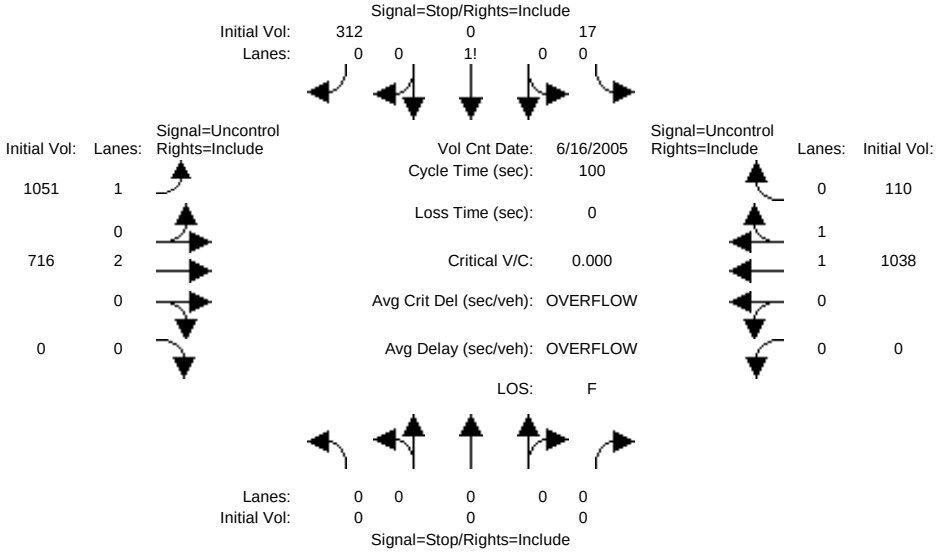
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertiime AM												
Base Vol:	39	0	250	0	0	0	0	658	23	223	813	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	0	250	0	0	0	0	658	23	223	813	0
Added Vol:	0	0	194	0	0	0	0	670	0	5	317	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	39	0	444	0	0	0	0	1328	23	228	1130	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	41	0	467	0	0	0	0	1398	24	240	1189	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	41	0	467	0	0	0	0	1398	24	240	1189	0
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2485	3079	711	2368	3092	595	xxxx	xxxx	xxxxx	1422	xxxx	xxxxx
Potent Cap.:	25	12	380	19	12	453	xxxx	xxxx	xxxxx	485	xxxx	xxxxx
Move Cap.:	15	6	380	0	6	453	xxxx	xxxx	xxxxx	485	xxxx	xxxxx
Volume/Cap:	2.69	0.00	1.23	xxxx	0.00	0.00	xxxx	xxxx	xxxx	0.49	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	19.8	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.7	xxxx	xxxxx
Control Del:	xxxxx	xxxx	155.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	19.5	xxxx	xxxxx
LOS by Move:	*	*	F	*	*	*	*	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	15	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	5.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	1278	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	245.9			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul AM

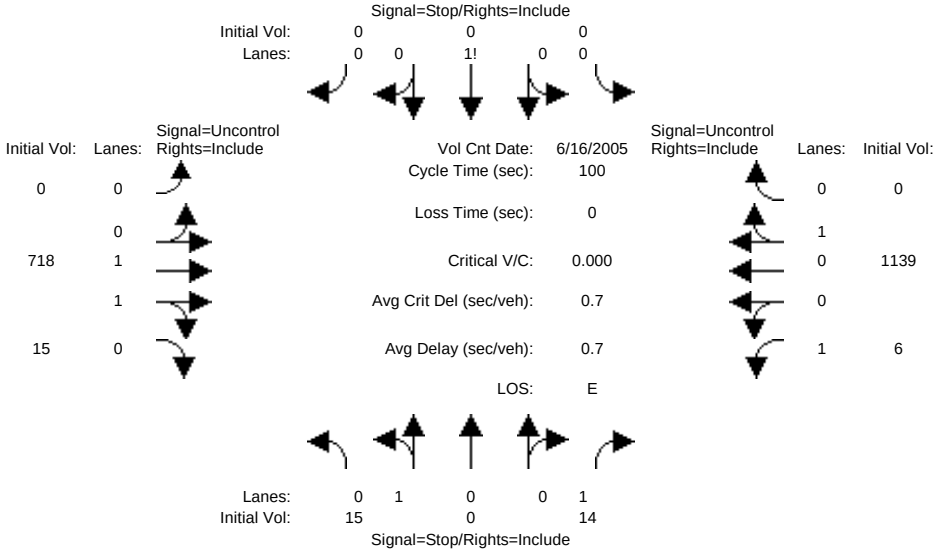
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	2	0	155	305	599	0	0	873	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	2	0	155	305	599	0	0	873	17
Added Vol:	0	0	0	15	0	157	746	117	0	0	165	93
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	17	0	312	1051	716	0	0	1038	110
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	18	0	328	1106	754	0	0	1093	116
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	18	0	328	1106	754	0	0	1093	116
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	3740	4117	604	1208	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	3	2	446	584	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	0	0	446	584	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	0.74	1.89	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	71.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	425.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	F	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul AM

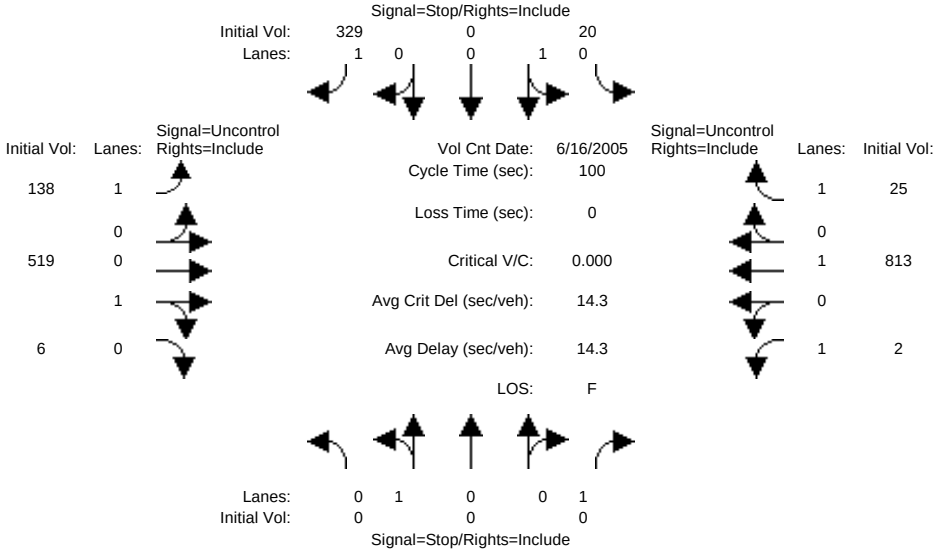
Intersection #7: SR 46E/Mill Road



Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	15	0	14	0	0	0	0	585	15	6	881	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	15	0	14	0	0	0	0	585	15	6	881	0
Added Vol:	0	0	0	0	0	0	0	133	0	0	258	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	15	0	14	0	0	0	0	718	15	6	1139	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	16	0	15	0	0	0	0	756	16	6	1199	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	16	0	15	0	0	0	0	756	16	6	1199	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1975	1975	386	1589	1983	1199	xxxx	xxxx	xxxxx	772	xxxx	xxxxx
Potent Cap.:	69	63	666	88	62	228	xxxx	xxxx	xxxxx	852	xxxx	xxxxx
Move Cap.:	69	62	666	85	62	228	xxxx	xxxx	xxxxx	852	xxxx	xxxxx
Volume/Cap:	0.23	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	10.5	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.3	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	69	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	72.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	42.5			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	E			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul AM

Intersection #8: SR 46E/Jardine Road

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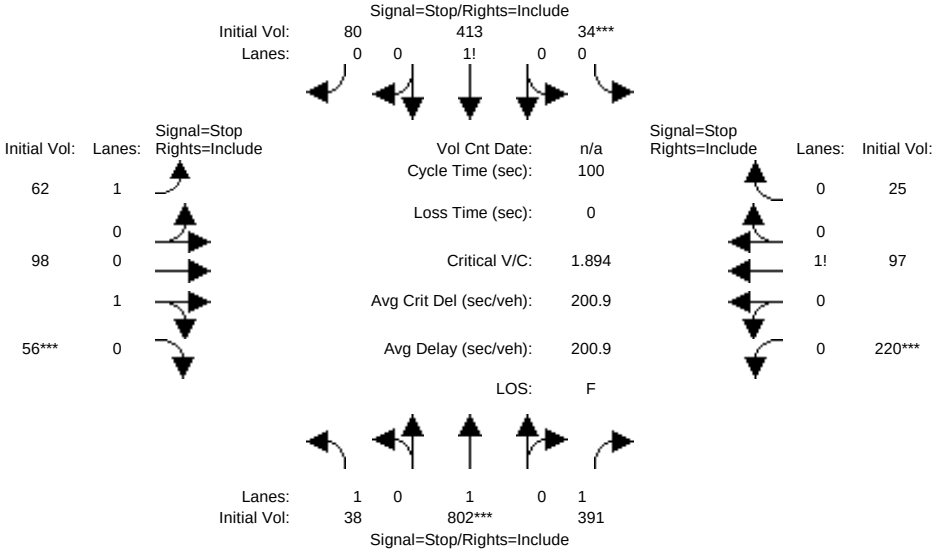
Street Name:           Jardine Road                    SR 46 E
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM
Base Vol:       0    0     0    19    0   323    92  432     6     2  562    17
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    19    0   323    92  432     6     2  562    17
Added Vol:      0    0     0     1    0     6    46   87     0     0  251     8
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    20    0   329   138  519     6     2  813    25
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0    21    0   346   145  546     6     2  856    26
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    21    0   346   145  546     6     2  856    26
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   6.4  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1886 1726   549  1700 1703   856   882 xxxx xxxxx   553 xxxx xxxxx
Potent Cap.:   54   90   539   102   93   361   775 xxxx xxxxx  1028 xxxx xxxxx
Move Cap.:      2   73   539    88   75   361   775 xxxx xxxxx  1028 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.24 0.00  0.96  0.19 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx  10.5   0.7 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx  72.4  10.7 xxxx xxxxx   8.5 xxxx xxxxx
LOS by Move:   *    *     *     *    *     F     B    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0 xxxx xxxxx    88 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx  58.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     F    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx            71.6           xxxxxx           xxxxxx
ApproachLOS:         *              F                *                *
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Near Term Cumul AM

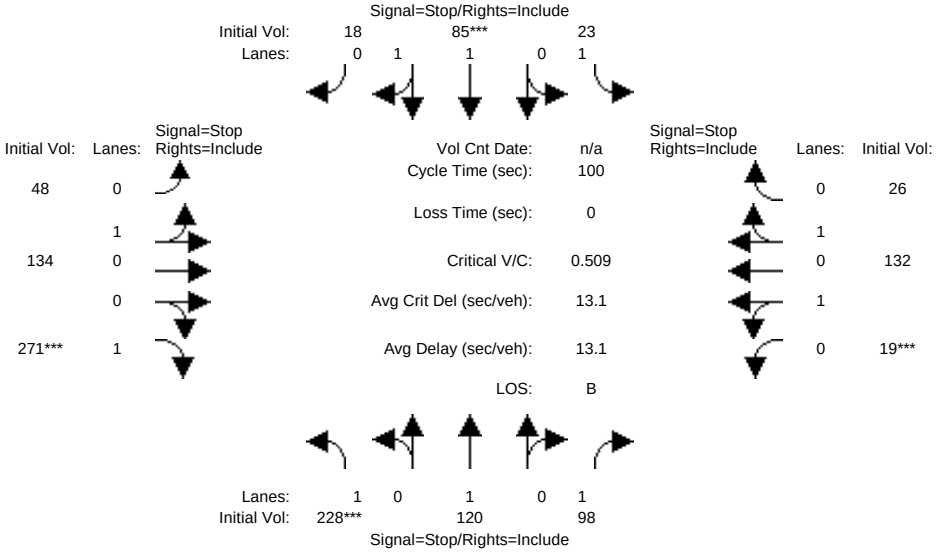
Intersection #9: Golden Hill/Union



Street Name:	Golden Hill Road						Union Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module: Summertime AM												
Base Vol:	38	265	211	34	249	55	32	84	56	217	95	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38	265	211	34	249	55	32	84	56	217	95	25
Added Vol:	0	537	180	0	164	25	30	14	0	3	2	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	38	802	391	34	413	80	62	98	56	220	97	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	40	844	412	36	435	84	65	103	59	232	102	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	844	412	36	435	84	65	103	59	232	102	26
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	40	844	412	36	435	84	65	103	59	232	102	26
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	0.06	0.79	0.15	1.00	0.64	0.36	0.65	0.28	0.07
Final Sat.:	418	446	488	28	343	66	368	254	145	266	117	30
Capacity Analysis Module:												
Vol/Sat:	0.10	1.89	0.84	1.27	1.27	1.27	0.18	0.41	0.41	0.87	0.87	0.87
Crit Moves:		****		****					****	****		
Delay/Veh:	12.2	430	38.4	162.2	162	162.2	14.3	17.2	17.2	47.3	47.3	47.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	12.2	430	38.4	162.2	162	162.2	14.3	17.2	17.2	47.3	47.3	47.3
LOS by Move:	B	F	E	F	F	F	B	C	C	E	E	E
ApproachDel:		292.5			162.2			16.4			47.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		292.5			162.2			16.4			47.3	
LOS by Appr:		F			F			C			E	
AllWayAvgQ:	0.1	51.9	3.8	18.4	18.4	18.4	0.2	0.6	0.6	4.1	4.1	4.1

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Near Term Cumul AM

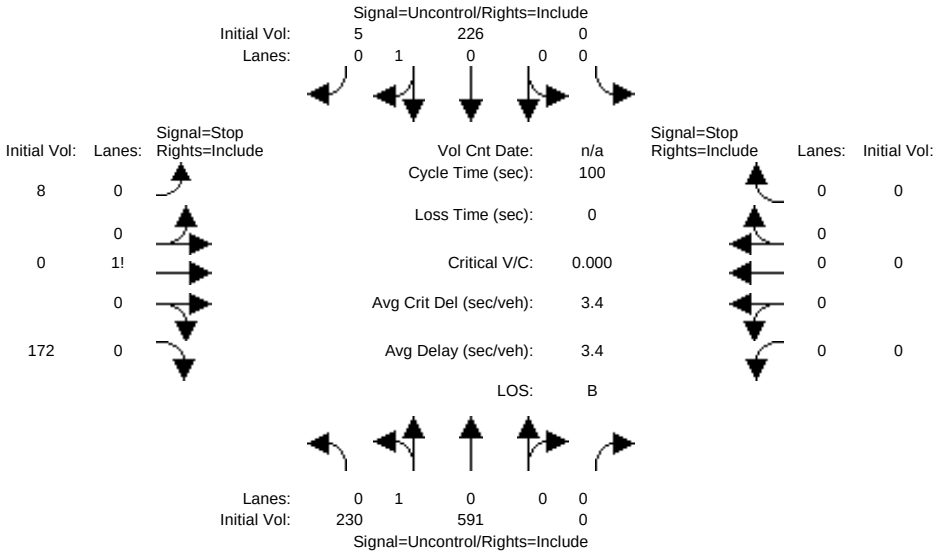
Intersection #10: Buena Vista/Dallons



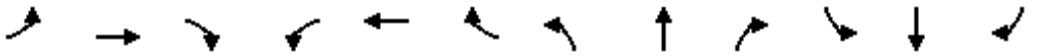
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	228	114	98	7	49	18	48	72	271	19	81	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	228	114	98	7	49	18	48	72	271	19	81	13
Added Vol:	0	6	0	16	36	0	0	62	0	0	51	13
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	228	120	98	23	85	18	48	134	271	19	132	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	240	126	103	24	89	19	51	141	285	20	139	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	240	126	103	24	89	19	51	141	285	20	139	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	240	126	103	24	89	19	51	141	285	20	139	27
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.65	0.35	0.26	0.74	1.00	0.21	1.50	0.29
Final Sat.:	472	502	554	409	726	157	137	382	591	103	730	147
Capacity Analysis Module:												
Vol/Sat:	0.51	0.25	0.19	0.06	0.12	0.12	0.37	0.37	0.48	0.19	0.19	0.19
Crit Moves:	****				****				****	****		
Delay/Veh:	17.1	11.8	10.2	11.3	11.2	11.1	13.1	13.1	13.6	11.4	11.2	10.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	17.1	11.8	10.2	11.3	11.2	11.1	13.1	13.1	13.6	11.4	11.2	10.9
LOS by Move:	C	B	B	B	B	B	B	B	B	B	B	B
ApproachDel:		14.1			11.2			13.4			11.1	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		14.1			11.2			13.4			11.1	
LOS by Appr:		B			B			B			B	
AllWayAvgQ:	0.9	0.3	0.2	0.1	0.1	0.1	0.5	0.5	0.8	0.2	0.2	0.2

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul AM

Intersection #11: Golden Hill Rd/Dallons Rd



Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:												
Base Vol:	168	84	0	0	114	3	7	0	121	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	168	84	0	0	114	3	7	0	121	0	0	0
Added Vol:	62	507	0	0	112	2	1	0	51	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	230	591	0	0	226	5	8	0	172	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	242	622	0	0	238	5	8	0	181	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	242	622	0	0	238	5	8	0	181	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	243	xxxx	xxxxx	xxxx	xxxx	xxxxx	1347	1347	241	xxxx	xxxx	xxxxx
Potent Cap.:	1335	xxxx	xxxxx	xxxx	xxxx	xxxxx	168	153	803	xxxx	xxxx	xxxxx
Move Cap.:	1335	xxxx	xxxxx	xxxx	xxxx	xxxxx	141	121	803	xxxx	xxxx	xxxxx
Volume/Cap:	0.18	xxxx	xxxx	xxxx	xxxx	xxxx	0.06	0.00	0.23	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.7	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	665	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	1.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	12.6	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	B	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			12.6			xxxxxx		
ApproachLOS:	*			*			B			*		

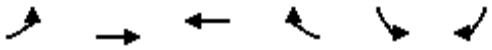


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	0.96	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3438	1477	1504	3343						1399	1404
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3438	1477	1504	3343						1399	1404
Volume (vph)	0	667	236	1174	1093	0	0	0	0	234	0	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	702	248	1236	1151	0	0	0	0	246	0	116
RTOR Reduction (vph)	0	0	118	0	0	0	0	0	0	0	0	79
Lane Group Flow (vph)	0	702	130	1236	1151	0	0	0	0	0	246	37
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		23.0	23.0	38.0	65.1						20.5	20.5
Effective Green, g (s)		23.6	23.6	38.8	66.4						20.6	20.6
Actuated g/C Ratio		0.25	0.25	0.41	0.70						0.22	0.22
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		854	367	614	2337						303	304
v/s Ratio Prot		c0.20		c0.82	0.34							
v/s Ratio Perm			0.09								0.18	0.03
v/c Ratio		0.82	0.35	2.01	0.49						0.81	0.12
Uniform Delay, d1		33.7	29.4	28.1	6.6						35.4	29.9
Progression Factor		1.00	1.00	1.18	0.32						1.00	1.00
Incremental Delay, d2		8.8	2.7	456.4	0.1						15.1	0.2
Delay (s)		42.5	32.1	489.5	2.1						50.5	30.1
Level of Service		D	C	F	A						D	C
Approach Delay (s)		39.8			254.5			0.0			44.0	
Approach LOS		D			F			A			D	

Intersection Summary			
HCM Average Control Delay	178.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

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				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		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)	1504	3282			3108		1570	1429				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1504	3282			3108		1570	1429				
Volume (vph)	95	806	0	0	1932	231	334	0	762	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	848	0	0	2034	243	352	0	802	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	100	848	0	0	2277	0	352	802	0	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	9.1	60.8			46.6		24.0	24.0				
Effective Green, g (s)	9.1	61.9			48.8		25.1	25.1				
Actuated g/C Ratio	0.10	0.65			0.51		0.26	0.26				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	144	2138			1597		415	378				
v/s Ratio Prot	c0.07	0.26			c0.73		0.22	c0.56				
v/s Ratio Perm												
v/c Ratio	0.69	0.40			1.43		0.85	2.12				
Uniform Delay, d1	41.6	7.8			23.1		33.1	35.0				
Progression Factor	1.31	0.06			1.00		1.00	1.00				
Incremental Delay, d2	7.8	0.3			195.3		15.9	513.6				
Delay (s)	62.2	0.8			218.4		49.0	548.6				
Level of Service	E	A			F		D	F				
Approach Delay (s)		7.2			218.4			396.2			0.0	
Approach LOS		A			F			F			A	

Intersection Summary			
HCM Average Control Delay	219.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	123.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	3223	3099		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3223	3099		1719	1538
Volume (vph)	129	1440	2014	112	102	149
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	136	1516	2120	118	107	157
RTOR Reduction (vph)	0	0	0	0	0	127
Lane Group Flow (vph)	136	1516	2238	0	107	30
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	16%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	14.3	110.6	60.5		20.1	20.1
Effective Green, g (s)	13.8	110.6	63.8		21.0	21.0
Actuated g/C Ratio	0.12	1.00	0.58		0.19	0.19
Clearance Time (s)	3.5		7.3		4.9	4.9
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	214	3223	1788		326	292
v/s Ratio Prot	c0.08	c0.47	c0.72		0.06	
v/s Ratio Perm						0.02
v/c Ratio	0.64	0.47	1.25		0.33	0.10
Uniform Delay, d1	46.0	0.0	23.4		38.7	37.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	0.1	118.1		0.7	0.2
Delay (s)	52.3	0.1	141.5		39.4	37.2
Level of Service	D	A	F		D	D
Approach Delay (s)		4.4	141.5		38.1	
Approach LOS		A	F		D	

Intersection Summary			
HCM Average Control Delay	80.4	HCM Level of Service	F
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.

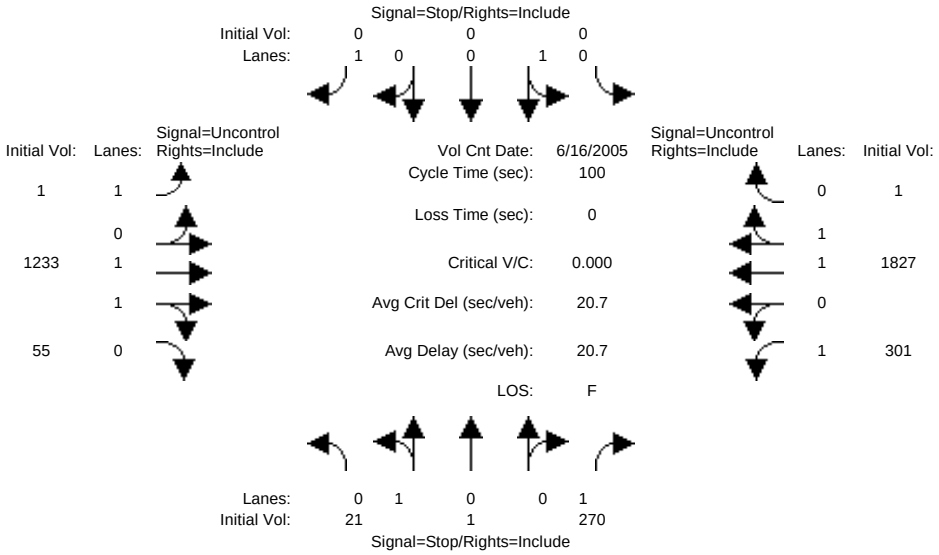
c Critical Lane Group

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		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.96		1.00	0.97			0.99			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1719	3027		1719	2980			1744			1670	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (perm)	1719	3027		1719	2980			1744			1670	
Volume (vph)	417	872	322	334	1268	284	238	311	66	394	575	661
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	918	339	352	1335	299	251	327	69	415	605	696
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	439	1257	0	352	1634	0	0	647	0	0	1716	0
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	20.0	60.0		20.0	60.0			50.0			30.4	
Effective Green, g (s)	19.5	63.3		19.5	63.3			50.9			31.3	
Actuated g/C Ratio	0.11	0.35		0.11	0.35			0.28			0.17	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	185	1059		185	1042			490			289	
v/s Ratio Prot	c0.26	0.42		0.20	c0.55			c0.37			c1.03	
v/s Ratio Perm												
v/c Ratio	2.37	1.19		1.90	1.57			1.32			5.94	
Uniform Delay, d1	80.8	58.8		80.8	58.8			65.1			74.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	634.2	93.8		425.8	260.3			158.0			2229.4	
Delay (s)	715.0	152.7		506.5	319.2			223.0			2304.3	
Level of Service	F	F		F	F			F			F	
Approach Delay (s)		298.2			352.4			223.0			2304.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	877.4	HCM Level of Service	F
HCM Volume to Capacity ratio	2.42		
Actuated Cycle Length (s)	181.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	183.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul PM

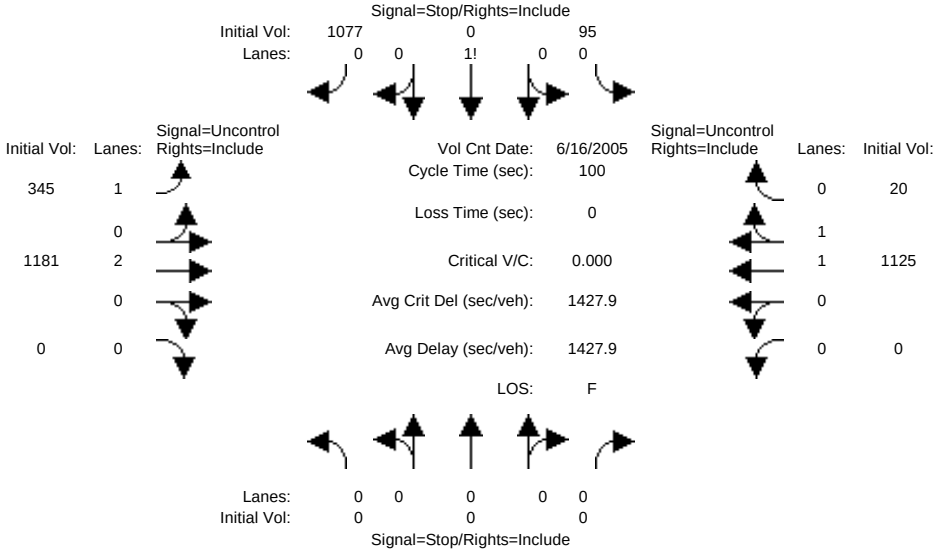
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	21	1	236	0	0	0	1	902	55	280	1041	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	236	0	0	0	1	902	55	280	1041	1
Added Vol:	0	0	34	0	0	0	0	331	0	21	786	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	1	270	0	0	0	1	1233	55	301	1827	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	22	1	284	0	0	0	1	1298	58	317	1923	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	22	1	284	0	0	0	1	1298	58	317	1923	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2924	3887	678	3209	3915	962	1924	xxxx	xxxxx	1356	xxxx	xxxxx
Potent Cap.:	12	4	399	4	3	260	311	xxxx	xxxxx	514	xxxx	xxxxx
Move Cap.:	6	1	399	0	1	260	311	xxxx	xxxxx	514	xxxx	xxxxx
Volume/Cap:	3.52	0.78	0.71	0.00	0.00	0.00	0.00	xxxx	xxxx	0.62	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	5.4	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	4.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	33.4	xxxxx	xxxx	xxxxx	16.6	xxxx	xxxxx	22.6	xxxx	xxxxx
LOS by Move:	*	*	D	*	*	*	C	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	5	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	4.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	2777	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	240.0			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul PM

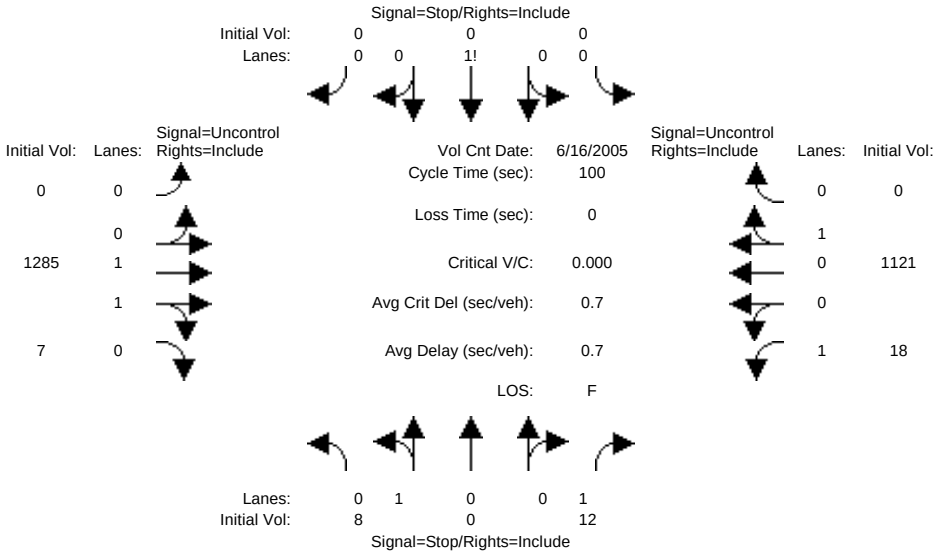
Intersection #6: SR 46E/Airport Rd




```
Street Name:            Airport Rd                      SR 46E
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM
Base Vol:       0    0     0    12    0   405   165  996     0     0  990     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    12    0   405   165  996     0     0  990     2
Added Vol:      0    0     0    83    0   672   180  185     0     0  135    18
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    95    0  1077   345 1181     0     0 1125    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0   100    0  1134   363 1243     0     0 1184    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0   100    0  1134   363 1243     0     0 1184    21
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.8  6.5   6.9   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  2543 3164   603  1205 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx    23   11   447   586 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx    12    4   447   586 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  8.69 0.00  2.53  0.62 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   4.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  20.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     C    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  110 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  144 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 4676 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    F     *     *    *     *     *    *     *
ApproachDel:    xxxxxx          4676.0          xxxxxx          xxxxxx
ApproachLOS:         *               F               *               *
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul PM

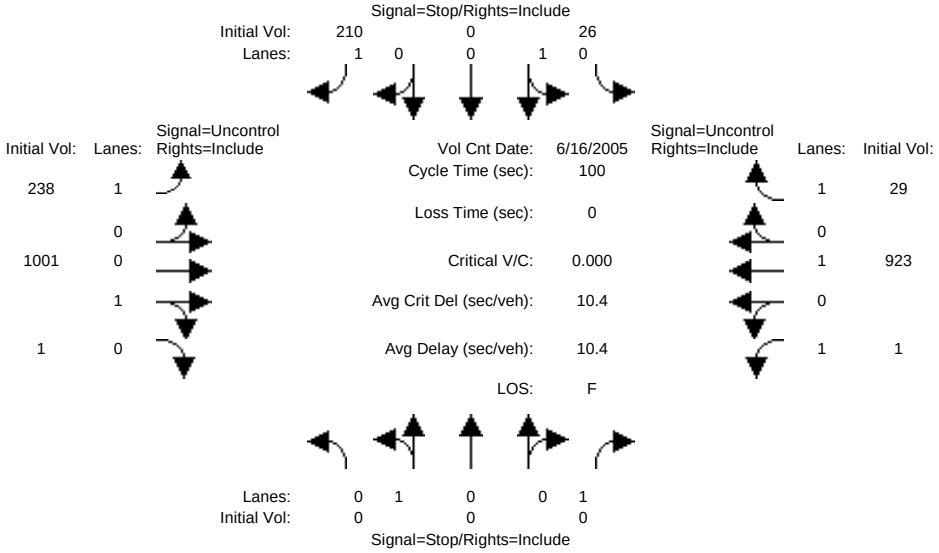
Intersection #7: SR 46E/Mill Road



Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	8	0	12	0	0	0	0	1017	7	18	968	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	0	12	0	0	0	0	1017	7	18	968	0
Added Vol:	0	0	0	0	0	0	0	268	0	0	153	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	0	12	0	0	0	0	1285	7	18	1121	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	8	0	13	0	0	0	0	1353	7	19	1180	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	8	0	13	0	0	0	0	1353	7	19	1180	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2574	2574	680	1894	2578	1180	xxxx	xxxx	xxxxx	1360	xxxx	xxxxx
Potent Cap.:	29	26	454	54	26	234	xxxx	xxxx	xxxxx	512	xxxx	xxxxx
Move Cap.:	28	25	454	51	25	234	xxxx	xxxx	xxxxx	512	xxxx	xxxxx
Volume/Cap:	0.30	0.00	0.03	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	13.1	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.3	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	28	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	181.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	80.4			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul PM

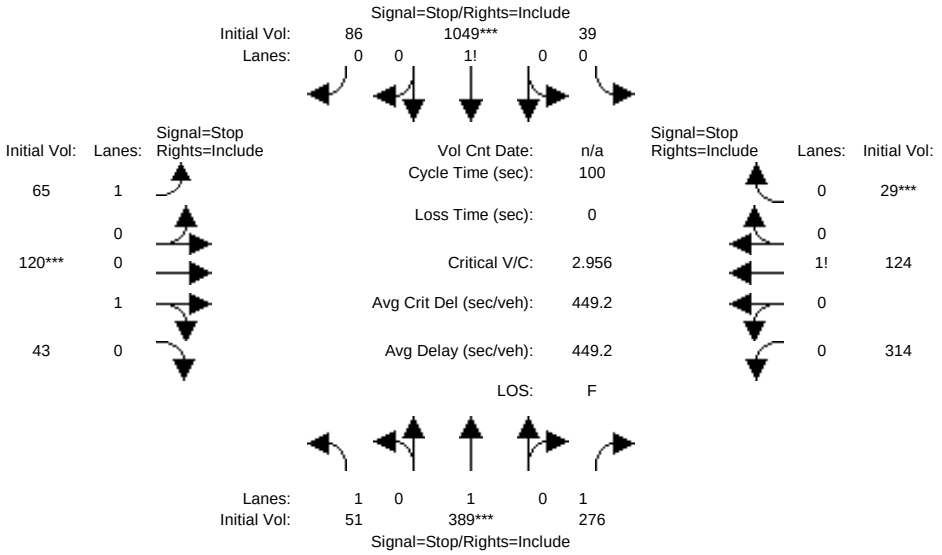
Intersection #8: SR 46E/Jardine Road




```
Street Name:           Jardine Road                    SR 46 E
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM
Base Vol:       0    0     0    21    0   182   234  737     1     1  798    28
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    21    0   182   234  737     1     1  798    28
Added Vol:      0    0     0     5    0    28     4  264     0     0  125     1
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    26    0   210   238 1001     1     1  923    29
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0    27    0   221   251 1054     1     1  972    31
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    27    0   221   251 1054     1     1  972    31
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   6.4  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 2655 2559  1054  2529 2529   972  1002 xxxx xxxxx  1055 xxxx xxxxx
Potent Cap.:   15   27   277    31   28   309   699 xxxx xxxxx   668 xxxx xxxxx
Move Cap.:      3   17   277    22   18   309   699 xxxx xxxxx   668 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  1.23 0.00  0.71  0.36 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   5.1   1.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx  41.2  13.0 xxxx xxxxx  10.4 xxxx xxxxx
LOS by Move:   *    *     *     *    *     E     B    *     *     B    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0 xxxx xxxxx    22 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   3.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx 523.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     F    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx            94.2           xxxxxx           xxxxxx
ApproachLOS:         *              F                *                *
```


Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Near Term Cumul PM

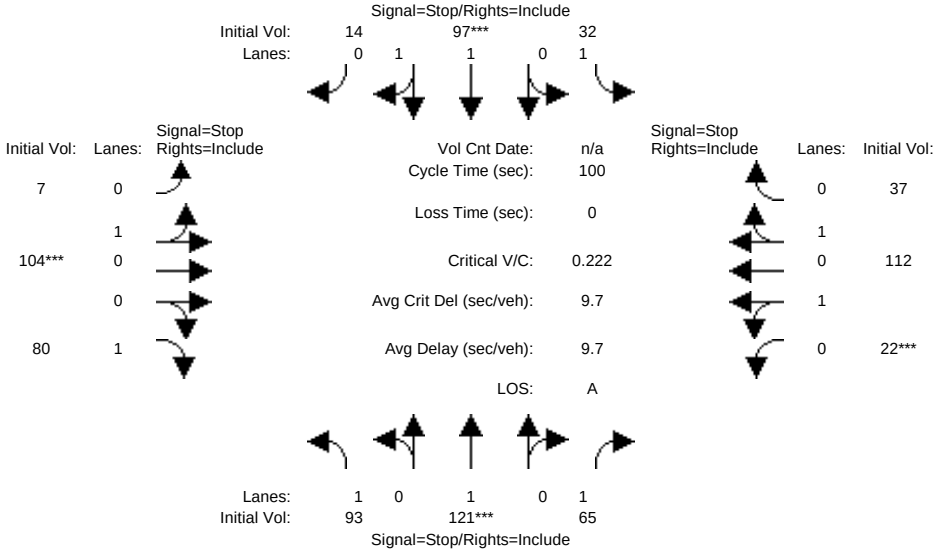
Intersection #9: Golden Hill/Union



Street Name:	Golden Hill Road						Union Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:	Summertime PM											
Base Vol:	51	202	243	39	357	47	27	119	43	302	115	29
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	51	202	243	39	357	47	27	119	43	302	115	29
Added Vol:	0	187	33	0	692	39	38	1	0	12	9	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	51	389	276	39	1049	86	65	120	43	314	124	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	54	409	291	41	1104	91	68	126	45	331	131	31
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	54	409	291	41	1104	91	68	126	45	331	131	31
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	54	409	291	41	1104	91	68	126	45	331	131	31
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	0.03	0.90	0.07	1.00	0.74	0.26	0.67	0.27	0.06
Final Sat.:	403	427	466	14	374	31	367	290	104	277	109	26
Capacity Analysis Module:												
Vol/Sat:	0.13	0.96	0.62	2.96	2.96	2.96	0.19	0.43	0.43	1.19	1.19	1.19
Crit Moves:		****			****			****				****
Delay/Veh:	13.0	62.7	22.4	904.7	905	904.7	14.7	18.5	18.5	136.8	137	136.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	13.0	62.7	22.4	904.7	905	904.7	14.7	18.5	18.5	136.8	137	136.8
LOS by Move:	B	F	C	F	F	F	B	C	C	F	F	F
ApproachDel:		43.6			904.7			17.4			136.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		43.6			904.7			17.4			136.8	
LOS by Appr:		E			F			C			F	
AllWayAvgQ:	0.2	6.1	1.5	104	104	103.7	0.2	0.7	0.7	14.3	14.3	14.3

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Near Term Cumul PM

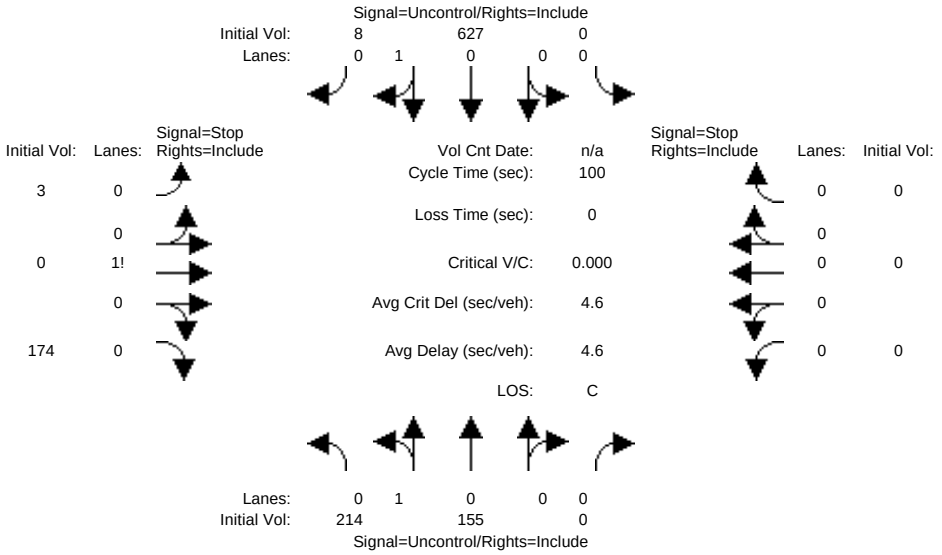
Intersection #10: Buena Vista/Dallons



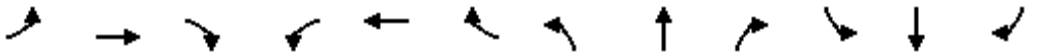
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	93	87	65	12	89	14	7	25	80	22	31	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	93	87	65	12	89	14	7	25	80	22	31	16
Added Vol:	0	34	0	20	8	0	0	79	0	0	81	21
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	93	121	65	32	97	14	7	104	80	22	112	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	98	127	68	34	102	15	7	109	84	23	118	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	98	127	68	34	102	15	7	109	84	23	118	39
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	98	127	68	34	102	15	7	109	84	23	118	39
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.75	0.25	0.06	0.94	1.00	0.26	1.31	0.43
Final Sat.:	530	573	643	500	950	139	36	537	647	144	758	260
Capacity Analysis Module:												
Vol/Sat:	0.18	0.22	0.11	0.07	0.11	0.11	0.20	0.20	0.13	0.16	0.16	0.15
Crit Moves:		****			****			****			****	
Delay/Veh:	10.6	10.3	8.6	9.9	9.6	9.5	10.1	10.1	8.7	9.9	9.6	9.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.6	10.3	8.6	9.9	9.6	9.5	10.1	10.1	8.7	9.9	9.6	9.3
LOS by Move:	B	B	A	A	A	A	B	B	A	A	A	A
ApproachDel:		10.0			9.7			9.5			9.6	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		10.0			9.7			9.5			9.6	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.2	0.3	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul PM

Intersection #11: Golden Hill Rd/Dallons Rd



Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:												
Base Vol:	135	38	0	0	84	6	1	0	93	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	135	38	0	0	84	6	1	0	93	0	0	0
Added Vol:	79	117	0	0	543	2	2	0	81	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	214	155	0	0	627	8	3	0	174	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	225	163	0	0	660	8	3	0	183	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	225	163	0	0	660	8	3	0	183	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	668	xxxx	xxxxx	xxxx	xxxx	xxxxx	1278	1278	664	xxxx	xxxx	xxxxx
Potent Cap.:	931	xxxx	xxxxx	xxxx	xxxx	xxxxx	185	168	464	xxxx	xxxx	xxxxx
Move Cap.:	931	xxxx	xxxxx	xxxx	xxxx	xxxxx	146	121	464	xxxx	xxxx	xxxxx
Volume/Cap:	0.24	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	0.00	0.39	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.9	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	10.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	B	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	447	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	2.0	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	10.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	18.7	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	B	*	*	*	*	*	*	C	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			18.7			xxxxxx		
ApproachLOS:	*			*			C			*		

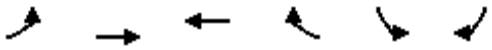


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.72	1.00						0.95	1.00
Satd. Flow (prot)		3438	1468	1167	3343						1388	1404
Flt Permitted		1.00	1.00	0.72	1.00						0.95	1.00
Satd. Flow (perm)		3438	1468	1167	3343						1388	1404
Volume (vph)	0	718	302	1478	1166	0	0	0	0	282	0	151
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	756	318	1556	1227	0	0	0	0	297	0	159
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	0	0	0	76
Lane Group Flow (vph)	0	756	175	1556	1227	0	0	0	0	0	297	83
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Actuated Green, G (s)		18.4	18.4	45.0	67.5						23.1	23.1
Effective Green, g (s)		19.0	19.0	45.8	68.8						23.2	23.2
Actuated g/C Ratio		0.19	0.19	0.46	0.69						0.23	0.23
Clearance Time (s)		4.6	4.6	4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		653	279	534	2300						322	326
v/s Ratio Prot		c0.22		c1.33	0.37							
v/s Ratio Perm			0.12								0.21	0.06
v/c Ratio		1.16	0.63	2.91	0.53						0.92	0.25
Uniform Delay, d1		40.5	37.3	27.1	7.7						37.5	31.3
Progression Factor		1.00	1.00	1.32	0.40						1.00	1.00
Incremental Delay, d2		87.4	10.3	861.7	0.1						30.8	0.4
Delay (s)		127.9	47.6	897.6	3.2						68.3	31.8
Level of Service		F	D	F	A						E	C
Approach Delay (s)		104.1			503.2			0.0			55.6	
Approach LOS		F			F			A			E	

Intersection Summary			
HCM Average Control Delay	356.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.01		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	127.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

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			*0.91		1.00	1.00				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.99		1.00	0.85				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1467	3252			2991		1556	1429				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1467	3252			2991		1556	1429				
Volume (vph)	90	910	0	0	2292	235	351	0	807	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	958	0	0	2413	247	369	0	849	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	95	958	0	0	2660	0	369	849	0	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split			Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	9.9	62.8			47.8		27.0	27.0				
Effective Green, g (s)	9.9	63.9			50.0		28.1	28.1				
Actuated g/C Ratio	0.10	0.64			0.50		0.28	0.28				
Clearance Time (s)	4.0	5.1			6.2		5.1	5.1				
Vehicle Extension (s)	3.0	3.0			3.0		4.5	4.5				
Lane Grp Cap (vph)	145	2078			1496		437	402				
v/s Ratio Prot	c0.06	0.29			c0.89		0.24	c0.59				
v/s Ratio Perm												
v/c Ratio	0.66	0.46			1.78		0.84	2.11				
Uniform Delay, d1	43.4	9.2			25.0		33.9	35.9				
Progression Factor	1.31	0.19			1.00		1.00	1.00				
Incremental Delay, d2	1.0	0.1			352.9		14.9	508.7				
Delay (s)	57.8	1.8			377.9		48.8	544.7				
Level of Service	E	A			F		D	F				
Approach Delay (s)		6.9			377.9			394.5			0.0	
Approach LOS		A			F			F			A	

Intersection Summary			
HCM Average Control Delay	302.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	131.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	3195	3153		1719	1538
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1719	3195	3153		1719	1538
Volume (vph)	116	1602	2378	114	103	149
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	122	1686	2503	120	108	157
RTOR Reduction (vph)	0	0	0	0	0	126
Lane Group Flow (vph)	122	1686	2623	0	108	31
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	13%	14%	5%	5%	5%
Turn Type	Prot					Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases						7
Actuated Green, G (s)	13.5	110.9	60.5		21.6	21.6
Effective Green, g (s)	13.0	110.9	63.8		22.1	22.1
Actuated g/C Ratio	0.12	1.00	0.58		0.20	0.20
Clearance Time (s)	3.5		7.3		4.5	4.5
Vehicle Extension (s)	3.5		3.5		3.5	3.5
Lane Grp Cap (vph)	202	3195	1814		343	306
v/s Ratio Prot	0.07	c0.53	c0.83		0.06	
v/s Ratio Perm						0.02
v/c Ratio	0.60	0.53	1.45		0.31	0.10
Uniform Delay, d1	46.5	0.0	23.6		37.9	36.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.3	0.2	203.9		0.6	0.2
Delay (s)	51.8	0.2	227.4		38.6	36.5
Level of Service	D	A	F		D	D
Approach Delay (s)		3.7	227.4		37.3	
Approach LOS		A	F		D	

Intersection Summary			
HCM Average Control Delay	130.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	110.9	Sum of lost time (s)	4.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

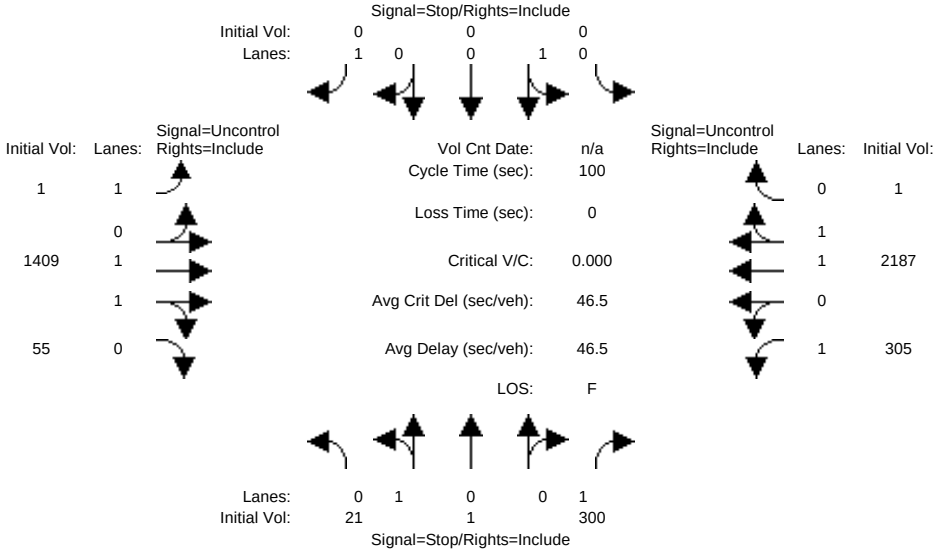
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.96		1.00	0.98			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1719	3091		1719	3086			1747			1690	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (perm)	1719	3091		1719	3086			1747			1690	
Volume (vph)	417	1036	322	335	1634	285	238	311	76	396	575	661
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	1091	339	353	1720	300	251	327	80	417	605	696
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	439	1430	0	353	2020	0	0	658	0	0	1718	0
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases												
Actuated Green, G (s)	4.9	42.3		3.9	41.3			34.0			32.0	
Effective Green, g (s)	4.4	45.6		3.4	44.6			34.9			32.9	
Actuated g/C Ratio	0.03	0.34		0.03	0.34			0.26			0.25	
Clearance Time (s)	3.5	7.3		3.5	7.3			4.9			4.9	
Vehicle Extension (s)	2.0	3.0		2.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	57	1061		44	1036			459			419	
v/s Ratio Prot	c0.26	0.46		0.21	c0.65			c0.38			c1.02	
v/s Ratio Perm												
v/c Ratio	7.70	1.35		8.02	1.95			1.43			4.10	
Uniform Delay, d1	64.2	43.6		64.7	44.1			49.0			50.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3051.7	162.8		3206.3	431.0			207.3			1400.8	
Delay (s)	3115.9	206.4		3271.0	475.1			256.3			1450.7	
Level of Service	F	F		F	F			F			F	
Approach Delay (s)		889.8			891.0			256.3			1450.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	972.8	HCM Level of Service	F
HCM Volume to Capacity ratio	2.62		
Actuated Cycle Length (s)	132.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	193.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul Fri PM

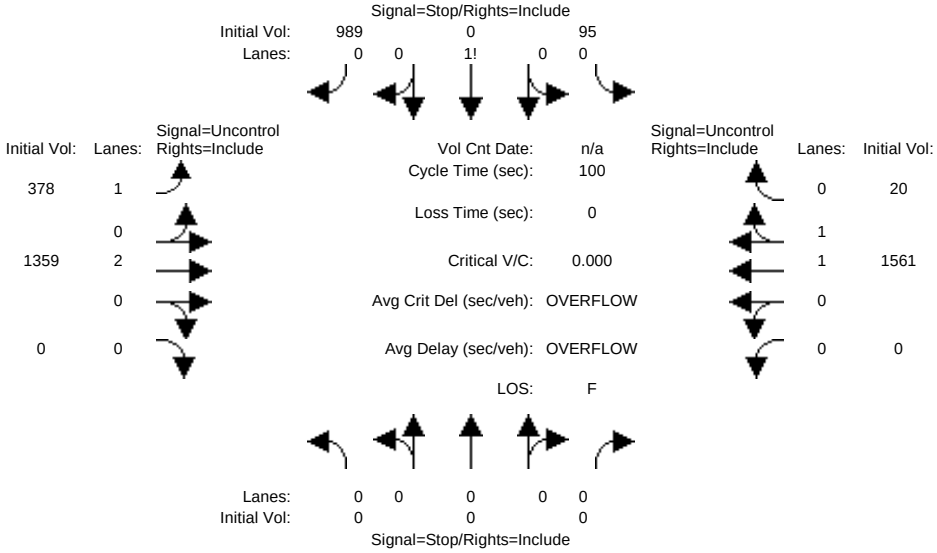
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:	Summertime Fri PM											
Base Vol:	21	1	266	0	0	0	1	1078	55	284	1401	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	266	0	0	0	1	1078	55	284	1401	1
Added Vol:	0	0	34	0	0	0	0	331	0	21	786	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	1	300	0	0	0	1	1409	55	305	2187	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	22	1	316	0	0	0	1	1483	58	321	2302	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	22	1	316	0	0	0	1	1483	58	321	2302	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	3307	4459	771	3689	4488	1152	2303	xxxx	xxxxx	1541	xxxx	xxxxx
Potent Cap.:	7	1	347	2	1	194	221	xxxx	xxxxx	437	xxxx	xxxxx
Move Cap.:	3	0	347	0	0	194	221	xxxx	xxxxx	437	xxxx	xxxxx
Volume/Cap:	8.31	2.79	0.91	xxxx	0.00	0.00	0.00	xxxx	xxxx	0.74	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	9.1	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	5.9	xxxx	xxxxx
Control Del:	xxxxx	xxxx	63.2	xxxxx	xxxx	xxxxx	21.3	xxxx	xxxxx	32.9	xxxx	xxxxx
LOS by Move:	*	*	F	*	*	*	C	*	*	D	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	2	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	4.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7719	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	586.2			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul Fri PM

Intersection #6: SR 46E/Airport Rd

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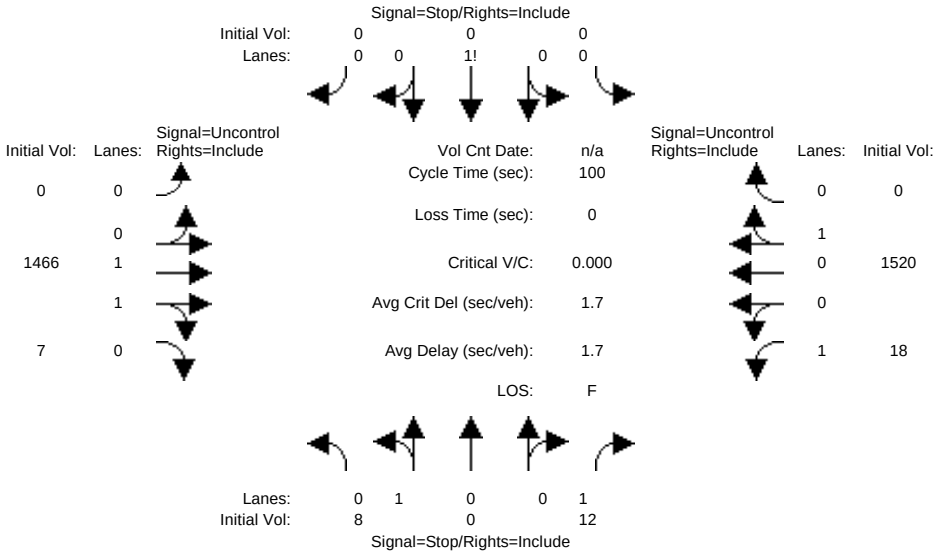
Street Name:            Airport Rd                      SR 46E
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:Summertime Fri PM
Base Vol:       0    0     0    12    0   317   198 1174     0     0 1426     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    12    0   317   198 1174     0     0 1426     2
Added Vol:      0    0     0    83    0   672   180  185     0     0  135    18
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    95    0   989   378 1359     0     0 1561    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0   100    0  1041   398 1431     0     0 1643    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0   100    0  1041   398 1431     0     0 1643    21
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.8  6.5   6.9   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  3165 3880   832  1664 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx     8    4   316   392 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx     0    0   316   392 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  3.29  1.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  12.6 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  82.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     F    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         *                F                *                *
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul Fri PM

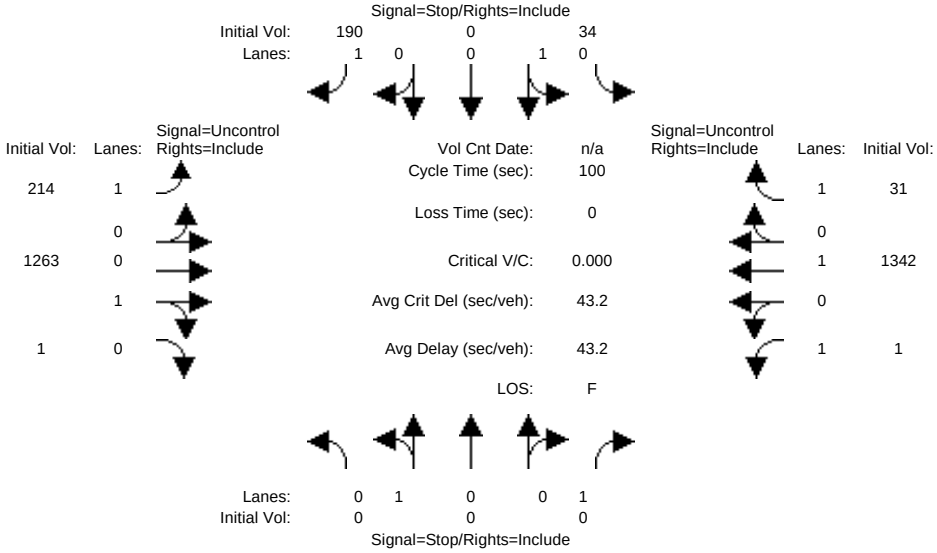
Intersection #7: SR 46E/Mill Road



Street Name:	Mill Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:Summertime Fri PM												
Base Vol:	8	0	12	0	0	0	0	1198	7	18	1367	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	0	12	0	0	0	0	1198	7	18	1367	0
Added Vol:	0	0	0	0	0	0	0	268	0	0	153	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	0	12	0	0	0	0	1466	7	18	1520	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	8	0	13	0	0	0	0	1543	7	19	1600	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	8	0	13	0	0	0	0	1543	7	19	1600	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	3185	3185	775	2409	3188	1600	xxxx	xxxx	xxxxx	1551	xxxx	xxxxx
Potent Cap.:	12	10	401	23	10	132	xxxx	xxxx	xxxxx	433	xxxx	xxxxx
Move Cap.:	11	10	401	22	10	132	xxxx	xxxx	xxxxx	433	xxxx	xxxxx
Volume/Cap:	0.75	0.00	0.03	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	14.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	13.7	xxxx	xxxxx
LOS by Move:	*	*	B	*	*	*	*	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	11	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	1.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	604.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	F	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	250.4			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

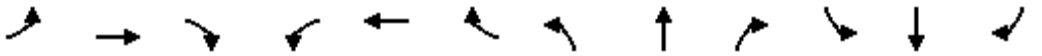
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Near Term Cumul Fri PM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:Summertime Fri PM												
Base Vol:	0	0	0	29	0	162	210	999	1	1	1217	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	162	210	999	1	1	1217	30
Added Vol:	0	0	0	5	0	28	4	264	0	0	125	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	34	0	190	214	1263	1	1	1342	31
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	36	0	200	225	1329	1	1	1413	33
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	36	0	200	225	1329	1	1	1413	33
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	6.4	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	3312	3228	1330	3195	3196	1413	1445	xxxx	xxxxx	1331	xxxx	xxxxx
Potent Cap.:	5	10	191	11	10	171	475	xxxx	xxxxx	525	xxxx	xxxxx
Move Cap.:	0	5	191	7	5	171	475	xxxx	xxxxx	525	xxxx	xxxxx
Volume/Cap:	xxxx	0.00	0.00	5.00	0.00	1.17	0.47	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	10.7	2.5	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	176.8	19.2	xxxx	xxxxx	11.9	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	C	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	7	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	5.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	2803	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	F	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			575.3			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

MITIGATED NEAR-TERM CUMULATIVE WITH PROJECT MITIGATION INTERSECTION LOS CALCULATIONS

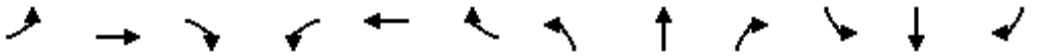


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.95		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4588		3099	3406						1373	1223
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4588		3099	3406						1373	1223
Volume (vph)	0	710	338	638	763	0	0	0	0	176	1	57
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	747	356	672	803	0	0	0	0	185	1	60
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	0	0	0	49
Lane Group Flow (vph)	0	1033	0	672	803	0	0	0	0	0	186	11
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		41.7		35.2	81.0						19.6	19.6
Effective Green, g (s)		42.3		36.0	82.3						19.7	19.7
Actuated g/C Ratio		0.38		0.33	0.75						0.18	0.18
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1764		1014	2548						246	219
v/s Ratio Prot		c0.23		c0.22	0.24							
v/s Ratio Perm											0.14	0.01
v/c Ratio		0.59		0.66	0.32						0.76	0.05
Uniform Delay, d1		26.9		31.8	4.6						42.9	37.4
Progression Factor		1.00		0.55	0.24						1.00	1.00
Incremental Delay, d2		1.4		0.1	0.2						12.4	0.1
Delay (s)		28.3		17.7	1.3						55.3	37.5
Level of Service		C		B	A						E	D
Approach Delay (s)		28.3			8.8			0.0			51.0	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1399	3374			5802			1570	1404			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1399	3374			5802			1570	1404			
Volume (vph)	71	809	0	0	1166	143	221	0	1098	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	852	0	0	1227	151	233	0	1156	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	55	0	0	0
Lane Group Flow (vph)	75	852	0	0	1378	0	0	233	1101	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	7.0	34.9			22.8			64.9	64.9			
Effective Green, g (s)	7.0	36.0			25.0			66.0	66.0			
Actuated g/C Ratio	0.06	0.33			0.23			0.60	0.60			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	89	1104			1319			942	842			
v/s Ratio Prot	0.05	c0.25			c0.24			0.15				
v/s Ratio Perm									c0.78			
v/c Ratio	0.84	0.77			1.04			0.25	1.31			
Uniform Delay, d1	51.0	33.3			42.5			10.3	22.0			
Progression Factor	1.09	0.43			1.00			1.00	1.00			
Incremental Delay, d2	40.9	4.1			37.3			0.2	146.9			
Delay (s)	96.3	18.3			79.8			10.6	168.9			
Level of Service	F	B			E			B	F			
Approach Delay (s)		24.6			79.8			142.3			0.0	
Approach LOS		C			E			F			A	

Intersection Summary			
HCM Average Control Delay	89.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

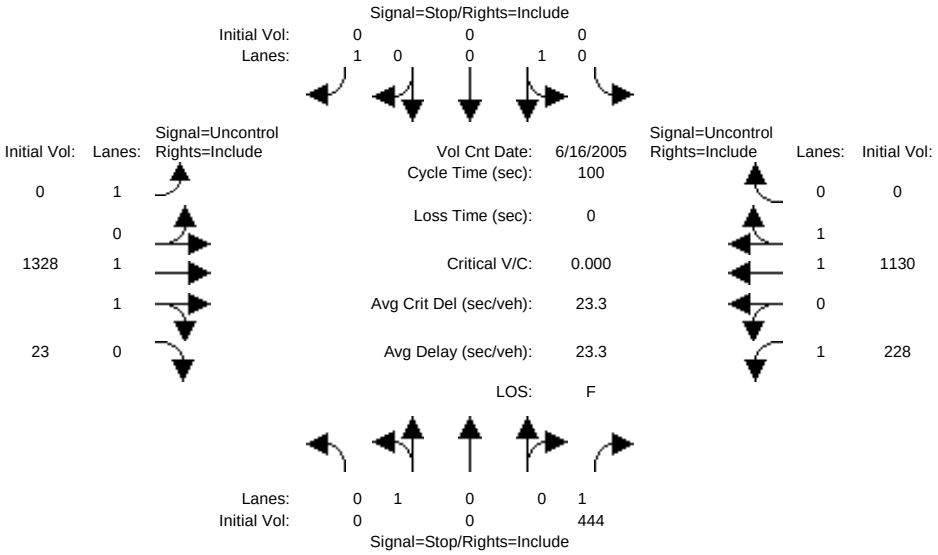


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3112	1505	3335	3167	1485	3335	3307		3335	1810	1511
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3112	1505	3335	3167	1485	3335	3307		3335	1810	1511
Volume (vph)	612	966	331	113	740	313	371	602	180	328	231	342
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	644	1017	348	119	779	329	391	634	189	345	243	360
RTOR Reduction (vph)	0	0	215	0	0	216	0	0	0	0	0	264
Lane Group Flow (vph)	644	1017	133	119	779	113	391	823	0	345	243	96
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	23.5	41.6	41.6	7.7	25.8	25.8	17.0	32.0		15.3	30.3	30.3
Effective Green, g (s)	23.0	44.9	44.9	7.2	29.1	29.1	17.9	32.9		16.2	31.2	31.2
Actuated g/C Ratio	0.20	0.38	0.38	0.06	0.25	0.25	0.15	0.28		0.14	0.27	0.27
Clearance Time (s)	3.5	7.3	7.3	3.5	7.3	7.3	4.9	4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.5	3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	654	1192	577	205	786	369	509	928		461	482	402
v/s Ratio Prot	c0.19	0.33		0.04	c0.25		c0.12	c0.25		0.10	0.13	
v/s Ratio Perm			0.09			0.08						0.06
v/c Ratio	0.98	0.85	0.23	0.58	0.99	0.31	0.77	0.89		0.75	0.50	0.24
Uniform Delay, d1	46.9	33.1	24.5	53.5	43.9	35.8	47.7	40.4		48.5	36.4	33.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	31.0	6.1	0.2	2.7	29.8	0.5	7.1	10.4		6.8	1.0	0.4
Delay (s)	77.9	39.2	24.7	56.2	73.7	36.3	54.7	50.8		55.3	37.4	34.1
Level of Service	E	D	C	E	E	D	D	D		E	D	C
Approach Delay (s)		49.1			62.0			52.1			42.6	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	51.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	117.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul AM

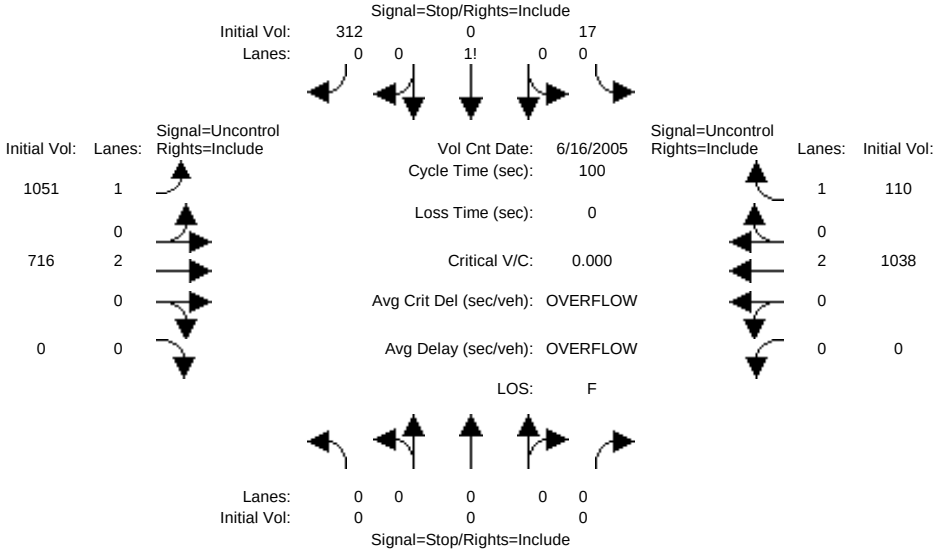
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertiime AM												
Base Vol:	39	0	250	0	0	0	0	658	23	223	813	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	0	250	0	0	0	0	658	23	223	813	0
Added Vol:	0	0	194	0	0	0	0	670	0	5	317	0
Union LT Re:	-39	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	444	0	0	0	0	1328	23	228	1130	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	467	0	0	0	0	1398	24	240	1189	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	467	0	0	0	0	1398	24	240	1189	0
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2485	3079	711	2368	3092	595	xxxx	xxxx	xxxxx	1422	xxxx	xxxxx
Potent Cap.:	25	12	380	19	12	453	xxxx	xxxx	xxxxx	485	xxxx	xxxxx
Move Cap.:	15	6	380	0	6	453	xxxx	xxxx	xxxxx	485	xxxx	xxxxx
Volume/Cap:	0.00	0.00	1.23	xxxx	0.00	0.00	xxxx	xxxx	xxxx	0.49	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	19.8	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.7	xxxx	xxxxx
Control Del:	xxxxx	xxxx	155.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	19.5	xxxx	xxxxx
LOS by Move:	*	*	F	*	*	*	*	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	155.2			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul AM

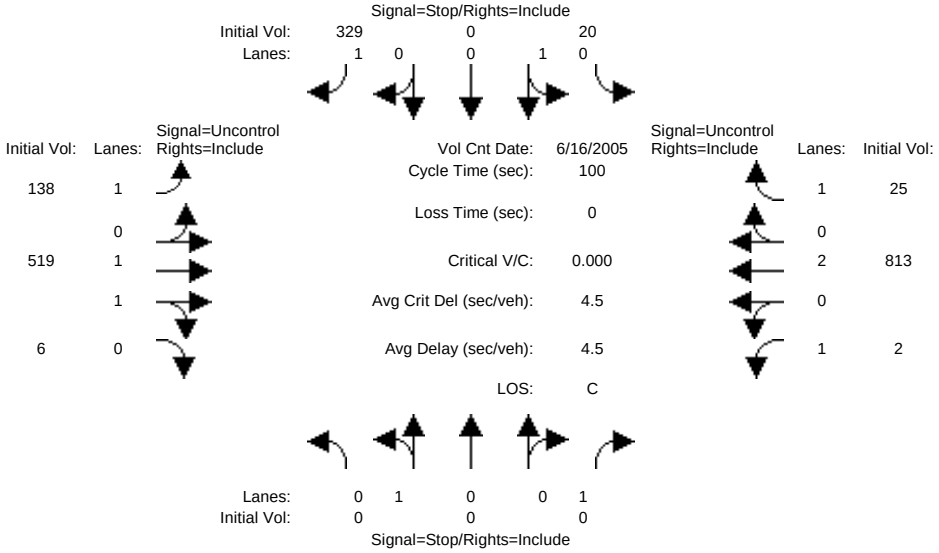
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	2	0	155	305	599	0	0	873	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	2	0	155	305	599	0	0	873	17
Added Vol:	0	0	0	15	0	157	746	117	0	0	165	93
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	17	0	312	1051	716	0	0	1038	110
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	18	0	328	1106	754	0	0	1093	116
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	18	0	328	1106	754	0	0	1093	116
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	3682	4059	546	1208	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	4	3	487	584	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	0	0	487	584	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	0	0	xxxxx	0	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	0.67	1.89	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	71.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	425.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	F	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul AM

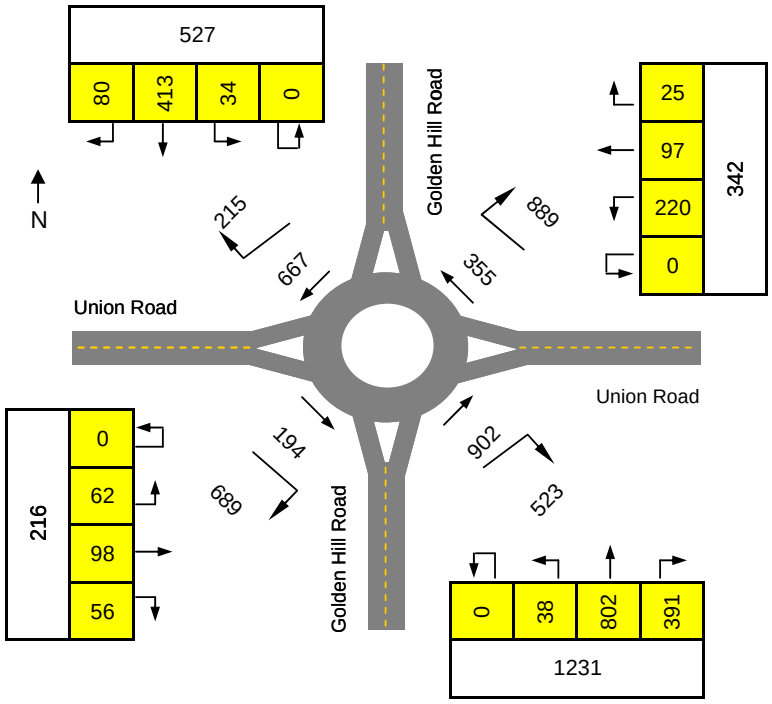
Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime AM												
Base Vol:	0	0	0	19	0	323	92	432	6	2	562	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	19	0	323	92	432	6	2	562	17
Added Vol:	0	0	0	1	0	6	46	87	0	0	251	8
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	329	138	519	6	2	813	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	21	0	346	145	546	6	2	856	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	21	0	346	145	546	6	2	856	26
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1272	1726	276	1424	1703	428	882	xxxx	xxxxx	553	xxxx	xxxxx
Potent Cap.:	127	90	727	129	93	581	775	xxxx	xxxxx	1028	xxxx	xxxxx
Move Cap.:	44	73	727	110	75	581	775	xxxx	xxxxx	1028	xxxx	xxxxx
Total Cap:	85	205	xxxxx	335	275	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.06	0.00	0.60	0.19	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	3.9	0.7	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	19.9	10.7	xxxx	xxxxx	8.5	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	B	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	335	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	16.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	C	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			19.7			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)					1		
Period (hr)	0.25	Date	6/16/2005	E-W	Union Road		
PHF	0.95	Time	AM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	1231	194	1105	***1.17***	***99***	***F***	***925***
South	527	355	1018	0.54	8	A	75
East	216	667	850	0.27	6	A	25
West	342	902	723	0.50	10	A	75
All	2316				56	F	



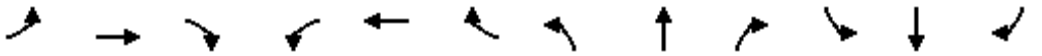
Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***



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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4716		2918	3343						1399	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4716		2918	3343						1399	1404
Volume (vph)	0	667	236	1174	1093	0	0	0	0	234	0	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	702	248	1236	1151	0	0	0	0	246	0	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	94
Lane Group Flow (vph)	0	950	0	1236	1151	0	0	0	0	0	246	22
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		27.4		56.2	87.7						22.9	22.9
Effective Green, g (s)		28.0		57.0	89.0						23.0	23.0
Actuated g/C Ratio		0.23		0.48	0.74						0.19	0.19
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1100		1386	2479						268	269
v/s Ratio Prot		c0.20		c0.42	0.34							
v/s Ratio Perm											0.18	0.02
v/c Ratio		0.86		0.89	0.46						0.92	0.08
Uniform Delay, d1		44.2		28.7	6.1						47.6	39.8
Progression Factor		1.00		1.26	1.89						1.00	1.00
Incremental Delay, d2		9.0		2.1	0.3						33.6	0.1
Delay (s)		53.2		38.3	11.9						81.2	40.0
Level of Service		D		D	B						F	D
Approach Delay (s)		53.2			25.6			0.0			68.0	
Approach LOS		D			C			A			E	

Intersection Summary			
HCM Average Control Delay	36.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1504	3282			5626			1570	1429			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1504	3282			5626			1570	1429			
Volume (vph)	95	806	0	0	1932	231	334	0	762	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	848	0	0	2034	243	352	0	802	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	82	0	0	0
Lane Group Flow (vph)	100	848	0	0	2277	0	0	352	720	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	8.0	59.9			46.8			49.9	49.9			
Effective Green, g (s)	8.0	61.0			49.0			51.0	51.0			
Actuated g/C Ratio	0.07	0.51			0.41			0.42	0.42			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	100	1668			2297			667	607			
v/s Ratio Prot	c0.07	0.26			c0.40			0.22				
v/s Ratio Perm									c0.50			
v/c Ratio	1.00	0.51			0.99			0.53	1.19			
Uniform Delay, d1	56.0	19.6			35.3			25.6	34.5			
Progression Factor	0.60	2.00			1.00			1.00	1.00			
Incremental Delay, d2	62.9	0.5			16.8			1.2	99.5			
Delay (s)	96.4	39.5			52.1			26.8	134.0			
Level of Service	F	D			D			C	F			
Approach Delay (s)		45.5			52.1			101.3			0.0	
Approach LOS		D			D			F			A	

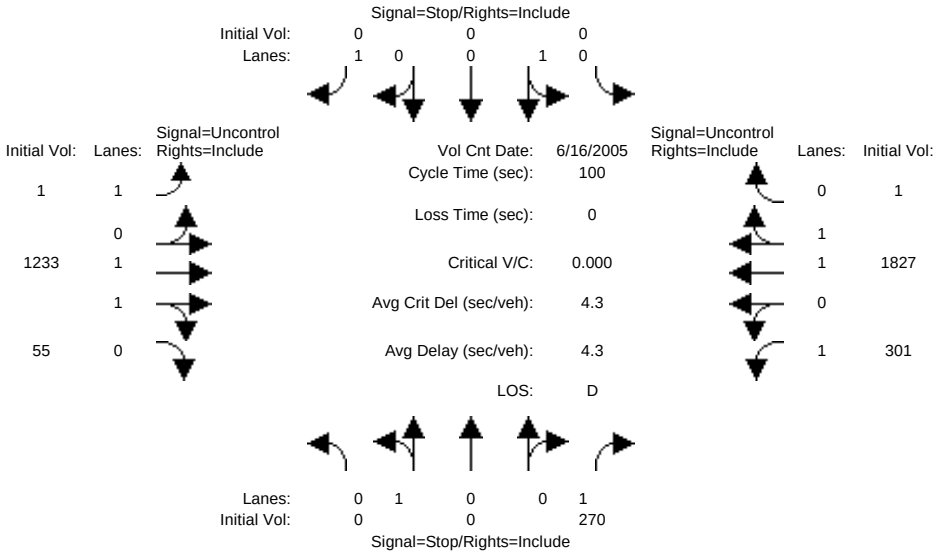
Intersection Summary			
HCM Average Control Delay	63.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3139	1500	3335	3034	1483	3335	3335		3335	1810	1512
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3139	1500	3335	3034	1483	3335	3335		3335	1810	1512
Volume (vph)	417	872	322	334	1268	284	260	311	66	394	575	661
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	918	339	352	1335	299	274	327	69	415	605	696
RTOR Reduction (vph)	0	0	37	0	0	89	0	0	0	0	0	4
Lane Group Flow (vph)	439	918	302	352	1335	210	274	396	0	415	605	692
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	14.5	36.9	47.0	14.3	36.7	50.8	10.1	34.1		14.1	38.1	52.6
Effective Green, g (s)	14.0	40.2	51.2	13.8	40.0	55.0	11.0	35.0		15.0	39.0	53.0
Actuated g/C Ratio	0.12	0.34	0.43	0.12	0.33	0.46	0.09	0.29		0.12	0.32	0.44
Clearance Time (s)	3.5	7.3	4.9	3.5	7.3	4.9	4.9	4.9		4.9	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0		2.0	3.0	2.0
Lane Grp Cap (vph)	389	1052	690	384	1011	729	306	973		417	588	718
v/s Ratio Prot	0.13	0.29	0.04	0.11	c0.44	0.04	0.08	0.12		c0.12	c0.33	c0.11
v/s Ratio Perm			0.16			0.11						0.35
v/c Ratio	1.13	0.87	0.44	0.92	1.32	0.29	0.90	0.41		1.00	1.03	0.96
Uniform Delay, d1	53.0	37.5	24.2	52.5	40.0	20.3	53.9	34.2		52.5	40.5	32.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	85.4	10.0	0.2	25.7	151.2	0.1	26.0	0.3		42.5	44.7	24.7
Delay (s)	138.4	47.5	24.4	78.2	191.2	20.4	79.9	34.4		95.0	85.2	57.2
Level of Service	F	D	C	E	F	C	E	C		F	F	E
Approach Delay (s)		66.4			145.5			53.0			76.2	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM Average Control Delay	93.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul PM

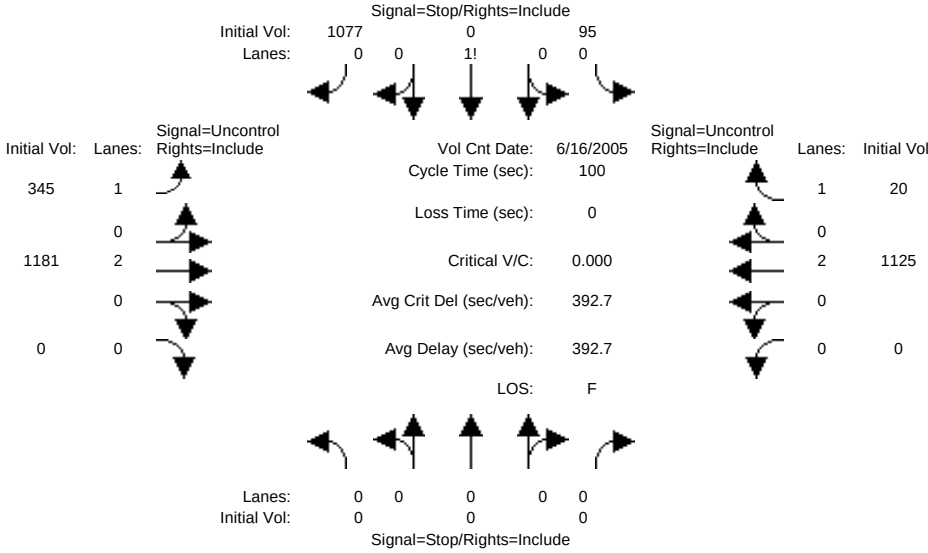
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	21	1	236	0	0	0	1	902	55	280	1041	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	236	0	0	0	1	902	55	280	1041	1
Added Vol:	0	0	34	0	0	0	0	331	0	21	786	0
Union LT Re:	-21	-1	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	270	0	0	0	1	1233	55	301	1827	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	284	0	0	0	1	1298	58	317	1923	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	284	0	0	0	1	1298	58	317	1923	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2924	3887	678	3208	3915	962	1924	xxxx	xxxxx	1356	xxxx	xxxxx
Potent Cap.:	12	4	399	4	3	260	311	xxxx	xxxxx	514	xxxx	xxxxx
Move Cap.:	6	1	399	1	1	260	311	xxxx	xxxxx	514	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.71	0.00	0.00	0.00	0.00	xxxx	xxxx	0.62	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	5.4	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	4.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	33.4	xxxxx	xxxx	xxxxx	16.6	xxxx	xxxxx	22.6	xxxx	xxxxx
LOS by Move:	*	*	D	*	*	*	C	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	33.4			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	D			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul PM

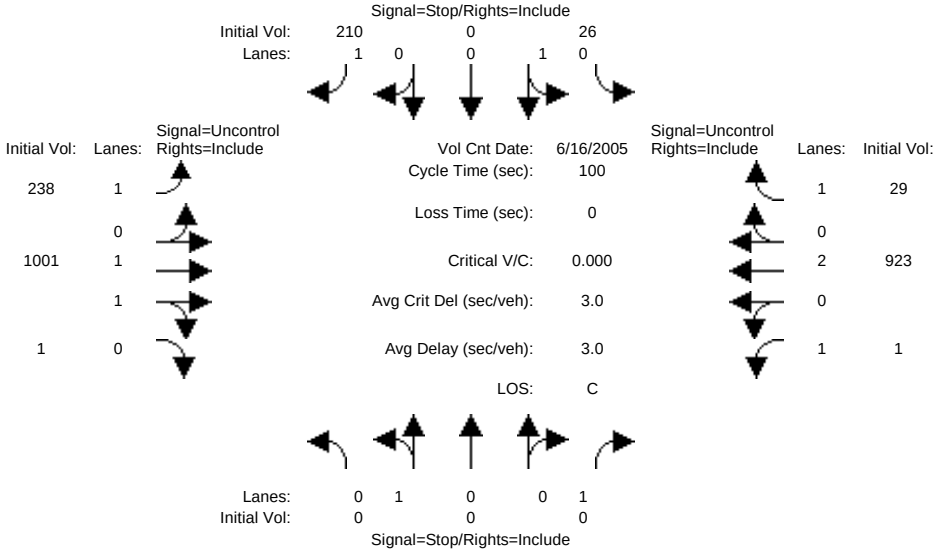
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	0	0	0	12	0	405	165	996	0	0	990	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	12	0	405	165	996	0	0	990	2
Added Vol:	0	0	0	83	0	672	180	185	0	0	135	18
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	95	0	1077	345	1181	0	0	1125	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	100	0	1134	363	1243	0	0	1184	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	100	0	1134	363	1243	0	0	1184	21
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2532	3154	592	1205	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	23	11	454	586	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	12	4	454	586	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	0	0	xxxxx	78	41	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	1.29	0.00	2.49	0.62	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	4.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	20.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	C	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	326	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	117	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	1282	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			1281.8			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul PM

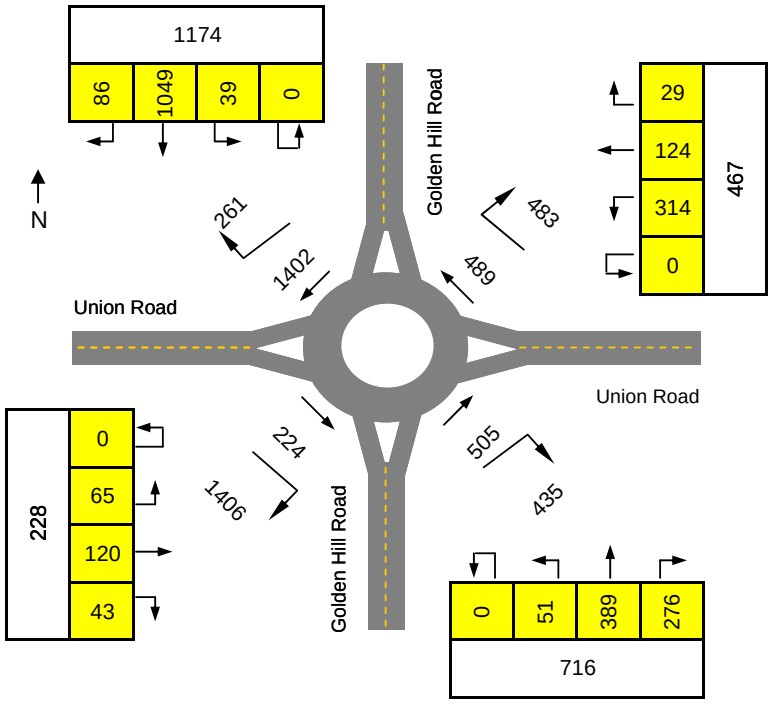
Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	0	0	0	21	0	182	234	737	1	1	798	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	21	0	182	234	737	1	1	798	28
Added Vol:	0	0	0	5	0	28	4	264	0	0	125	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	26	0	210	238	1001	1	1	923	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	27	0	221	251	1054	1	1	972	31
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	27	0	221	251	1054	1	1	972	31
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2043	2559	527	2002	2529	486	1002	xxxx	xxxxx	1055	xxxx	xxxxx
Potent Cap.:	34	27	501	53	28	533	699	xxxx	xxxxx	668	xxxx	xxxxx
Move Cap.:	14	17	501	38	18	533	699	xxxx	xxxxx	668	xxxx	xxxxx
Total Cap:	56	67	xxxxx	187	108	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.00	0.15	0.00	0.41	0.36	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	2.0	1.6	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	16.5	13.0	xxxx	xxxxx	10.4	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	B	*	*	B	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	187	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	27.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	D	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			17.7			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)					1		
Period (hr)	0.25	Date	6/16/2005	E-W	Union Road		
PHF	0.95	Time	PM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	716	224	1089	0.69	10	B	150
South	1174	489	946	***1.31***	***156***	***F***	***1150***
East	228	1402	398	0.60	22	C	100
West	467	505	937	0.52	8	A	75
All	2585				77	F	



Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4685		2968	3343						1388	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4685		2968	3343						1388	1404
Volume (vph)	0	718	302	1478	1166	0	0	0	0	282	0	151
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	756	318	1556	1227	0	0	0	0	297	0	159
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	95
Lane Group Flow (vph)	0	1074	0	1556	1227	0	0	0	0	0	297	64
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		25.3		57.2	86.6						24.0	24.0
Effective Green, g (s)		25.9		58.0	87.9						24.1	24.1
Actuated g/C Ratio		0.22		0.48	0.73						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1011		1435	2449						279	282
v/s Ratio Prot		c0.23		c0.52	0.37							
v/s Ratio Perm											0.21	0.05
v/c Ratio		1.06		1.08	0.50						1.06	0.23
Uniform Delay, d1		47.0		31.0	6.8						48.0	40.1
Progression Factor		1.00		1.13	0.95						1.00	1.00
Incremental Delay, d2		46.4		39.3	0.3						72.0	0.4
Delay (s)		93.4		74.3	6.7						119.9	40.6
Level of Service		F		E	A						F	D
Approach Delay (s)		93.4			44.5			0.0			92.2	
Approach LOS		F			D			A			F	

Intersection Summary			
HCM Average Control Delay	61.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1467	3252			5653			1556	1429			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1467	3252			5653			1556	1429			
Volume (vph)	90	910	0	0	2292	235	351	0	807	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	958	0	0	2413	247	369	0	849	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	76	0	0	0
Lane Group Flow (vph)	95	958	0	0	2660	0	0	369	773	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	6.0	61.9			50.8			47.9	47.9			
Effective Green, g (s)	6.0	63.0			53.0			49.0	49.0			
Actuated g/C Ratio	0.05	0.52			0.44			0.41	0.41			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	73	1707			2497			635	584			
v/s Ratio Prot	c0.06	0.29			c0.47			0.24				
v/s Ratio Perm									c0.54			
v/c Ratio	1.30	0.56			1.07			0.58	1.32			
Uniform Delay, d1	57.0	19.2			33.5			27.5	35.5			
Progression Factor	1.00	2.00			1.00			1.00	1.00			
Incremental Delay, d2	144.6	0.1			38.4			1.9	157.1			
Delay (s)	201.9	38.6			71.9			29.4	192.6			
Level of Service	F	D			E			C	F			
Approach Delay (s)		53.3			71.9			143.1			0.0	
Approach LOS		D			E			F			A	

Intersection Summary			
HCM Average Control Delay	85.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

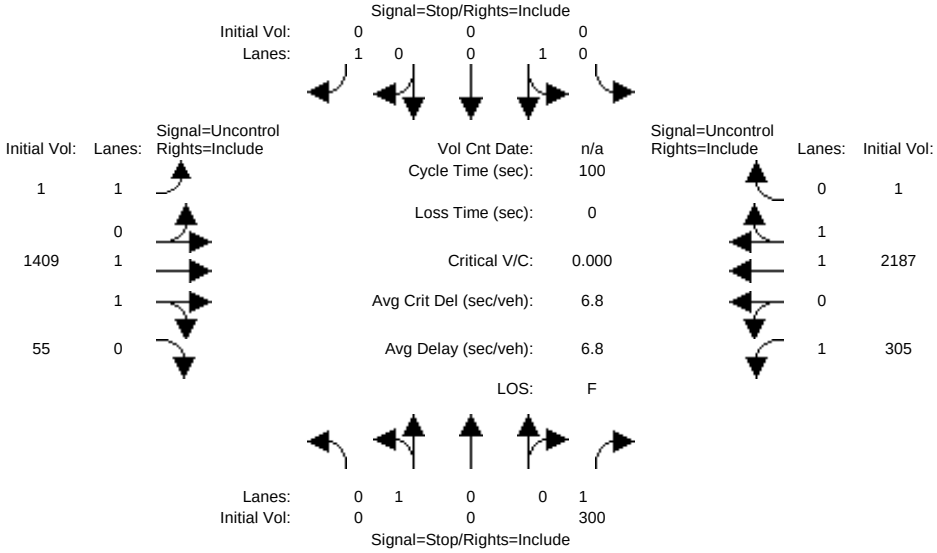
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3139	1538	3335	3112	1538	3335	3337		3335	1810	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3139	1538	3335	3112	1538	3335	3337		3335	1810	1538
Volume (vph)	417	1036	322	335	1634	285	260	311	76	396	575	661
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	1091	339	353	1720	300	274	327	80	417	605	696
RTOR Reduction (vph)	0	0	39	0	0	98	0	0	0	0	0	2
Lane Group Flow (vph)	439	1091	300	353	1720	202	274	407	0	417	605	694
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	12.5	39.2	48.7	15.0	41.7	54.2	9.5	34.1		12.5	37.1	49.6
Effective Green, g (s)	12.0	42.5	51.5	14.5	45.0	57.0	9.0	35.0		12.0	38.0	50.0
Actuated g/C Ratio	0.10	0.35	0.43	0.12	0.38	0.48	0.08	0.29		0.10	0.32	0.42
Clearance Time (s)	3.5	7.3	3.5	3.5	7.3	3.5	3.5	4.9		3.5	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.5		2.0	3.5	2.0
Lane Grp Cap (vph)	334	1112	711	403	1167	782	250	973		334	573	692
v/s Ratio Prot	c0.13	0.35	0.03	0.11	c0.55	0.03	0.08	0.12		c0.13	c0.33	0.10
v/s Ratio Perm			0.16			0.11						0.35
v/c Ratio	1.31	0.98	0.42	0.88	1.47	0.26	1.10	0.42		1.25	1.06	1.00
Uniform Delay, d1	54.0	38.4	23.9	51.9	37.5	18.9	55.5	34.3		54.0	41.0	35.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	161.2	22.4	0.1	18.2	217.9	0.1	85.0	0.3		134.4	53.2	35.0
Delay (s)	215.2	60.7	24.0	70.1	255.4	18.9	140.5	34.6		188.4	94.2	70.0
Level of Service	F	E	C	E	F	B	F	C		F	F	E
Approach Delay (s)		90.4			198.0			77.2			107.3	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	131.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul Fri PM

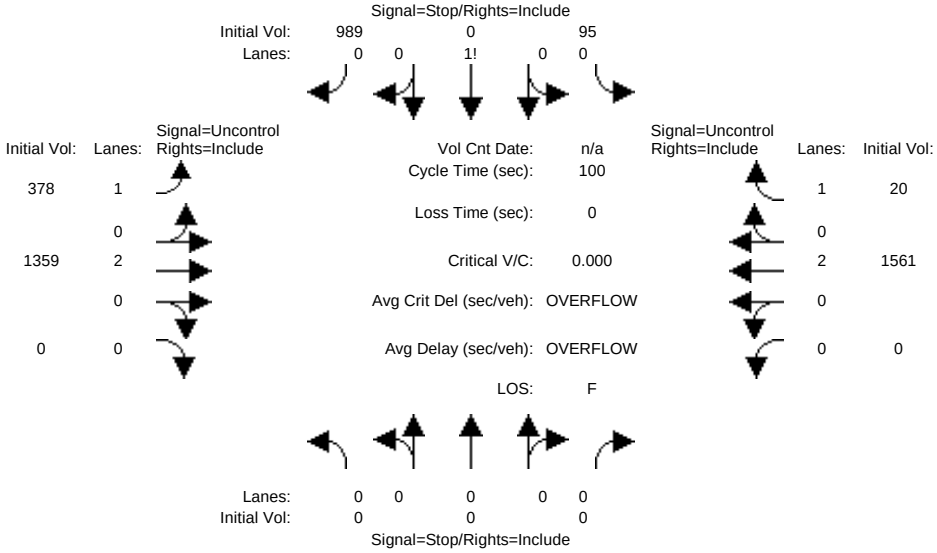
Intersection #5: SR 46E/Union Rd



Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:	Summertime Fri PM											
Base Vol:	21	1	266	0	0	0	1	1078	55	284	1401	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	266	0	0	0	1	1078	55	284	1401	1
Added Vol:	0	0	34	0	0	0	0	331	0	21	786	0
UnionLTRest:	-21	-1	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	300	0	0	0	1	1409	55	305	2187	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	316	0	0	0	1	1483	58	321	2302	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	316	0	0	0	1	1483	58	321	2302	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	3307	4459	771	3688	4488	1152	2303	xxxx	xxxxx	1541	xxxx	xxxxx
Potent Cap.:	7	1	347	2	1	194	221	xxxx	xxxxx	437	xxxx	xxxxx
Move Cap.:	3	0	347	0	0	194	221	xxxx	xxxxx	437	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.91	0.00	0.00	0.00	0.00	xxxx	xxxx	0.74	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	9.1	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	5.9	xxxx	xxxxx
Control Del:	xxxxx	xxxx	63.2	xxxxx	xxxx	xxxxx	21.3	xxxx	xxxxx	32.9	xxxx	xxxxx
LOS by Move:	*	*	F	*	*	*	C	*	*	D	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	63.2			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul Fri PM

Intersection #6: SR 46E/Airport Rd

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Street Name:            Airport Rd                      SR 46E
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:Summertime Fri PM
Base Vol:       0    0     0    12    0   317   198 1174     0     0 1426     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    12    0   317   198 1174     0     0 1426     2
Added Vol:      0    0     0    83    0   672   180  185     0     0  135    18
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    95    0   989   378 1359     0     0 1561    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0   100    0  1041   398 1431     0     0 1643    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0   100    0  1041   398 1431     0     0 1643    21
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.8  6.5   6.9   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  3154 3869   822  1664 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx     9    4   322   392 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx     0    0   322   392 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:      0    0 xxxxx     0    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  3.24  1.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  12.6 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  82.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     F    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          *                F                *                *
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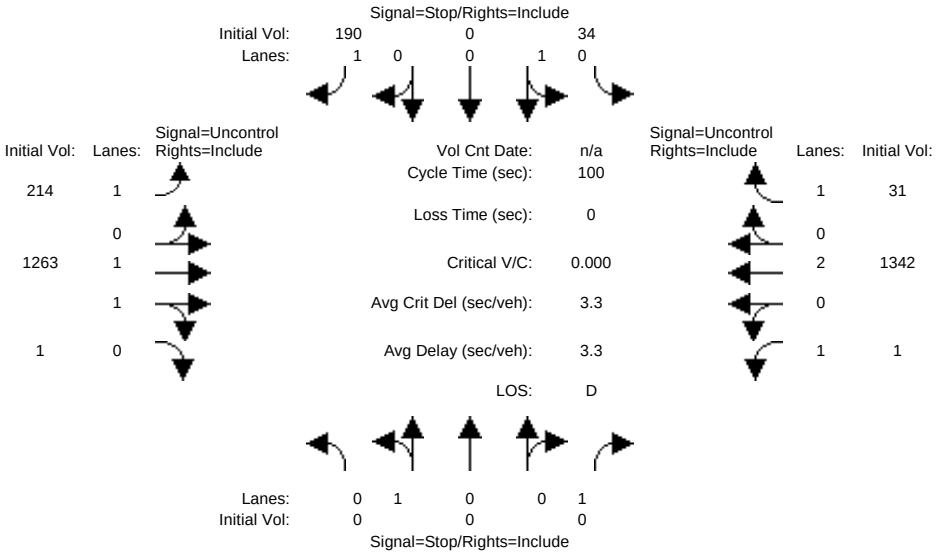
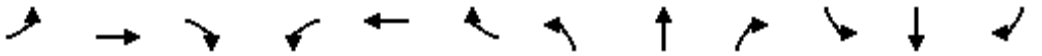
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul Fri PM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:	Summertime Fri PM											
Base Vol:	0	0	0	29	0	162	210	999	1	1	1217	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	162	210	999	1	1	1217	30
Added Vol:	0	0	0	5	0	28	4	264	0	0	125	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	34	0	190	214	1263	1	1	1342	31
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	36	0	200	225	1329	1	1	1413	33
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	36	0	200	225	1329	1	1	1413	33
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2489	3228	665	2530	3196	706	1445	xxxx	xxxxx	1331	xxxx	xxxxx
Potent Cap.:	15	10	407	23	10	383	475	xxxx	xxxxx	525	xxxx	xxxxx
Move Cap.:	5	5	407	15	5	383	475	xxxx	xxxxx	525	xxxx	xxxxx
Total Cap:	0	0	xxxxx	130	68	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	0.00	0.28	0.00	0.52	0.47	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	2.9	2.5	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	24.3	19.2	xxxx	xxxxx	11.9	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	C	*	*	B	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	0	xxxx	xxxxx	130	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	1.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	43.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	E	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			27.1			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

MITIGATED NEAR-TERM CUMULATIVE WITH ADDITIONAL MITIGATION INTERSECTION LOS CALCULATIONS

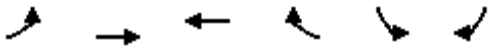


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.95		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4588		3099	3406						1373	1223
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4588		3099	3406						1373	1223
Volume (vph)	0	710	338	638	763	0	0	0	0	176	1	57
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	747	356	672	803	0	0	0	0	185	1	60
RTOR Reduction (vph)	0	78	0	0	0	0	0	0	0	0	0	49
Lane Group Flow (vph)	0	1025	0	672	803	0	0	0	0	0	186	11
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		38.5		30.2	72.8						17.8	17.8
Effective Green, g (s)		39.1		31.0	74.1						17.9	17.9
Actuated g/C Ratio		0.39		0.31	0.74						0.18	0.18
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1794		961	2524						246	219
v/s Ratio Prot		c0.22		c0.22	0.24							
v/s Ratio Perm											0.14	0.01
v/c Ratio		0.57		0.70	0.32						0.76	0.05
Uniform Delay, d1		23.9		30.4	4.4						39.0	34.0
Progression Factor		1.00		0.95	0.22						1.00	1.00
Incremental Delay, d2		1.3		1.7	0.3						12.4	0.1
Delay (s)		25.2		30.8	1.3						51.4	34.1
Level of Service		C		C	A						D	C
Approach Delay (s)		25.2			14.7			0.0			47.2	
Approach LOS		C			B			A			D	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	0.88			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1399	3374			5807			1570	2472			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1399	3374			5807			1570	2472			
Volume (vph)	71	809	0	0	1166	143	221	0	1098	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	852	0	0	1227	151	233	0	1156	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	142	0	0	0
Lane Group Flow (vph)	75	852	0	0	1378	0	0	233	1014	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	7.8	46.5			33.6			43.3	43.3			
Effective Green, g (s)	7.8	47.6			35.8			44.4	44.4			
Actuated g/C Ratio	0.08	0.48			0.36			0.44	0.44			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	109	1606			2079			697	1098			
v/s Ratio Prot	c0.05	0.25			c0.24			0.15				
v/s Ratio Perm									c0.41			
v/c Ratio	0.69	0.53			0.66			0.33	0.92			
Uniform Delay, d1	44.9	18.4			27.0			18.2	26.2			
Progression Factor	1.65	0.23			1.00			1.00	1.00			
Incremental Delay, d2	13.7	1.0			1.7			0.5	13.0			
Delay (s)	87.7	5.2			28.7			18.6	39.1			
Level of Service	F	A			C			B	D			
Approach Delay (s)		11.9			28.7			35.7			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

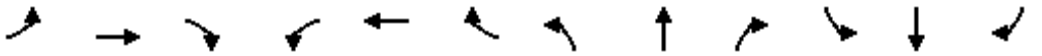


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	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)	3335	3223	3223	1507	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3335	3223	3223	1507	1719	1538
Volume (vph)	236	1671	1106	215	186	237
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	248	1759	1164	226	196	249
RTOR Reduction (vph)	0	0	0	0	0	180
Lane Group Flow (vph)	248	1759	1164	226	196	69
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	12%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	9.7	68.3	25.0	25.0	17.9	17.9
Effective Green, g (s)	9.2	68.3	28.3	28.3	18.8	18.8
Actuated g/C Ratio	0.13	1.00	0.41	0.41	0.28	0.28
Clearance Time (s)	3.5		7.3	7.3	4.9	4.9
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	449	3223	1335	624	473	423
v/s Ratio Prot	0.07	c0.55	c0.36		0.11	
v/s Ratio Perm				0.15		0.04
v/c Ratio	0.55	0.55	0.87	0.36	0.41	0.16
Uniform Delay, d1	27.6	0.0	18.3	13.8	20.2	18.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2	6.7	0.4	0.7	0.2
Delay (s)	29.2	0.2	25.0	14.2	20.9	19.0
Level of Service	C	A	C	B	C	B
Approach Delay (s)		3.8	23.3		19.9	
Approach LOS		A	C		B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	4.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

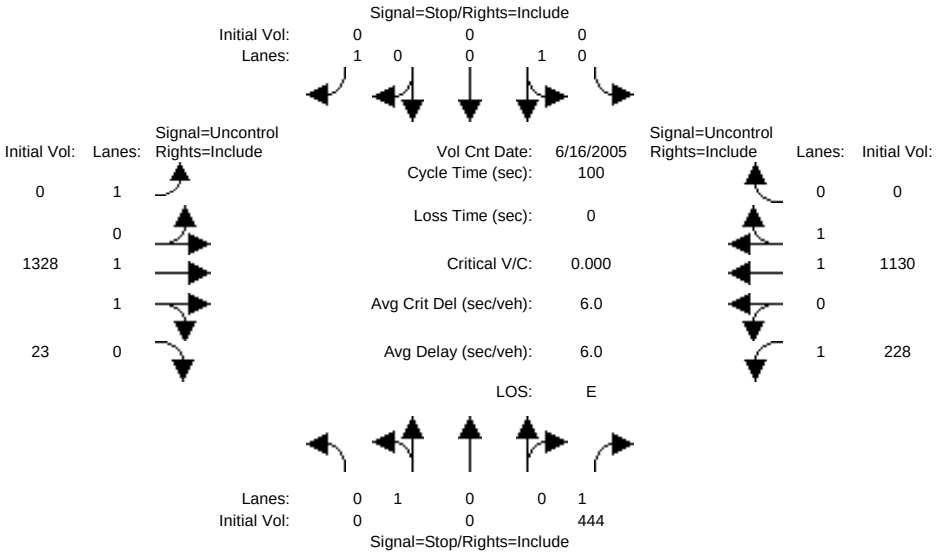


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	4472	1506	3335	4550	1486	3335	3307		3335	1810	1512
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	4472	1506	3335	4550	1486	3335	3307		3335	1810	1512
Volume (vph)	612	966	331	113	740	313	371	602	180	328	231	342
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	644	1017	348	119	779	329	391	634	189	345	243	360
RTOR Reduction (vph)	0	0	217	0	0	226	0	0	0	0	0	264
Lane Group Flow (vph)	644	1017	131	119	779	103	391	823	0	345	243	96
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	24.0	38.8	38.8	6.6	21.4	21.4	17.0	30.7		15.4	29.1	29.1
Effective Green, g (s)	23.5	42.1	42.1	6.1	24.7	24.7	17.9	31.6		16.3	30.0	30.0
Actuated g/C Ratio	0.21	0.38	0.38	0.05	0.22	0.22	0.16	0.28		0.15	0.27	0.27
Clearance Time (s)	3.5	7.3	7.3	3.5	7.3	7.3	4.9	4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.5	3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	699	1679	566	181	1003	327	533	932		485	484	405
v/s Ratio Prot	c0.19	0.23		0.04	c0.17		c0.12	c0.25		0.10	0.13	
v/s Ratio Perm			0.09			0.07						0.06
v/c Ratio	0.92	0.61	0.23	0.66	0.78	0.31	0.73	0.88		0.71	0.50	0.24
Uniform Delay, d1	43.4	28.3	23.9	52.0	41.1	36.6	44.8	38.5		45.7	34.7	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	17.3	0.6	0.2	6.4	3.8	0.6	5.4	10.1		5.1	1.0	0.4
Delay (s)	60.7	28.9	24.1	58.4	44.9	37.2	50.2	48.6		50.7	35.7	32.5
Level of Service	E	C	C	E	D	D	D	D		D	D	C
Approach Delay (s)		38.3			44.2			49.1			39.9	
Approach LOS		D			D			D			D	

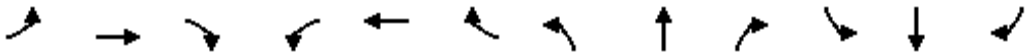
Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	112.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul AM

Intersection #5: SR 46E/Union Rd



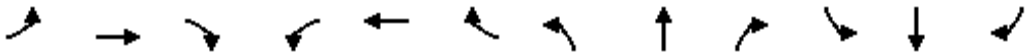
Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertiime AM												
Base Vol:	39	0	250	0	0	0	0	658	23	223	813	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	0	250	0	0	0	0	658	23	223	813	0
Added Vol:	0	0	194	0	0	0	0	670	0	5	317	0
Union LT Re:	-39	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	444	0	0	0	0	1328	23	228	1130	0
User Adj:	1.00	1.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	312	0	0	0	0	1398	24	240	1189	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	312	0	0	0	0	1398	24	240	1189	0
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2485	3079	711	2368	3092	595	xxxx	xxxx	xxxxx	1422	xxxx	xxxxx
Potent Cap.:	25	12	380	19	12	453	xxxx	xxxx	xxxxx	485	xxxx	xxxxx
Move Cap.:	15	6	380	2	6	453	xxxx	xxxx	xxxxx	485	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.82	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.49	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	7.3	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	2.7	xxxx	xxxxx
Control Del:	xxxxx	xxxx	45.6	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	19.5	xxxx	xxxxx
LOS by Move:	*	*	E	*	*	*	*	*	*	C	*	*
Movement:	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	45.6			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	E			*			*			*		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	110	0	1051	0	0	17	312
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	116	0	1106	0	0	18	328
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								368				
pX, platoon unblocked												
vC, conflicting volume	851	1288	182	1288	1453	553	346			1106		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	851	1288	182	1288	1453	553	346			1106		
tC, single (s)	7.9	6.9	7.3	7.9	6.9	7.3	4.5			4.5		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	73	100			100		
cM capacity (veh/h)	164	139	773	103	109	431	1083			527		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	116	369	738	346
Volume Left	0	0	0	0
Volume Right	116	0	0	328
cSH	431	1083	1700	1700
Volume to Capacity	0.27	0.00	0.43	0.20
Queue Length 95th (ft)	27	0	0	0
Control Delay (s)	16.4	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	16.4	0.0		0.0
Approach LOS	C			

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			



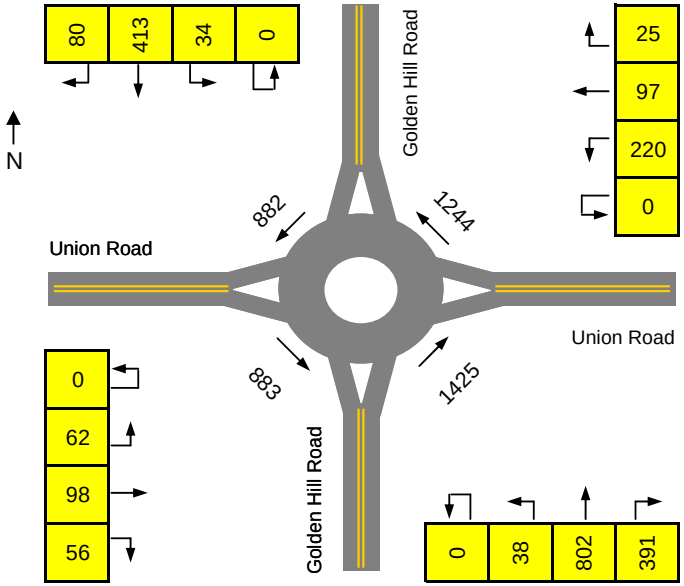
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1051	0	0	0	0	0	0	0	0	17	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1106	0	0	0	0	0	0	0	0	18	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											350	
pX, platoon unblocked												
vC, conflicting volume	36	36	0	36	36	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	36	36	0	36	36	0	0			0		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	0	100	100	100	100	100	100			99		
cM capacity (veh/h)	916	811	1032	916	811	1032	1507			1507		

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	553	553	18
Volume Left	553	553	18
Volume Right	0	0	0
cSH	916	916	1507
Volume to Capacity	0.60	0.60	0.01
Queue Length 95th (ft)	105	105	1
Control Delay (s)	14.7	14.7	7.4
Lane LOS	B	B	A
Approach Delay (s)	14.7		7.4
Approach LOS	B		

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

ROUNDABOUT OPERATIONS ANALYSIS

Type of Design		Roundabout with Double-Lane Circulating Roadway						
Period (hr)	0.25	Date		6/16/2005	E-W	Union Road		
PHF	0.95	Time		AM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Lanes**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	1231	2	194	2277	0.57	4	A	100
South	527	2	355	2163	0.26	2	A	25
East	216	1	667	971	0.23	5	A	25
West	342	1	902	887	0.41	7	A	50
All	2316					4	A	



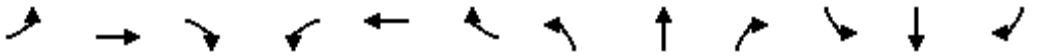
Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

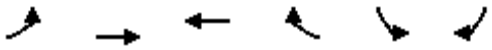


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4716		2918	3343						1399	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4716		2918	3343						1399	1404
Volume (vph)	0	667	236	1174	1093	0	0	0	0	234	0	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	702	248	1236	1151	0	0	0	0	246	0	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	94
Lane Group Flow (vph)	0	950	0	1236	1151	0	0	0	0	0	246	22
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		22.1		45.2	71.4						19.2	19.2
Effective Green, g (s)		22.7		46.0	72.7						19.3	19.3
Actuated g/C Ratio		0.23		0.46	0.73						0.19	0.19
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1071		1342	2430						270	271
v/s Ratio Prot		c0.20		c0.42	0.34							
v/s Ratio Perm											0.18	0.02
v/c Ratio		0.89		0.92	0.47						0.91	0.08
Uniform Delay, d1		37.4		25.3	5.7						39.5	33.1
Progression Factor		1.00		0.31	1.08						1.00	1.00
Incremental Delay, d2		10.9		6.7	0.4						32.3	0.1
Delay (s)		48.3		14.5	6.5						71.9	33.2
Level of Service		D		B	A						E	C
Approach Delay (s)		48.3			10.6			0.0			59.5	
Approach LOS		D			B			A			E	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	0.88			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			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)	1504	3282			5628			1570	2515			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1504	3282			5628			1570	2515			
Volume (vph)	95	806	0	0	1932	231	334	0	762	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	848	0	0	2034	243	352	0	802	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	257	0	0	0
Lane Group Flow (vph)	100	848	0	0	2277	0	0	352	545	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	10.0	64.1			49.0			25.7	25.7			
Effective Green, g (s)	10.0	65.2			51.2			26.8	26.8			
Actuated g/C Ratio	0.10	0.65			0.51			0.27	0.27			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	150	2140			2882			421	674			
v/s Ratio Prot	c0.07	0.26			c0.40			c0.22				
v/s Ratio Perm									0.22			
v/c Ratio	0.67	0.40			0.79			0.84	0.81			
Uniform Delay, d1	43.4	8.2			20.0			34.5	34.2			
Progression Factor	1.61	0.45			1.00			1.00	1.00			
Incremental Delay, d2	5.0	0.2			2.3			14.5	7.9			
Delay (s)	75.1	3.9			22.3			49.0	42.1			
Level of Service	E	A			C			D	D			
Approach Delay (s)		11.4			22.3			44.2			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	3335	3223	3112	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3335	3223	3112	1497	1719	1538
Volume (vph)	129	1440	2014	112	102	149
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	136	1516	2120	118	107	157
RTOR Reduction (vph)	0	0	0	0	0	103
Lane Group Flow (vph)	136	1516	2120	118	107	54
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	16%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	8.3	118.9	79.9	79.9	15.0	15.0
Effective Green, g (s)	7.8	118.9	83.2	83.2	15.9	15.9
Actuated g/C Ratio	0.07	1.00	0.70	0.70	0.13	0.13
Clearance Time (s)	3.5		7.3	7.3	4.9	4.9
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	219	3223	2178	1048	230	206
v/s Ratio Prot	0.04	c0.47	c0.68		0.06	
v/s Ratio Perm				0.08		0.04
v/c Ratio	0.62	0.47	0.97	0.11	0.47	0.26
Uniform Delay, d1	54.1	0.0	16.8	5.8	47.6	46.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.6	0.1	13.6	0.1	1.8	0.8
Delay (s)	59.7	0.1	30.4	5.9	49.3	47.0
Level of Service	E	A	C	A	D	D
Approach Delay (s)		5.0	29.1		48.0	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	118.9	Sum of lost time (s)	4.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.

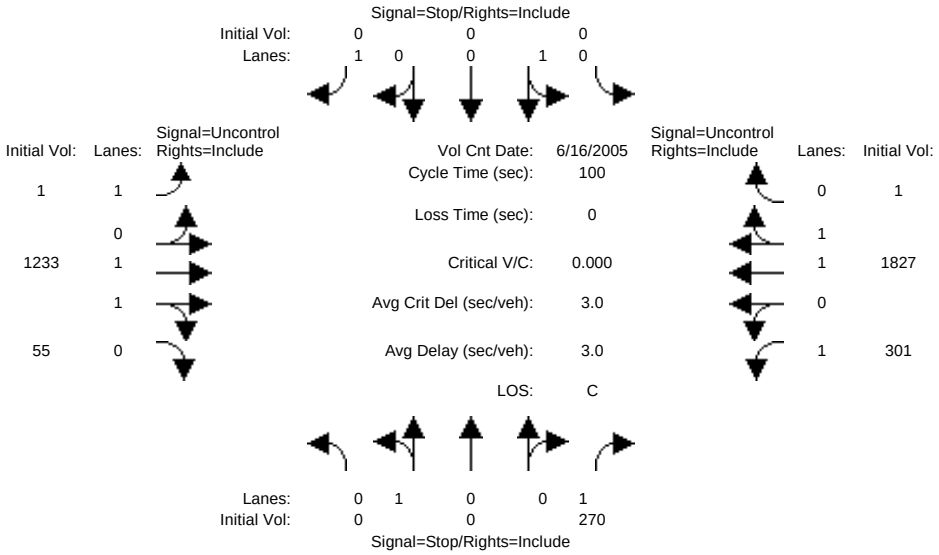
c Critical Lane Group

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	4510	1500	3335	4359	1486	3335	3335		3335	1810	1513
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	4510	1500	3335	4359	1486	3335	3335		3335	1810	1513
Volume (vph)	417	872	322	334	1268	284	260	311	66	394	575	661
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	918	339	352	1335	299	274	327	69	415	605	696
RTOR Reduction (vph)	0	0	40	0	0	94	0	0	0	0	0	3
Lane Group Flow (vph)	439	918	299	352	1335	205	274	396	0	415	605	693
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	17.4	35.8	45.9	14.3	32.7	47.8	10.1	34.1		15.1	39.1	56.5
Effective Green, g (s)	16.9	39.1	50.1	13.8	36.0	52.0	11.0	35.0		16.0	40.0	56.9
Actuated g/C Ratio	0.14	0.33	0.42	0.12	0.30	0.43	0.09	0.29		0.13	0.33	0.47
Clearance Time (s)	3.5	7.3	4.9	3.5	7.3	4.9	4.9	4.9		4.9	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0		2.0	3.0	2.0
Lane Grp Cap (vph)	470	1471	677	384	1309	694	306	974		445	604	768
v/s Ratio Prot	0.13	c0.20	0.04	0.11	c0.31	0.04	0.08	0.12		c0.12	c0.33	c0.13
v/s Ratio Perm			0.16			0.10						0.33
v/c Ratio	0.93	0.62	0.44	0.92	1.02	0.30	0.90	0.41		0.93	1.00	0.90
Uniform Delay, d1	50.9	34.2	24.9	52.5	42.0	22.1	53.9	34.1		51.4	40.0	28.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.5	2.0	0.2	25.7	30.0	0.1	26.0	0.3		26.2	37.0	13.5
Delay (s)	76.4	36.2	25.1	78.1	71.9	22.1	79.9	34.4		77.6	77.0	42.5
Level of Service	E	D	C	E	E	C	E	C		E	E	D
Approach Delay (s)		44.4			65.5			53.0			63.2	
Approach LOS		D			E			D			E	

Intersection Summary			
HCM Average Control Delay	57.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul PM

Intersection #5: SR 46E/Union Rd

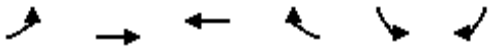


Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: >> Count Date: 16 Jun 2005 << Summertime PM												
Base Vol:	21	1	236	0	0	0	1	902	55	280	1041	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	236	0	0	0	1	902	55	280	1041	1
Added Vol:	0	0	34	0	0	0	0	331	0	21	786	0
Union LT Re:	-21	-1	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	270	0	0	0	1	1233	55	301	1827	1
User Adj:	1.00	1.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	189	0	0	0	1	1298	58	317	1923	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	189	0	0	0	1	1298	58	317	1923	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2924	3887	678	3208	3915	962	1924	xxxx	xxxxx	1356	xxxx	xxxxx
Potent Cap.:	12	4	399	4	3	260	311	xxxx	xxxxx	514	xxxx	xxxxx
Move Cap.:	6	1	399	1	1	260	311	xxxx	xxxxx	514	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.47	0.00	0.00	0.00	0.00	xxxx	xxxx	0.62	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	2.5	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	4.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	21.9	xxxxx	xxxx	xxxxx	16.6	xxxx	xxxxx	22.6	xxxx	xxxxx
LOS by Move:	*	*	C	*	*	*	C	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	21.9			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	C			*			*			*		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	20	0	345	0	0	95	1077
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	21	0	363	0	0	100	1134
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								368				
pX, platoon unblocked												
vC, conflicting volume	869	1030	667	1030	1597	182	1234			363		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	869	1030	667	1030	1597	182	1234			363		
tC, single (s)	7.9	6.9	7.3	7.9	6.9	7.3	4.5			4.5		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	211	203	359	163	88	774	466			1067		

Direction, Lane #	WB 1	NE 1	NE 2	SW 1
Volume Total	21	182	182	1234
Volume Left	0	0	0	0
Volume Right	21	0	0	1134
cSH	774	1700	1700	1700
Volume to Capacity	0.03	0.11	0.11	0.73
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	9.8	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.8	0.0		0.0
Approach LOS	A			

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	81.5%	ICU Level of Service	D	
Analysis Period (min)	15			



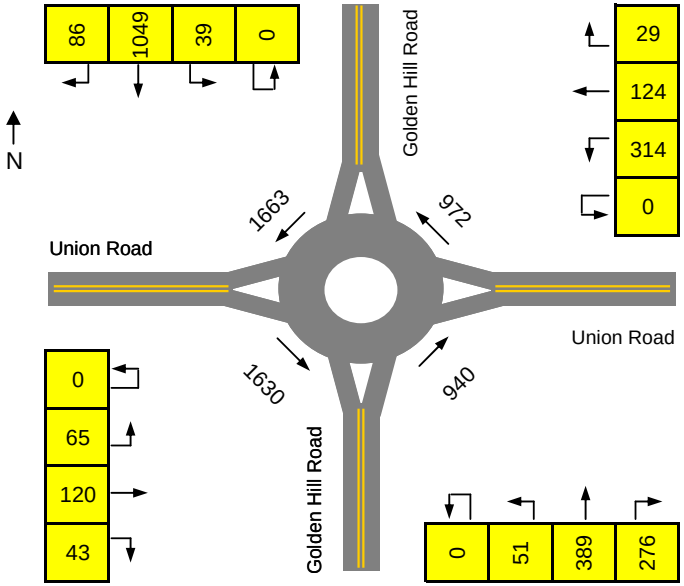
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Volume (veh/h)	345	0	0	0	95	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	363	0	0	0	100	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)					410	
pX, platoon unblocked						
vC, conflicting volume	200	200	200	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200	200	200	0	0	
tC, single (s)	7.3	6.7	6.7	6.4	4.3	
tC, 2 stage (s)						
tF (s)	3.7	4.2	4.2	3.5	2.4	
p0 queue free %	47	100	100	100	93	
cM capacity (veh/h)	683	619	619	1032	1507	

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	182	182	100
Volume Left	182	182	100
Volume Right	0	0	0
cSH	683	683	1507
Volume to Capacity	0.27	0.27	0.07
Queue Length 95th (ft)	27	27	5
Control Delay (s)	12.2	12.2	7.6
Lane LOS	B	B	A
Approach Delay (s)	12.2		7.6
Approach LOS	B		

Intersection Summary			
Average Delay	11.2		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

ROUNDABOUT OPERATIONS ANALYSIS

Type of Design		Roundabout with Double-Lane Circulating Roadway						
Period (hr)	0.25	Date		6/16/2005	E-W	Union Road		
PHF	0.95	Time		PM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Lanes**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	716	2	224	2256	0.33	2	A	25
South	1174	2	489	2068	0.60	4	A	100
East	228	1	1402	710	0.34	8	A	25
West	467	1	505	1028	0.48	7	A	75
All	2585					4	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

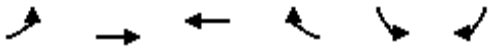
***** Assumes a queued vehicle length of 25 feet***

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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4685		2968	3343						1388	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4685		2968	3343						1388	1404
Volume (vph)	0	718	302	1478	1166	0	0	0	0	282	0	151
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	756	318	1556	1227	0	0	0	0	297	0	159
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	95
Lane Group Flow (vph)	0	1074	0	1556	1227	0	0	0	0	0	297	64
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		25.3		57.2	86.6						24.0	24.0
Effective Green, g (s)		25.9		58.0	87.9						24.1	24.1
Actuated g/C Ratio		0.22		0.48	0.73						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1011		1435	2449						279	282
v/s Ratio Prot		c0.23		c0.52	0.37							
v/s Ratio Perm											0.21	0.05
v/c Ratio		1.06		1.08	0.50						1.06	0.23
Uniform Delay, d1		47.0		31.0	6.8						48.0	40.1
Progression Factor		1.00		0.82	0.89						1.00	1.00
Incremental Delay, d2		46.4		45.0	0.4						72.0	0.4
Delay (s)		93.4		70.3	6.4						119.9	40.6
Level of Service		F		E	A						F	D
Approach Delay (s)		93.4			42.1			0.0			92.2	
Approach LOS		F			D			A			F	

Intersection Summary			
HCM Average Control Delay	60.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	0.88			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1467	3252			5655			1556	2515			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1467	3252			5655			1556	2515			
Volume (vph)	90	910	0	0	2292	235	351	0	807	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	958	0	0	2413	247	369	0	849	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	230	0	0	0
Lane Group Flow (vph)	95	958	0	0	2660	0	0	369	619	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	9.0	79.2			65.1			30.6	30.6			
Effective Green, g (s)	9.0	80.3			67.3			31.7	31.7			
Actuated g/C Ratio	0.08	0.67			0.56			0.26	0.26			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	110	2176			3172			411	664			
v/s Ratio Prot	c0.06	0.29			c0.47			0.24				
v/s Ratio Perm									c0.25			
v/c Ratio	0.86	0.44			0.84			0.90	0.93			
Uniform Delay, d1	54.9	9.3			21.8			42.6	43.1			
Progression Factor	0.88	2.02			1.00			1.00	1.00			
Incremental Delay, d2	6.5	0.1			2.8			22.4	20.4			
Delay (s)	54.6	18.9			24.7			65.0	63.5			
Level of Service	D	B			C			E	E			
Approach Delay (s)		22.1			24.7			63.9			0.0	
Approach LOS		C			C			E			A	

Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	3335	3195	3167	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3335	3195	3167	1497	1719	1538
Volume (vph)	116	1602	2378	114	103	149
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	122	1686	2503	120	108	157
RTOR Reduction (vph)	0	0	0	0	0	98
Lane Group Flow (vph)	122	1686	2503	120	108	59
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	13%	14%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	8.3	119.8	86.7	86.7	9.5	9.5
Effective Green, g (s)	7.8	119.8	90.0	90.0	10.0	10.0
Actuated g/C Ratio	0.07	1.00	0.75	0.75	0.08	0.08
Clearance Time (s)	3.5		7.3	7.3	4.5	4.5
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	217	3195	2379	1125	143	128
v/s Ratio Prot	0.04	c0.53	c0.79		c0.06	
v/s Ratio Perm				0.08		0.04
v/c Ratio	0.56	0.53	1.05	0.11	0.76	0.46
Uniform Delay, d1	54.3	0.0	14.9	4.0	53.7	52.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.2	34.0	0.0	20.6	3.1
Delay (s)	57.9	0.2	48.9	4.1	74.3	55.4
Level of Service	E	A	D	A	E	E
Approach Delay (s)		4.1	46.8		63.1	
Approach LOS		A	D		E	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	119.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

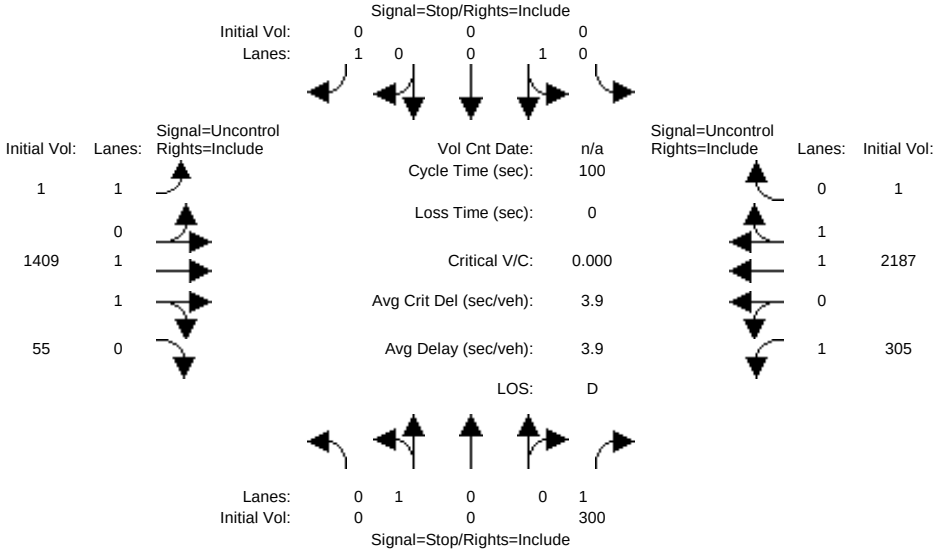
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	4510	1538	3335	4472	1538	3335	3337		3335	1810	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	4510	1538	3335	4472	1538	3335	3337		3335	1810	1538
Volume (vph)	417	1036	322	335	1634	285	260	311	76	396	575	661
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	1091	339	353	1720	300	274	327	80	417	605	696
RTOR Reduction (vph)	0	0	35	0	0	97	0	0	0	0	0	2
Lane Group Flow (vph)	439	1091	304	353	1720	203	274	407	0	417	605	694
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	15.5	39.2	49.7	15.0	38.7	51.2	10.5	34.1		12.5	36.1	51.6
Effective Green, g (s)	15.0	42.5	52.5	14.5	42.0	54.0	10.0	35.0		12.0	37.0	52.0
Actuated g/C Ratio	0.12	0.35	0.44	0.12	0.35	0.45	0.08	0.29		0.10	0.31	0.43
Clearance Time (s)	3.5	7.3	3.5	3.5	7.3	3.5	3.5	4.9		3.5	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.5		2.0	3.5	2.0
Lane Grp Cap (vph)	417	1597	724	403	1565	743	278	973		334	558	718
v/s Ratio Prot	0.13	0.24	0.03	0.11	c0.38	0.03	0.08	0.12		c0.13	c0.33	c0.12
v/s Ratio Perm			0.16			0.10						0.33
v/c Ratio	1.05	0.68	0.42	0.88	1.10	0.27	0.99	0.42		1.25	1.08	0.97
Uniform Delay, d1	52.5	33.0	23.3	51.9	39.0	20.7	54.9	34.3		54.0	41.5	33.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	58.6	1.2	0.1	18.2	54.9	0.1	49.5	0.3		134.4	62.9	25.2
Delay (s)	111.1	34.2	23.4	70.1	93.9	20.8	104.4	34.6		188.4	104.4	58.4
Level of Service	F	C	C	E	F	C	F	C		F	F	E
Approach Delay (s)		50.3			81.1			62.7			106.2	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM Average Control Delay	77.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

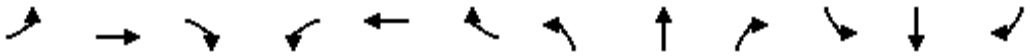
c Critical Lane Group

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Mitig Near Term Cumul Fri PM

Intersection #5: SR 46E/Union Rd



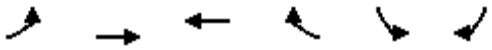
Street Name:	Union Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:	Summertime Fri PM											
Base Vol:	21	1	266	0	0	0	1	1078	55	284	1401	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	1	266	0	0	0	1	1078	55	284	1401	1
Added Vol:	0	0	34	0	0	0	0	331	0	21	786	0
UnionLTRest:	-21	-1	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	300	0	0	0	1	1409	55	305	2187	1
User Adj:	1.00	1.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	211	0	0	0	1	1483	58	321	2302	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	211	0	0	0	1	1483	58	321	2302	1
Critical Gap Module:												
Critical Gp:	6.8	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	3307	4459	771	3688	4488	1152	2303	xxxx	xxxxx	1541	xxxx	xxxxx
Potent Cap.:	7	1	347	2	1	194	221	xxxx	xxxxx	437	xxxx	xxxxx
Move Cap.:	3	0	347	0	0	194	221	xxxx	xxxxx	437	xxxx	xxxxx
Volume/Cap:	0.00	0.00	0.61	0.00	0.00	0.00	0.00	xxxx	xxxx	0.74	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	3.8	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	5.9	xxxx	xxxxx
Control Del:	xxxxx	xxxx	30.1	xxxxx	xxxx	xxxxx	21.3	xxxx	xxxxx	32.9	xxxx	xxxxx
LOS by Move:	*	*	D	*	*	*	C	*	*	D	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	30.1			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	D			*			*			*		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	20	0	378	0	0	95	989
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	21	0	398	0	0	100	1041
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								360				
pX, platoon unblocked												
vC, conflicting volume	841	1018	621	1018	1539	199	1141			398		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	841	1018	621	1018	1539	199	1141			398		
tC, single (s)	7.9	6.9	7.3	7.9	6.9	7.3	4.5			4.5		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	222	207	387	167	96	753	510			1032		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	21	199	199	1141
Volume Left	0	0	0	0
Volume Right	21	0	0	1041
cSH	753	1700	1700	1700
Volume to Capacity	0.03	0.12	0.12	0.67
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.9	0.0		0.0
Approach LOS	A			

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	76.1%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Volume (veh/h)	378	0	0	0	95	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	398	0	0	0	100	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked						
vC, conflicting volume	200	200	200	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200	200	200	0	0	
tC, single (s)	7.3	6.7	6.7	6.4	4.3	
tC, 2 stage (s)						
tF (s)	3.7	4.2	4.2	3.5	2.4	
p0 queue free %	42	100	100	100	93	
cM capacity (veh/h)	683	619	619	1032	1507	

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	199	199	100
Volume Left	199	199	100
Volume Right	0	0	0
cSH	683	683	1507
Volume to Capacity	0.29	0.29	0.07
Queue Length 95th (ft)	30	30	5
Control Delay (s)	12.4	12.4	7.6
Lane LOS	B	B	A
Approach Delay (s)	12.4		7.6
Approach LOS	B		

Intersection Summary			
Average Delay	11.5		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

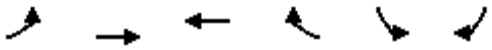
CUMULATIVE (WITH PROJECT MITIGATION)
INTERSECTION LOS CALCULATIONS

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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4624		3099	3406						1372	1223
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4624		3099	3406						1372	1223
Volume (vph)	0	999	406	946	1242	0	0	0	0	234	1	68
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1052	427	996	1307	0	0	0	0	246	1	72
RTOR Reduction (vph)	0	60	0	0	0	0	0	0	0	0	0	58
Lane Group Flow (vph)	0	1419	0	996	1307	0	0	0	0	0	247	14
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		38.6		44.2	86.9						23.7	23.7
Effective Green, g (s)		39.2		45.0	88.2						23.8	23.8
Actuated g/C Ratio		0.33		0.38	0.74						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1511		1162	2503						272	243
v/s Ratio Prot		c0.31		c0.32	0.38							
v/s Ratio Perm											0.18	0.01
v/c Ratio		0.94		0.86	0.52						0.91	0.06
Uniform Delay, d1		39.2		34.5	6.8						47.0	39.0
Progression Factor		1.00		0.92	0.27						1.00	1.00
Incremental Delay, d2		12.6		0.6	0.1						31.3	0.1
Delay (s)		51.8		32.4	1.9						78.3	39.1
Level of Service		D		C	A						E	D
Approach Delay (s)		51.8			15.1			0.0			69.5	
Approach LOS		D			B			A			E	

Intersection Summary			
HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1399	3374			5826			1570	1404			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1399	3374			5826			1570	1404			
Volume (vph)	85	1375	0	0	1908	212	265	0	1476	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	1447	0	0	2008	223	279	0	1554	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	42	0	0	0
Lane Group Flow (vph)	89	1447	0	0	2231	0	0	279	1512	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	5.0	43.9			33.8			65.9	65.9			
Effective Green, g (s)	5.0	45.0			36.0			67.0	67.0			
Actuated g/C Ratio	0.04	0.38			0.30			0.56	0.56			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	58	1265			1748			877	784			
v/s Ratio Prot	c0.06	0.43			c0.38			0.18				
v/s Ratio Perm									c1.08			
v/c Ratio	1.53	1.14			1.28			0.32	1.93			
Uniform Delay, d1	57.5	37.5			42.0			14.2	26.5			
Progression Factor	1.48	0.34			1.00			1.00	1.00			
Incremental Delay, d2	296.8	72.2			128.9			0.4	422.3			
Delay (s)	381.7	85.1			170.9			14.6	448.8			
Level of Service	F	F			F			B	F			
Approach Delay (s)		102.3			170.9			382.7			0.0	
Approach LOS		F			F			F			A	

Intersection Summary			
HCM Average Control Delay	221.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	136.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1719	3223	3223	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1719	3223	3223	1497	1719	1538
Volume (vph)	417	2461	1843	384	275	311
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	2591	1940	404	289	327
RTOR Reduction (vph)	0	0	0	0	0	278
Lane Group Flow (vph)	439	2591	1940	404	289	49
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	12%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	30.5	120.0	56.7	56.7	17.1	17.1
Effective Green, g (s)	30.0	120.0	60.0	60.0	18.0	18.0
Actuated g/C Ratio	0.25	1.00	0.50	0.50	0.15	0.15
Clearance Time (s)	3.5		7.3	7.3	4.9	4.9
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	430	3223	1612	749	258	231
v/s Ratio Prot	c0.26	0.80	c0.60		c0.17	
v/s Ratio Perm				0.27		0.03
v/c Ratio	1.02	0.80	1.20	0.54	1.12	0.21
Uniform Delay, d1	45.0	0.0	30.0	20.5	51.0	44.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.8	1.6	97.7	2.8	92.2	0.5
Delay (s)	93.8	1.6	127.7	23.3	143.2	45.3
Level of Service	F	A	F	C	F	D
Approach Delay (s)		14.9	109.8		91.2	
Approach LOS		B	F		F	

Intersection Summary			
HCM Average Control Delay	59.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.

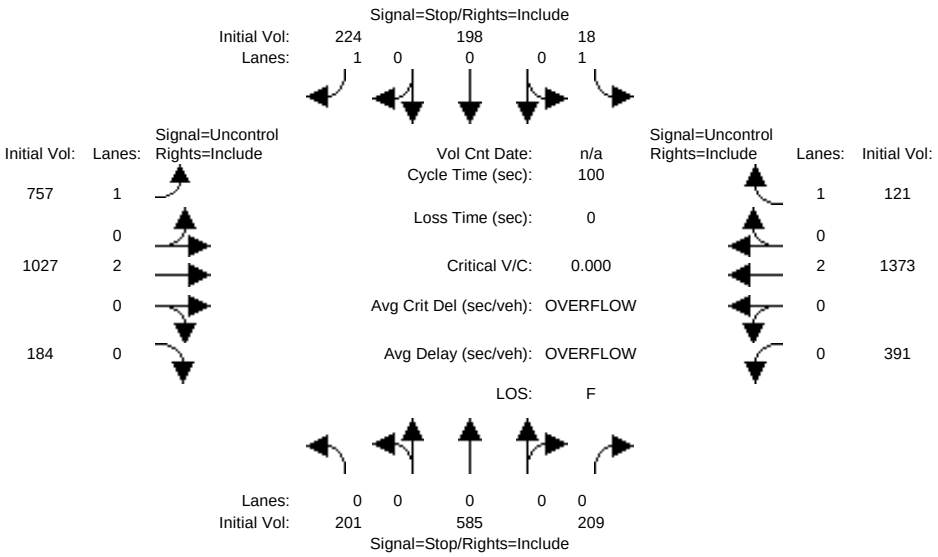
c Critical Lane Group

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3112	1514	3335	3167	1503	3335	3317		3335	1810	1522
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3112	1514	3335	3167	1503	3335	3317		3335	1810	1522
Volume (vph)	734	1486	541	106	1334	363	576	774	208	396	303	410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	773	1564	569	112	1404	382	606	815	219	417	319	432
RTOR Reduction (vph)	0	0	89	0	0	10	0	0	0	0	0	1
Lane Group Flow (vph)	773	1564	480	112	1404	372	606	1034	0	417	319	431
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	23.5	45.7	62.8	4.5	26.7	41.8	17.1	34.1		15.1	32.1	55.6
Effective Green, g (s)	23.0	49.0	67.0	4.0	30.0	46.0	18.0	35.0		16.0	33.0	56.0
Actuated g/C Ratio	0.19	0.41	0.56	0.03	0.25	0.38	0.15	0.29		0.13	0.28	0.47
Clearance Time (s)	3.5	7.3	4.9	3.5	7.3	4.9	4.9	4.9		4.9	4.9	3.5
Vehicle Extension (s)	2.0	3.0	3.5	2.0	3.0	3.5	3.5	3.5		3.5	3.5	2.0
Lane Grp Cap (vph)	639	1271	896	111	792	626	500	967		445	498	761
v/s Ratio Prot	c0.23	0.50	0.08	0.03	c0.44	0.08	c0.18	c0.31		0.13	0.18	0.11
v/s Ratio Perm			0.24			0.17						0.17
v/c Ratio	1.21	1.23	0.54	1.01	1.77	0.59	1.21	1.07		0.94	0.64	0.57
Uniform Delay, d1	48.5	35.5	16.7	58.0	45.0	29.6	51.0	42.5		51.5	38.3	23.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	108.5	110.8	0.7	87.9	352.9	1.6	112.8	49.3		27.5	2.9	0.6
Delay (s)	157.0	146.3	17.4	145.9	397.9	31.2	163.8	91.8		79.0	41.2	23.8
Level of Service	F	F	B	F	F	C	F	F		E	D	C
Approach Delay (s)		123.9			309.2			118.4			48.3	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM Average Control Delay	157.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml AM

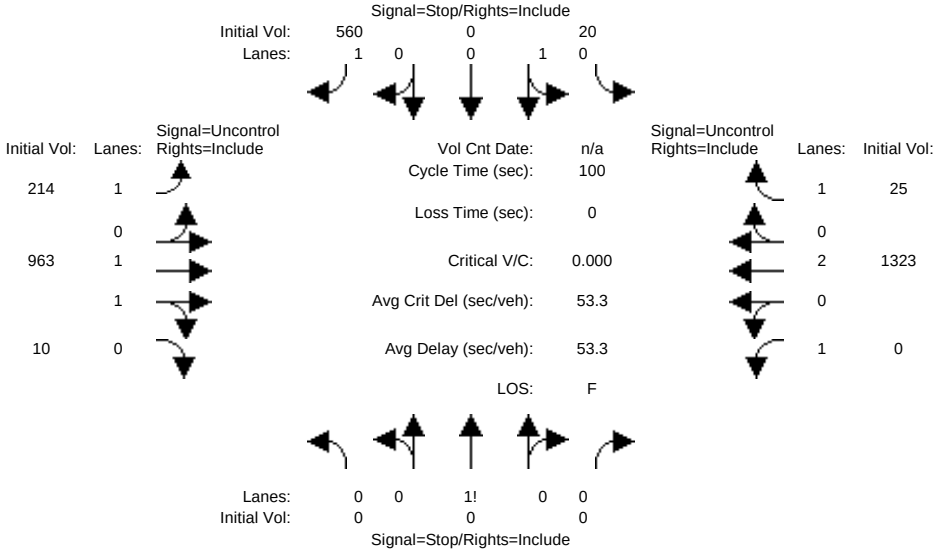
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:AM Peak												
Base Vol:	201	585	209	18	198	224	757	1027	184	391	1373	121
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	201	585	209	18	198	224	757	1027	184	391	1373	121
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	201	585	209	18	198	224	757	1027	184	391	1373	121
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	212	616	220	19	208	236	797	1081	194	412	1445	127
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	212	616	220	19	208	236	797	1081	194	412	1445	127
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	4422	5167	637	4711	5137	723	1573	xxxx	xxxxx	1275	xxxx	xxxxx
Potent Cap.:	0	0	425	0	0	373	425	xxxx	xxxxx	552	xxxx	xxxxx
Move Cap.:	0	0	425	0	0	373	425	xxxx	xxxxx	552	xxxx	xxxxx
Total Cap:	0	0	xxxxx	0	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	0.52	xxxx	xxxx	0.63	1.88	xxxx	xxxx	0.75	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	52.2	xxxx	xxxxx	6.4	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	425.1	xxxx	xxxxx	28.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	F	*	*	D	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	0	xxxxx	0	xxxx	0	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	28.3	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	D	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml AM

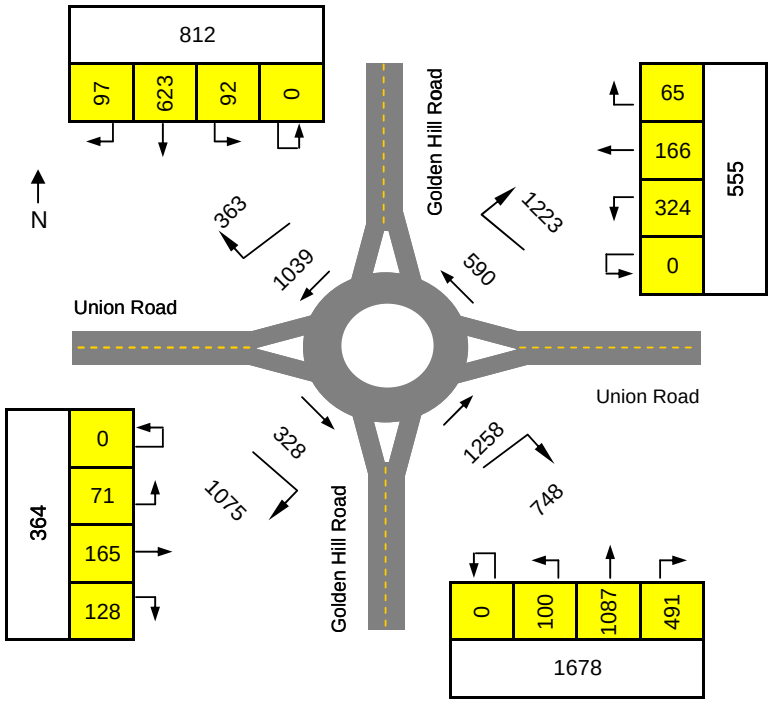
Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Volume Module:AM Peak												
Base Vol:	0	0	0	20	0	560	214	963	10	0	1323	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	20	0	560	214	963	10	0	1323	25
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	560	214	963	10	0	1323	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	21	0	589	225	1014	11	0	1393	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	21	0	589	225	1014	11	0	1393	26
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2166	2888	512	2350	2867	696	1419	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	27	16	512	31	17	389	486	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	0	9	512	20	9	389	486	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	0.00	0.00	1.07	0.00	1.52	0.46	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	32.0	2.4	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	271.6	18.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	C	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	0	xxxxx	20	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	2.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	501.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	F	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			279.5			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)					1		
Period (hr)	0.25	Date	6/16/2005	E-W	Union Road		
PHF	0.95	Time	AM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	1678	328	1033	***1.71***	***331***	***F***	***2450***
South	812	590	891	0.96	38	E	400
East	364	1039	649	0.59	13	B	100
West	555	1258	531	***1.10***	***92***	***F***	***475***
All	3409				188	F	



Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).

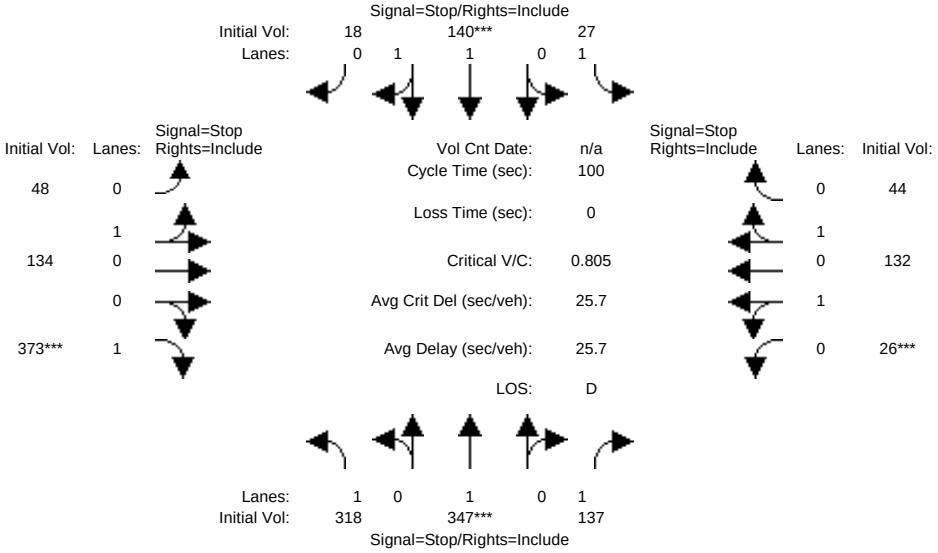
Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cuml AM

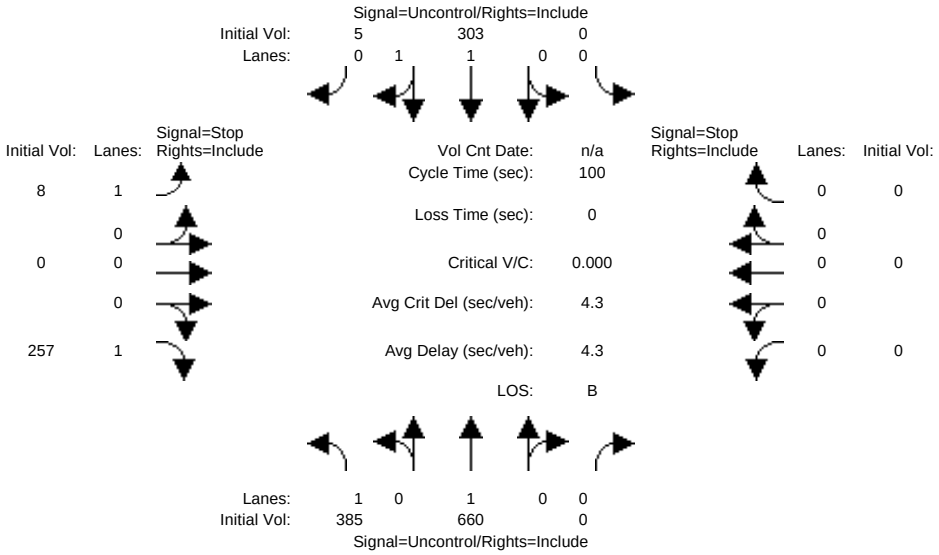
Intersection #10: Buena Vista/Dallons



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:AM Peak												
Base Vol:	318	165	137	23	104	18	48	134	373	26	132	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	318	165	137	23	104	18	48	134	373	26	132	26
Added Vol:	0	182	0	4	36	0	0	0	0	0	0	18
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	318	347	137	27	140	18	48	134	373	26	132	44
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	335	365	144	28	147	19	51	141	393	27	139	46
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	335	365	144	28	147	19	51	141	393	27	139	46
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	335	365	144	28	147	19	51	141	393	27	139	46
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.77	0.23	0.26	0.74	1.00	0.26	1.31	0.43
Final Sat.:	426	454	486	338	639	83	117	326	499	102	531	182
Capacity Analysis Module:												
Vol/Sat:	0.79	0.81	0.30	0.08	0.23	0.23	0.43	0.43	0.79	0.27	0.26	0.25
Crit Moves:		****			****				****	****		
Delay/Veh:	34.9	35.2	12.7	13.4	14.6	14.4	16.3	16.3	30.2	14.2	13.9	13.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.9	35.2	12.7	13.4	14.6	14.4	16.3	16.3	30.2	14.2	13.9	13.4
LOS by Move:	D	E	B	B	B	B	C	C	D	B	B	B
ApproachDel:		31.2			14.4			25.7			13.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		31.2			14.4			25.7			13.8	
LOS by Appr:		D			B			D			B	
AllWayAvgQ:	2.8	3.1	0.4	0.1	0.3	0.3	0.7	0.7	2.8	0.3	0.3	0.3

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml AM

Intersection #11: Golden Hill Rd/Dallons Rd



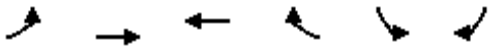
Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:AM Peak												
Base Vol:	367	660	0	0	303	5	8	0	253	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	367	660	0	0	303	5	8	0	253	0	0	0
Added Vol:	18	0	0	0	0	0	0	0	4	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	385	660	0	0	303	5	8	0	257	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	405	695	0	0	319	5	8	0	271	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	405	695	0	0	319	5	8	0	271	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	324	xxxx	xxxxx	xxxx	xxxx	xxxxx	1827	xxxx	162	xxxx	xxxx	xxxxx
Potent Cap.:	1247	xxxx	xxxxx	xxxx	xxxx	xxxxx	85	xxxx	888	xxxx	xxxx	xxxxx
Move Cap.:	1247	xxxx	xxxxx	xxxx	xxxx	xxxxx	64	xxxx	888	xxxx	xxxx	xxxxx
Volume/Cap:	0.33	xxxx	xxxx	xxxx	xxxx	xxxx	0.13	xxxx	0.30	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	1.4	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	1.3	xxxx	xxxx	xxxxx
Control Del:	9.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	69.7	xxxx	10.8	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	F	*	B	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			12.6			xxxxxx		
ApproachLOS:	*			*			B			*		

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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4765		2918	3343						1399	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4765		2918	3343						1399	1404
Volume (vph)	0	1104	283	1591	1789	0	0	0	0	324	0	132
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1162	298	1675	1883	0	0	0	0	341	0	139
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	0	1460	0	1675	1883	0	0	0	0	0	341	112
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		28.4		54.2	86.7						23.9	23.9
Effective Green, g (s)		29.0		55.0	88.0						24.0	24.0
Actuated g/C Ratio		0.24		0.46	0.73						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1152		1337	2452						280	281
v/s Ratio Prot		c0.31		c0.57	0.56							
v/s Ratio Perm											0.24	0.08
v/c Ratio		1.27		1.25	0.77						1.22	0.40
Uniform Delay, d1		45.5		32.5	9.8						48.0	41.7
Progression Factor		1.00		0.24	0.81						1.00	1.00
Incremental Delay, d2		127.3		114.4	0.2						126.0	0.9
Delay (s)		172.8		122.0	8.1						174.0	42.6
Level of Service		F		F	A						F	D
Approach Delay (s)		172.8			61.7			0.0			136.0	
Approach LOS		F			E			A			F	

Intersection Summary			
HCM Average Control Delay	97.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1504	3282			5640			1570	1429			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1504	3282			5640			1570	1429			
Volume (vph)	114	1334	0	0	2979	330	401	0	1226	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	1404	0	0	3136	347	422	0	1291	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0	0	0
Lane Group Flow (vph)	120	1404	0	0	3483	0	0	422	1247	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	6.0	58.9			47.8			50.9	50.9			
Effective Green, g (s)	6.0	60.0			50.0			52.0	52.0			
Actuated g/C Ratio	0.05	0.50			0.42			0.43	0.43			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	75	1641			2350			680	619			
v/s Ratio Prot	c0.08	0.43			c0.62			0.27				
v/s Ratio Perm									c0.87			
v/c Ratio	1.60	0.86			1.48			0.62	2.01			
Uniform Delay, d1	57.0	26.2			35.0			26.4	34.0			
Progression Factor	0.60	1.30			1.00			1.00	1.00			
Incremental Delay, d2	275.6	0.6			219.3			2.2	462.1			
Delay (s)	310.0	34.6			254.3			28.6	496.1			
Level of Service	F	C			F			C	F			
Approach Delay (s)		56.3			254.3			380.9			0.0	
Approach LOS		E			F			F			A	

Intersection Summary			
HCM Average Control Delay	241.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

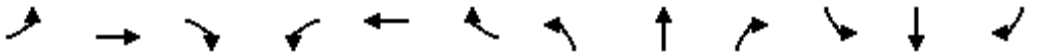


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	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)	1719	3223	3112	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1719	3223	3112	1497	1719	1538
Volume (vph)	262	2299	3077	232	205	233
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	276	2420	3239	244	216	245
RTOR Reduction (vph)	0	0	0	0	0	154
Lane Group Flow (vph)	276	2420	3239	244	216	91
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	16%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	14.5	120.0	78.7	78.7	11.1	11.1
Effective Green, g (s)	14.0	120.0	82.0	82.0	12.0	12.0
Actuated g/C Ratio	0.12	1.00	0.68	0.68	0.10	0.10
Clearance Time (s)	3.5		7.3	7.3	4.9	4.9
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	201	3223	2127	1023	172	154
v/s Ratio Prot	c0.16	0.75	c1.04		c0.13	
v/s Ratio Perm				0.16		0.06
v/c Ratio	1.37	0.75	1.52	0.24	1.26	0.59
Uniform Delay, d1	53.0	0.0	19.0	7.2	54.0	51.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	196.1	1.1	237.7	0.6	153.6	6.3
Delay (s)	249.1	1.1	256.7	7.7	207.6	58.0
Level of Service	F	A	F	A	F	E
Approach Delay (s)		26.4	239.3		128.1	
Approach LOS		C	F		F	

Intersection Summary			
HCM Average Control Delay	145.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.9%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

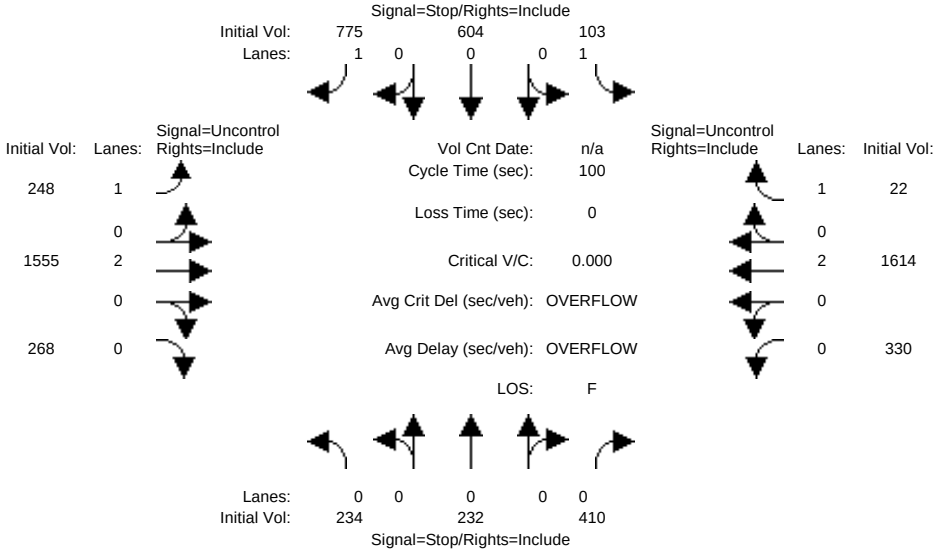


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3139	1499	3335	3034	1483	3335	3331		3335	1810	1512
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3139	1499	3335	3034	1483	3335	3331		3335	1810	1512
Volume (vph)	500	1560	513	145	2109	333	448	414	92	462	732	793
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	1642	540	153	2220	351	472	436	97	486	771	835
RTOR Reduction (vph)	0	0	25	0	0	57	0	0	0	0	0	0
Lane Group Flow (vph)	526	1642	515	153	2220	294	472	533	0	486	771	835
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	14.5	42.4	52.5	8.8	36.7	50.8	10.1	34.1		14.1	38.1	52.6
Effective Green, g (s)	14.0	45.7	56.7	8.3	40.0	55.0	11.0	35.0		15.0	39.0	53.0
Actuated g/C Ratio	0.12	0.38	0.47	0.07	0.33	0.46	0.09	0.29		0.12	0.32	0.44
Clearance Time (s)	3.5	7.3	4.9	3.5	7.3	4.9	4.9	4.9		4.9	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0		2.0	3.0	2.0
Lane Grp Cap (vph)	389	1195	758	231	1011	729	306	972		417	588	718
v/s Ratio Prot	c0.16	0.52	0.06	0.05	c0.73	0.05	c0.14	0.16		0.15	c0.43	c0.14
v/s Ratio Perm			0.28			0.15						0.42
v/c Ratio	1.35	1.37	0.68	0.66	2.20	0.40	1.54	0.55		1.17	1.31	1.16
Uniform Delay, d1	53.0	37.1	24.6	54.5	40.0	21.6	54.5	35.8		52.5	40.5	33.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	174.6	173.7	1.9	5.4	541.4	0.1	259.8	0.6		97.6	151.9	88.2
Delay (s)	227.6	210.8	26.5	59.9	581.4	21.7	314.3	36.5		150.1	192.4	121.7
Level of Service	F	F	C	E	F	C	F	D		F	F	F
Approach Delay (s)		177.3			480.0			167.0			154.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	267.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	137.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml PM

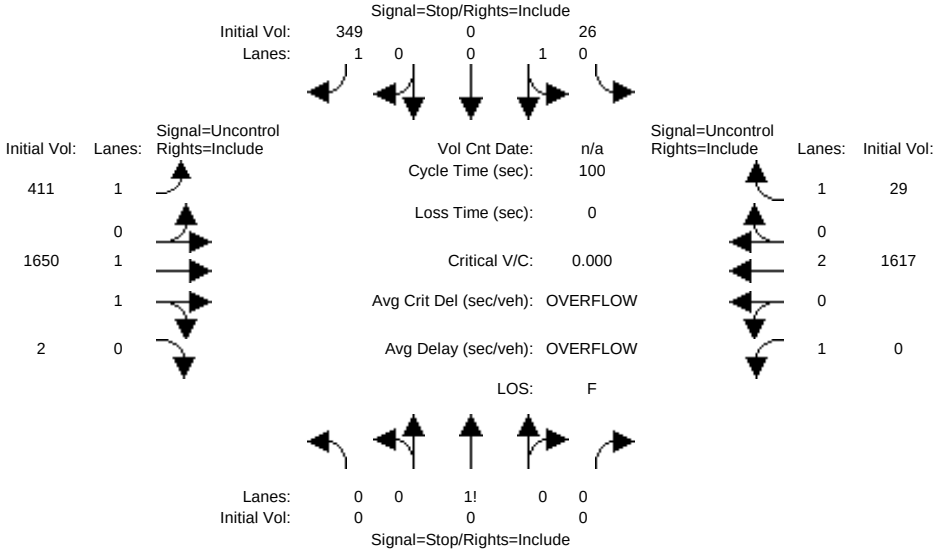
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:PM Peak												
Base Vol:	234	232	410	103	604	775	248	1555	268	330	1614	22
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	232	410	103	604	775	248	1555	268	330	1614	22
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	234	232	410	103	604	775	248	1555	268	330	1614	22
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	246	244	432	108	636	816	261	1637	282	347	1699	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	246	244	432	108	636	816	261	1637	282	347	1699	23
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	4162	4717	959	3856	4835	849	1722	xxxx	xxxxx	1919	xxxx	xxxxx
Potent Cap.:	1	1	261	1	1	308	372	xxxx	xxxxx	312	xxxx	xxxxx
Move Cap.:	0	0	261	0	0	308	372	xxxx	xxxxx	312	xxxx	xxxxx
Total Cap:	0	0	xxxxx	0	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	1.66	xxxx	xxxx	2.65	0.70	xxxx	xxxx	1.11	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	5.1	xxxx	xxxxx	13.8	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	34.5	xxxx	xxxxx	121.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	D	*	*	F	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	0	xxxxx	0	xxxx	0	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	13.8	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	121.6	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	F	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			F			*			*		

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml PM

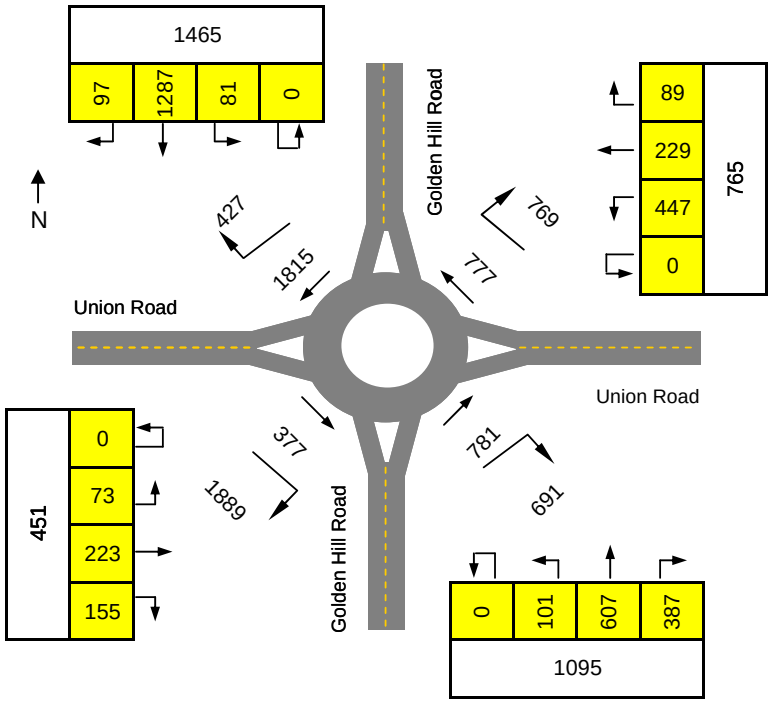
Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:PM Peak												
Base Vol:	0	0	0	26	0	349	411	1650	2	0	1617	29
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	26	0	349	411	1650	2	0	1617	29
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	26	0	349	411	1650	2	0	1617	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	27	0	367	433	1737	2	0	1702	31
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	27	0	367	433	1737	2	0	1702	31
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	3454	4336	869	3436	4306	851	1733	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	3	2	299	5	2	307	369	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	0	0	299	0	0	307	369	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	0.00	xxxx	xxxx	1.19	1.17	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	16.1	17.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	151.2	135.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	F	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	0	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)							1
Period (hr)	0.25	Date	6/16/2005	E-W	Union Road		
PHF	0.95	Time	PM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	1095	377	1006	***1.15***	***90***	***F***	***800***
South	1465	777	790	***1.95***	***442***	***F***	***2500***
East	451	1815	MAX	#N/A	#N/A	#N/A	#N/A
West	765	781	788	***1.02***	55	***F***	***450***
All	3776				#N/A	#N/A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).

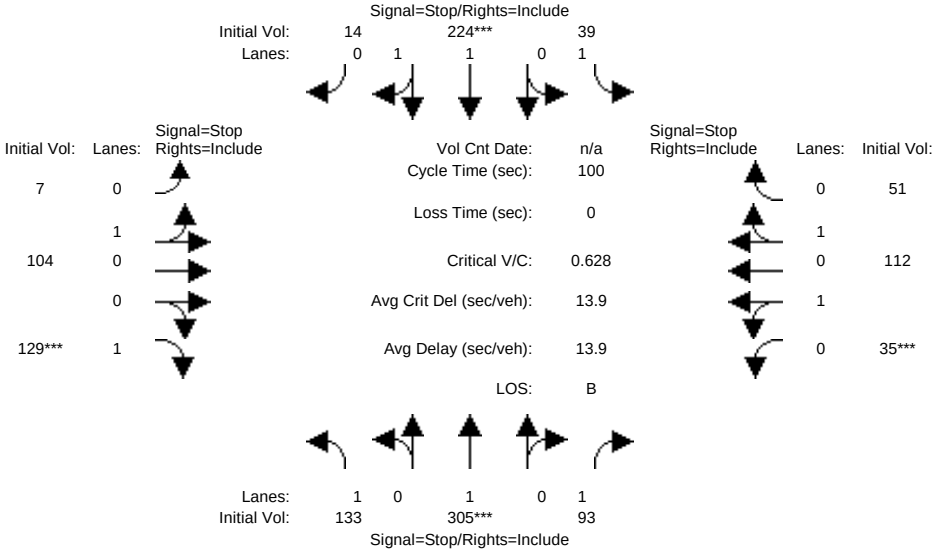
Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cuml PM

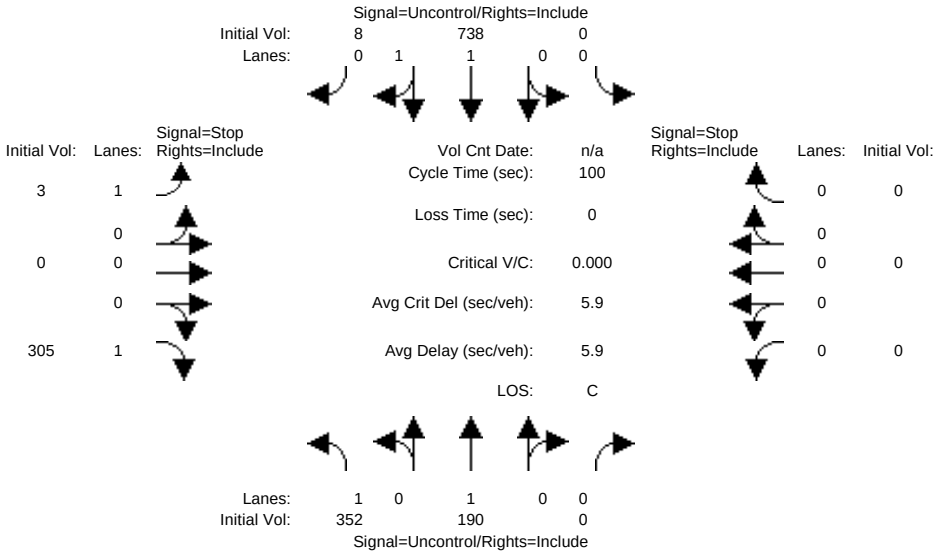
Intersection #10: Buena Vista/Dallons



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module: PM Peak												
Base Vol:	133	159	93	32	151	14	7	104	129	35	112	37
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	133	159	93	32	151	14	7	104	129	35	112	37
Added Vol:	0	146	0	7	73	0	0	0	0	0	0	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	133	305	93	39	224	14	7	104	129	35	112	51
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	140	321	98	41	236	15	7	109	136	37	118	54
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	140	321	98	41	236	15	7	109	136	37	118	54
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	140	321	98	41	236	15	7	109	136	37	118	54
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.88	0.12	0.06	0.94	1.00	0.35	1.13	0.52
Final Sat.:	473	511	559	430	871	55	30	441	521	161	532	252
Capacity Analysis Module:												
Vol/Sat:	0.30	0.63	0.18	0.10	0.27	0.27	0.25	0.25	0.26	0.23	0.22	0.21
Crit Moves:		****			****				****	****		
Delay/Veh:	13.0	19.9	10.1	11.4	12.6	12.5	12.1	12.1	11.3	12.2	11.8	11.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	13.0	19.9	10.1	11.4	12.6	12.5	12.1	12.1	11.3	12.2	11.8	11.3
LOS by Move:	B	C	B	B	B	B	B	B	B	B	B	B
ApproachDel:		16.5			12.4			11.7			11.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		16.5			12.4			11.7			11.8	
LOS by Appr:		C			B			B			B	
AllWayAvgQ:	0.4	1.5	0.2	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml PM

Intersection #11: Golden Hill Rd/Dallons Rd



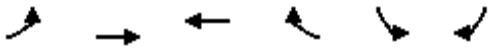
Street Name:	Golden Hill Rd						Dallons Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:PM Peak												
Base Vol:	338	190	0	0	738	8	3	0	298	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	338	190	0	0	738	8	3	0	298	0	0	0
Added Vol:	14	0	0	0	0	0	0	0	7	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	352	190	0	0	738	8	3	0	305	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	371	200	0	0	777	8	3	0	321	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	371	200	0	0	777	8	3	0	321	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	785	xxxx	xxxxx	xxxx	xxxx	xxxxx	1722	xxxx	393	xxxx	xxxx	xxxxx
Potent Cap.:	842	xxxx	xxxxx	xxxx	xxxx	xxxxx	99	xxxx	661	xxxx	xxxx	xxxxx
Move Cap.:	842	xxxx	xxxxx	xxxx	xxxx	xxxxx	65	xxxx	661	xxxx	xxxx	xxxxx
Volume/Cap:	0.44	xxxx	xxxx	xxxx	xxxx	xxxx	0.05	xxxx	0.49	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	2.3	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	2.7	xxxx	xxxx	xxxxx
Control Del:	12.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	63.1	xxxx	15.5	xxxxx	xxxx	xxxxx
LOS by Move:	B	*	*	*	*	*	F	*	C	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			16.0			xxxxxx		
ApproachLOS:	*			*			C			*		

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		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4742		2968	3343						1388	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4742		2968	3343						1388	1404
Volume (vph)	0	1205	362	2030	1943	0	0	0	0	399	0	181
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1268	381	2137	2045	0	0	0	0	420	0	191
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	20
Lane Group Flow (vph)	0	1649	0	2137	2045	0	0	0	0	0	420	171
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		28.4		54.2	86.7						23.9	23.9
Effective Green, g (s)		29.0		55.0	88.0						24.0	24.0
Actuated g/C Ratio		0.24		0.46	0.73						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1146		1360	2452						278	281
v/s Ratio Prot		c0.35		c0.72	0.61							
v/s Ratio Perm											0.30	0.12
v/c Ratio		1.44		1.57	0.83						1.51	0.61
Uniform Delay, d1		45.5		32.5	11.0						48.0	43.7
Progression Factor		1.00		1.13	0.76						1.00	1.00
Incremental Delay, d2		202.5		257.4	0.3						247.6	3.7
Delay (s)		248.0		294.0	8.7						295.6	47.4
Level of Service		F		F	A						F	D
Approach Delay (s)		248.0			154.5			0.0			218.0	
Approach LOS		F			F			A			F	

Intersection Summary			
HCM Average Control Delay	184.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1467	3252			5661			1556	1429			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1467	3252			5661			1556	1429			
Volume (vph)	108	1515	0	0	3552	347	421	0	1322	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	1595	0	0	3739	365	443	0	1392	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	41	0	0	0
Lane Group Flow (vph)	114	1595	0	0	4104	0	0	443	1351	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	5.0	59.9			49.8			49.9	49.9			
Effective Green, g (s)	5.0	61.0			52.0			51.0	51.0			
Actuated g/C Ratio	0.04	0.51			0.43			0.42	0.42			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	61	1653			2453			661	607			
v/s Ratio Prot	c0.08	0.49			c0.72			0.28				
v/s Ratio Perm									c0.95			
v/c Ratio	1.87	0.96			1.67			0.67	2.23			
Uniform Delay, d1	57.5	28.5			34.0			27.7	34.5			
Progression Factor	1.01	1.89			1.00			1.00	1.00			
Incremental Delay, d2	396.6	2.3			304.7			3.2	556.6			
Delay (s)	454.8	56.2			338.7			30.9	591.1			
Level of Service	F	E			F			C	F			
Approach Delay (s)		82.8			338.7			455.9			0.0	
Approach LOS		F			F			F			A	

Intersection Summary			
HCM Average Control Delay	309.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	130.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1719	3195	3167	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1719	3195	3167	1497	1719	1538
Volume (vph)	246	2592	3667	239	212	233
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	259	2728	3860	252	223	245
RTOR Reduction (vph)	0	0	0	0	0	121
Lane Group Flow (vph)	259	2728	3860	252	223	124
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	13%	14%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	11.5	120.0	83.7	83.7	9.5	9.5
Effective Green, g (s)	11.0	120.0	87.0	87.0	10.0	10.0
Actuated g/C Ratio	0.09	1.00	0.72	0.72	0.08	0.08
Clearance Time (s)	3.5		7.3	7.3	4.5	4.5
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	158	3195	2296	1085	143	128
v/s Ratio Prot	c0.15	0.85	c1.22		c0.13	
v/s Ratio Perm				0.17		0.08
v/c Ratio	1.64	0.85	1.68	0.23	1.56	0.97
Uniform Delay, d1	54.5	0.0	16.5	5.5	55.0	54.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	314.4	2.5	308.5	0.1	283.0	69.4
Delay (s)	368.9	2.5	325.0	5.6	338.0	124.2
Level of Service	F	A	F	A	F	F
Approach Delay (s)		34.2	305.4		226.1	
Approach LOS		C	F		F	

Intersection Summary			
HCM Average Control Delay	193.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	136.7%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

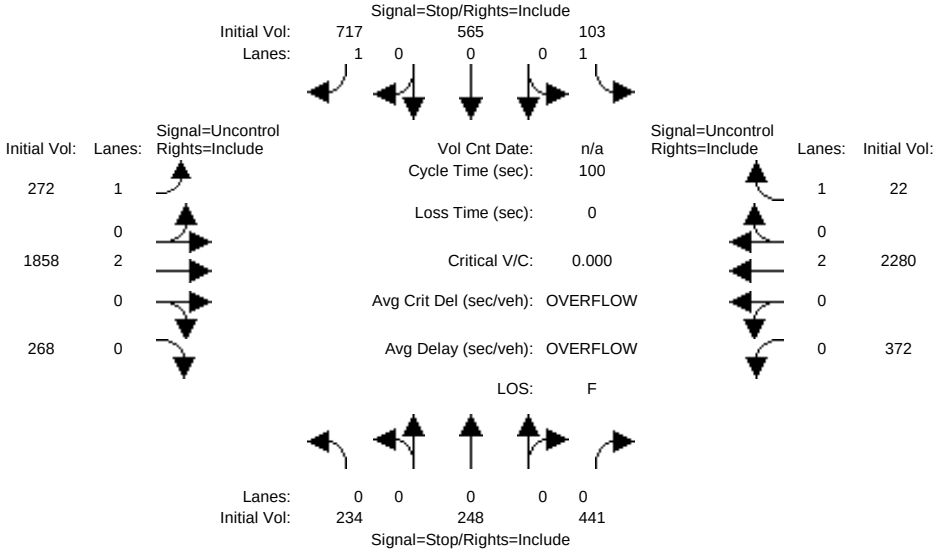
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3139	1538	3335	3112	1538	3335	3331		3335	1810	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3139	1538	3335	3112	1538	3335	3331		3335	1810	1538
Volume (vph)	500	1861	513	166	2705	339	448	414	108	472	732	793
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	1959	540	175	2847	357	472	436	114	497	771	835
RTOR Reduction (vph)	0	0	16	0	0	64	0	0	0	0	0	0
Lane Group Flow (vph)	526	1959	524	175	2847	293	472	550	0	497	771	835
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	11.5	47.7	58.2	6.5	42.7	55.2	10.5	34.1		12.5	36.1	47.6
Effective Green, g (s)	11.0	51.0	61.0	6.0	46.0	58.0	10.0	35.0		12.0	37.0	48.0
Actuated g/C Ratio	0.09	0.42	0.51	0.05	0.38	0.48	0.08	0.29		0.10	0.31	0.40
Clearance Time (s)	3.5	7.3	3.5	3.5	7.3	3.5	3.5	4.9		3.5	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.5		2.0	3.5	2.0
Lane Grp Cap (vph)	306	1334	833	167	1193	795	278	972		334	558	666
v/s Ratio Prot	c0.16	0.62	0.05	0.05	c0.91	0.04	0.14	0.17		c0.15	c0.43	0.11
v/s Ratio Perm			0.29			0.15						0.43
v/c Ratio	1.72	1.47	0.63	1.05	2.39	0.37	1.70	0.57		1.49	1.38	1.25
Uniform Delay, d1	54.5	34.5	21.3	57.0	37.0	19.5	55.0	36.1		54.0	41.5	36.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	337.0	215.0	1.1	82.9	626.5	0.1	329.1	0.8		235.0	182.7	126.3
Delay (s)	391.5	249.5	22.4	139.9	663.5	19.6	384.1	36.9		289.0	224.2	162.3
Level of Service	F	F	C	F	F	B	F	D		F	F	F
Approach Delay (s)		233.6			568.3			197.2			214.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	344.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	153.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml Fri PM

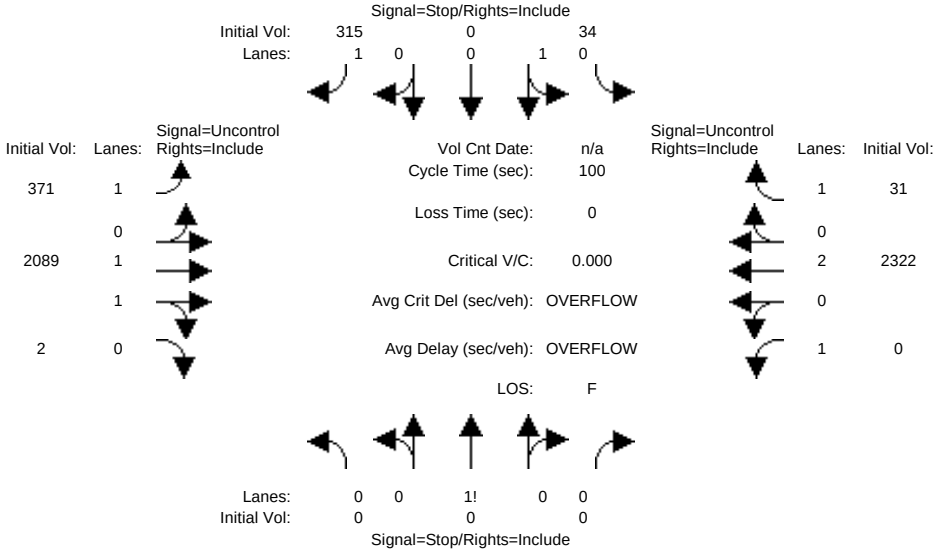
Intersection #6: SR 46E/Airport Rd



Street Name:	Airport Rd						SR 46E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module: Fri PM Peak												
Base Vol:	234	248	441	103	565	717	272	1858	268	372	2280	22
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	248	441	103	565	717	272	1858	268	372	2280	22
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	234	248	441	103	565	717	272	1858	268	372	2280	22
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	246	261	464	108	595	755	286	1956	282	392	2400	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	246	261	464	108	595	755	286	1956	282	392	2400	23
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	7.5	6.5	6.9	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	4950	5876	1119	4864	5994	1200	2423	xxxx	xxxxx	2238	xxxx	xxxxx
Potent Cap.:	0	0	204	0	0	180	199	xxxx	xxxxx	235	xxxx	xxxxx
Move Cap.:	0	0	204	0	0	180	199	xxxx	xxxxx	235	xxxx	xxxxx
Total Cap:	0	0	xxxxx	0	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	2.27	xxxx	xxxx	4.19	1.44	xxxx	xxxx	1.67	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	17.2	xxxx	xxxxx	25.4	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	269.7	xxxx	xxxxx	355.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	F	*	*	F	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	0	xxxxx	0	xxxx	0	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	25.4	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	355.3	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	F	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			F			*			*		

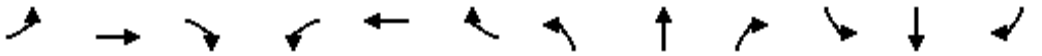
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cuml Fri PM

Intersection #8: SR 46E/Jardine Road



Street Name:	Jardine Road						SR 46 E					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Volume Module:Fri PM Peak												
Base Vol:	0	0	0	34	0	315	371	2089	2	0	2322	31
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	34	0	315	371	2089	2	0	2322	31
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	34	0	315	371	2089	2	0	2322	31
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	36	0	332	391	2199	2	0	2444	33
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	36	0	332	391	2199	2	0	2444	33
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	6.8	6.5	6.9	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	4203	5458	1101	4325	5426	1222	2477	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	1	0	210	1	0	174	189	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	0	0	210	0	0	174	189	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	0.00	xxxx	xxxx	1.90	2.06	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	24.7	30.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	471.4	537.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	F	F	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	0	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

MITIGATED CUMULATIVE WITH NEAR-TERM MITIGATION INTERSECTION LOS CALCULATIONS

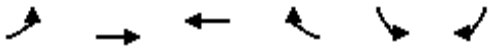


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4624		3099	3406						1372	1223
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4624		3099	3406						1372	1223
Volume (vph)	0	999	406	946	1242	0	0	0	0	234	1	68
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1052	427	996	1307	0	0	0	0	246	1	72
RTOR Reduction (vph)	0	60	0	0	0	0	0	0	0	0	0	58
Lane Group Flow (vph)	0	1419	0	996	1307	0	0	0	0	0	247	14
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	0%	5%	13%	13%	6%	0%	0%	0%	0%	32%	0%	32%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		39.6		43.2	86.9						23.7	23.7
Effective Green, g (s)		40.2		44.0	88.2						23.8	23.8
Actuated g/C Ratio		0.34		0.37	0.74						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1549		1136	2503						272	243
v/s Ratio Prot		c0.31		c0.32	0.38							
v/s Ratio Perm											0.18	0.01
v/c Ratio		0.92		0.88	0.52						0.91	0.06
Uniform Delay, d1		38.3		35.5	6.8						47.0	39.0
Progression Factor		1.00		0.98	0.13						1.00	1.00
Incremental Delay, d2		10.0		0.8	0.4						31.3	0.1
Delay (s)		48.3		35.6	1.2						78.3	39.1
Level of Service		D		D	A						E	D
Approach Delay (s)		48.3			16.1			0.0			69.5	
Approach LOS		D			B			A			E	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	0.88			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1399	3374			5828			1570	2472			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1399	3374			5828			1570	2472			
Volume (vph)	85	1375	0	0	1908	212	265	0	1476	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	1447	0	0	2008	223	279	0	1554	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	75	0	0	0
Lane Group Flow (vph)	89	1447	0	0	2231	0	0	279	1479	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	29%	7%	0%	0%	8%	29%	15%	0%	15%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	8.0	55.9			42.8			53.9	53.9			
Effective Green, g (s)	8.0	57.0			45.0			55.0	55.0			
Actuated g/C Ratio	0.07	0.48			0.38			0.46	0.46			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	93	1603			2186			720	1133			
v/s Ratio Prot	0.06	c0.43			c0.38			0.18				
v/s Ratio Perm									c0.60			
v/c Ratio	0.96	0.90			1.02			0.39	1.31			
Uniform Delay, d1	55.8	29.0			37.5			21.4	32.5			
Progression Factor	1.41	0.20			1.00			1.00	1.00			
Incremental Delay, d2	68.9	6.7			24.6			0.6	144.0			
Delay (s)	147.7	12.4			62.1			22.0	176.5			
Level of Service	F	B			E			C	F			
Approach Delay (s)		20.2			62.1			153.0			0.0	
Approach LOS		C			E			F			A	

Intersection Summary			
HCM Average Control Delay	80.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	3335	3223	3223	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3335	3223	3223	1497	1719	1538
Volume (vph)	417	2461	1843	384	275	311
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	2591	1940	404	289	327
RTOR Reduction (vph)	0	0	0	0	0	193
Lane Group Flow (vph)	439	2591	1940	404	289	134
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	12%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	17.5	120.0	62.7	62.7	24.1	24.1
Effective Green, g (s)	17.0	120.0	66.0	66.0	25.0	25.0
Actuated g/C Ratio	0.14	1.00	0.55	0.55	0.21	0.21
Clearance Time (s)	3.5		7.3	7.3	4.9	4.9
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	472	3223	1773	823	358	320
v/s Ratio Prot	0.13	c0.80	c0.60		0.17	
v/s Ratio Perm				0.27		0.09
v/c Ratio	0.93	0.80	1.09	0.49	0.81	0.42
Uniform Delay, d1	50.9	0.0	27.0	16.6	45.2	41.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.3	1.6	52.0	0.5	12.8	1.0
Delay (s)	76.3	1.6	79.0	17.2	58.0	42.2
Level of Service	E	A	E	B	E	D
Approach Delay (s)		12.4	68.3		49.7	
Approach LOS		B	E		D	

Intersection Summary			
HCM Average Control Delay	38.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	4472	1515	3335	4550	1506	3335	3317		3335	1810	1523
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	4472	1515	3335	4550	1506	3335	3317		3335	1810	1523
Volume (vph)	734	1486	541	106	1334	363	576	774	208	396	303	410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	773	1564	569	112	1404	382	606	815	219	417	319	432
RTOR Reduction (vph)	0	0	99	0	0	10	0	0	0	0	0	2
Lane Group Flow (vph)	773	1564	470	112	1404	372	606	1034	0	417	319	430
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	5%	16%	5%	5%	14%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	24.5	40.1	59.2	8.1	23.7	40.6	19.1	34.1		16.9	31.9	56.4
Effective Green, g (s)	24.0	43.4	63.4	7.6	27.0	44.8	20.0	35.0		17.8	32.8	56.8
Actuated g/C Ratio	0.20	0.36	0.53	0.06	0.23	0.37	0.17	0.29		0.15	0.27	0.47
Clearance Time (s)	3.5	7.3	4.9	3.5	7.3	4.9	4.9	4.9		4.9	4.9	3.5
Vehicle Extension (s)	2.0	3.0	3.5	2.0	3.0	3.5	3.5	3.5		3.5	3.5	2.0
Lane Grp Cap (vph)	668	1620	852	212	1025	613	557	969		496	496	773
v/s Ratio Prot	c0.23	0.35	0.09	0.03	c0.31	0.09	c0.18	c0.31		0.13	0.18	0.11
v/s Ratio Perm			0.22			0.16						0.17
v/c Ratio	1.16	0.97	0.55	0.53	1.37	0.61	1.09	1.07		0.84	0.64	0.56
Uniform Delay, d1	47.9	37.5	18.7	54.4	46.4	30.4	49.9	42.4		49.6	38.3	22.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	86.9	14.9	0.9	1.1	172.7	1.8	64.2	48.6		12.5	3.0	0.5
Delay (s)	134.8	52.3	19.6	55.5	219.1	32.2	114.1	91.0		62.1	41.3	23.0
Level of Service	F	D	B	E	F	C	F	F		E	D	C
Approach Delay (s)		67.8			171.8			99.5			42.0	
Approach LOS		E			F			F			D	

Intersection Summary			
HCM Average Control Delay	96.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	119.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	391	0	121	201	585	0	0	216	224
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	412	0	127	212	616	0	0	227	236
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								368				
pX, platoon unblocked												
vC, conflicting volume	1204	1384	345	1384	1502	308	463			616		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1204	1384	345	1384	1502	308	463			616		
tC, single (s)	7.9	6.9	7.3	7.9	6.9	7.3	4.5			4.5		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	0	100	80	78			100		
cM capacity (veh/h)	80	94	599	72	79	635	971			841		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	539	417	411	463
Volume Left	412	212	0	0
Volume Right	127	0	0	236
cSH	91	971	1700	1700
Volume to Capacity	5.91	0.22	0.24	0.27
Queue Length 95th (ft)	Err	21	0	0
Control Delay (s)	Err	6.1	0.0	0.0
Lane LOS	F	A		
Approach Delay (s)	Err	3.1		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	2947.0		
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

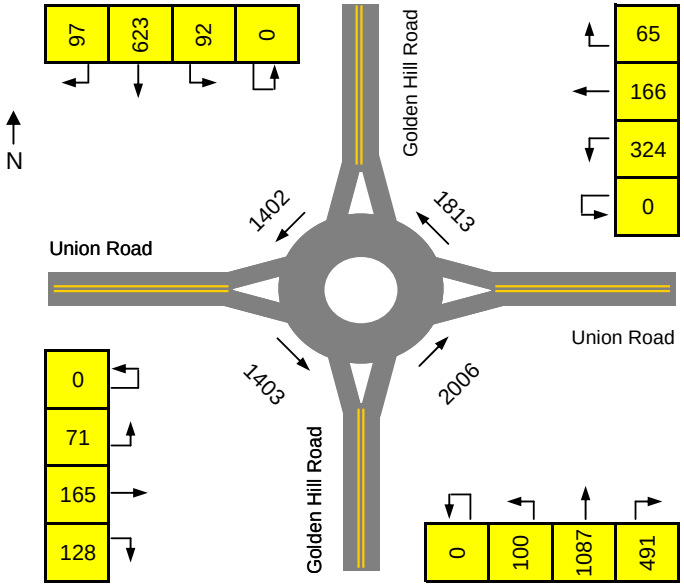
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	757	0	184	0	0	0	0	786	209	18	198	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	797	0	194	0	0	0	0	827	220	19	208	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											564	
pX, platoon unblocked												
vC, conflicting volume	1184	1294	208	1377	1184	937	208			1047		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1184	1294	208	1377	1184	937	208			1047		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	0	100	75	100	100	100	100			97		
cM capacity (veh/h)	149	144	786	82	169	296	1257			597		

Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1	SB 2
Volume Total	398	398	194	1047	19	208
Volume Left	398	398	0	0	19	0
Volume Right	0	0	194	220	0	0
cSH	149	149	786	1257	597	1700
Volume to Capacity	2.68	2.68	0.25	0.00	0.03	0.12
Queue Length 95th (ft)	886	886	24	0	2	0
Control Delay (s)	822.7	822.7	11.1	0.0	11.2	0.0
Lane LOS	F	F	B		B	
Approach Delay (s)	664.0			0.0	0.9	
Approach LOS	F					

Intersection Summary				
Average Delay	290.4			
Intersection Capacity Utilization	82.3%	ICU Level of Service	E	
Analysis Period (min)	15			

ROUNDABOUT OPERATIONS ANALYSIS

Type of Design		Roundabout with Double-Lane Circulating Roadway						
Period (hr)	0.25	Date	1/1/2002	6/16/2005	E-W	Union Road		
PHF	0.95	Time	AM	AM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Lanes**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	1678	2	328	2182	0.81	8	A	275
South	812	2	590	1996	0.43	3	A	50
East	364	2	1039	1677	0.23	3	A	25
West	555	2	1258	1522	0.38	4	A	50
All	3409					6	A	



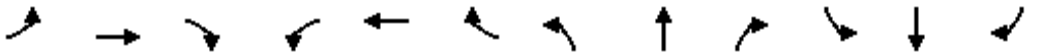
Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

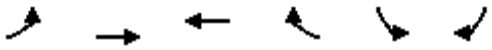


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4766		2918	3343						1399	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4766		2918	3343						1399	1404
Volume (vph)	0	1104	283	1591	1789	0	0	0	0	324	0	132
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1162	298	1675	1883	0	0	0	0	341	0	139
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	1460	0	1675	1883	0	0	0	0	0	341	113
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	20%	8%	0%	0%	0%	0%	29%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		29.4		52.2	85.7						24.9	24.9
Effective Green, g (s)		30.0		53.0	87.0						25.0	25.0
Actuated g/C Ratio		0.25		0.44	0.72						0.21	0.21
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1192		1289	2424						291	293
v/s Ratio Prot		c0.31		c0.57	0.56							
v/s Ratio Perm											0.24	0.08
v/c Ratio		1.22		1.30	0.78						1.17	0.39
Uniform Delay, d1		45.0		33.5	10.4						47.5	40.9
Progression Factor		1.00		0.60	0.39						1.00	1.00
Incremental Delay, d2		108.8		135.3	0.2						107.6	0.8
Delay (s)		153.8		155.4	4.3						155.1	41.7
Level of Service		F		F	A						F	D
Approach Delay (s)		153.8			75.4			0.0			122.3	
Approach LOS		F			E			A			F	

Intersection Summary			
HCM Average Control Delay	100.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	0.88			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1504	3282			5641			1570	2515			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1504	3282			5641			1570	2515			
Volume (vph)	114	1334	0	0	2979	330	401	0	1226	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	1404	0	0	3136	347	422	0	1291	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	99	0	0	0
Lane Group Flow (vph)	120	1404	0	0	3483	0	0	422	1192	0	0	0
Confl. Peds. (#/hr)	10		10	10		10						
Heavy Vehicles (%)	20%	10%	0%	0%	12%	30%	15%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	7.0	71.9			59.8			37.9	37.9			
Effective Green, g (s)	7.0	73.0			62.0			39.0	39.0			
Actuated g/C Ratio	0.06	0.61			0.52			0.32	0.32			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	88	1997			2915			510	817			
v/s Ratio Prot	c0.08	0.43			c0.62			0.27				
v/s Ratio Perm									c0.47			
v/c Ratio	1.36	0.70			1.19			0.83	1.46			
Uniform Delay, d1	56.5	16.1			29.0			37.4	40.5			
Progression Factor	1.67	0.38			1.00			1.00	1.00			
Incremental Delay, d2	170.3	0.2			91.3			11.6	213.2			
Delay (s)	264.5	6.3			120.3			48.9	253.7			
Level of Service	F	A			F			D	F			
Approach Delay (s)		26.6			120.3			203.3			0.0	
Approach LOS		C			F			F			A	

Intersection Summary			
HCM Average Control Delay	120.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	3335	3223	3112	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3335	3223	3112	1497	1719	1538
Volume (vph)	262	2299	3077	232	205	233
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	276	2420	3239	244	216	245
RTOR Reduction (vph)	0	0	0	0	0	91
Lane Group Flow (vph)	276	2420	3239	244	216	154
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	12%	16%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	8.5	120.0	84.7	84.7	11.1	11.1
Effective Green, g (s)	8.0	120.0	88.0	88.0	12.0	12.0
Actuated g/C Ratio	0.07	1.00	0.73	0.73	0.10	0.10
Clearance Time (s)	3.5		7.3	7.3	4.9	4.9
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	222	3223	2282	1098	172	154
v/s Ratio Prot	c0.08	0.75	c1.04		c0.13	
v/s Ratio Perm				0.16		0.10
v/c Ratio	1.24	0.75	1.42	0.22	1.26	1.00
Uniform Delay, d1	56.0	0.0	16.0	5.1	54.0	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	141.5	1.1	191.3	0.5	153.6	72.7
Delay (s)	197.5	1.1	207.3	5.6	207.6	126.7
Level of Service	F	A	F	A	F	F
Approach Delay (s)		21.2	193.2		164.6	
Approach LOS		C	F		F	

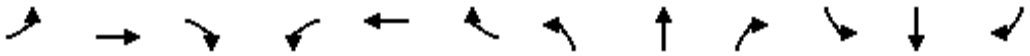
Intersection Summary			
HCM Average Control Delay	121.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.9%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	4510	1501	3335	4359	1484	3335	3331		3335	1810	1512
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	4510	1501	3335	4359	1484	3335	3331		3335	1810	1512
Volume (vph)	500	1560	513	145	2109	333	448	414	92	462	732	793
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	1642	540	153	2220	351	472	436	97	486	771	835
RTOR Reduction (vph)	0	0	43	0	0	53	0	0	0	0	0	1
Lane Group Flow (vph)	526	1642	497	153	2220	298	472	533	0	486	771	834
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	5%	15%	5%	5%	19%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	13.5	40.3	52.4	9.9	36.7	51.8	12.1	34.1		15.1	37.1	50.6
Effective Green, g (s)	13.0	43.6	56.6	9.4	40.0	56.0	13.0	35.0		16.0	38.0	51.0
Actuated g/C Ratio	0.11	0.36	0.47	0.08	0.33	0.47	0.11	0.29		0.13	0.32	0.42
Clearance Time (s)	3.5	7.3	4.9	3.5	7.3	4.9	4.9	4.9		4.9	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0		2.0	3.0	2.0
Lane Grp Cap (vph)	361	1639	758	261	1453	742	361	972		445	573	693
v/s Ratio Prot	0.16	c0.36	0.07	0.05	c0.51	0.05	c0.14	0.16		0.15	c0.43	c0.13
v/s Ratio Perm			0.26			0.15						0.42
v/c Ratio	1.46	1.00	0.66	0.59	1.53	0.40	1.31	0.55		1.09	1.35	1.20
Uniform Delay, d1	53.5	38.2	24.2	53.4	40.0	21.0	53.5	35.8		52.0	41.0	34.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	220.5	22.7	1.6	2.2	241.1	0.1	157.0	0.6		69.9	166.9	105.2
Delay (s)	274.0	60.9	25.8	55.6	281.1	21.1	210.5	36.5		121.9	207.9	139.7
Level of Service	F	E	C	E	F	C	F	D		F	F	F
Approach Delay (s)		95.3			234.9			118.2			160.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	158.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	330	0	22	234	232	0	0	707	775
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	347	0	23	246	244	0	0	744	816
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								368				
pX, platoon unblocked												
vC, conflicting volume	1790	1889	780	1109	2297	122	1560			244		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1790	1889	780	1109	2297	122	1560			244		
tC, single (s)	7.9	6.9	7.3	7.9	6.9	7.3	4.5			4.5		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	0	100	97	27			100		
cM capacity (veh/h)	16	15	300	58	8	849	340			1192		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	371	328	163	496	1064
Volume Left	347	246	0	0	0
Volume Right	23	0	0	0	816
cSH	62	340	1700	1700	1700
Volume to Capacity	6.01	0.73	0.10	0.29	0.63
Queue Length 95th (ft)	Err	135	0	0	0
Control Delay (s)	Err	36.8	0.0	0.0	0.0
Lane LOS	F	E			
Approach Delay (s)	Err	24.6		0.0	
Approach LOS	F				

Intersection Summary				
Average Delay	1535.3			
Intersection Capacity Utilization	87.3%	ICU Level of Service	E	
Analysis Period (min)	15			

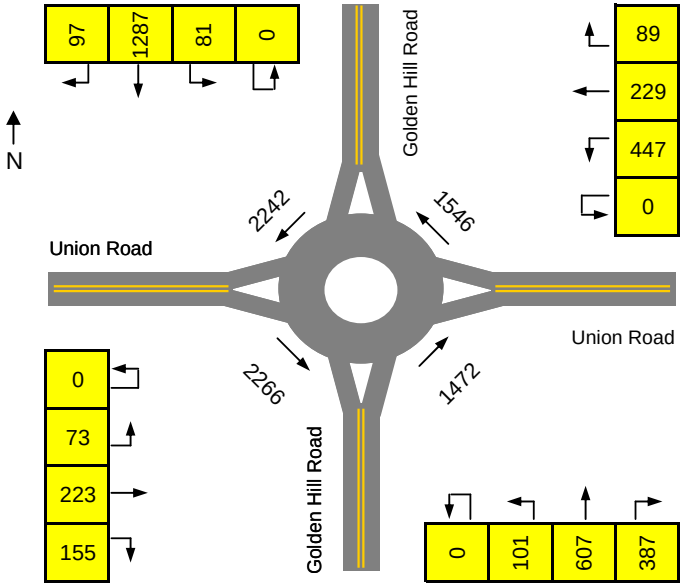
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	248	0	268	0	0	0	0	466	410	103	604	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	261	0	282	0	0	0	0	491	432	108	636	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											617	
pX, platoon unblocked												
vC, conflicting volume	1559	1775	636	1841	1559	706	636			922		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1559	1775	636	1841	1559	706	636			922		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	0	100	37	100	100	100	100			84		
cM capacity (veh/h)	72	62	446	17	85	405	863			668		

Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1	SB 2
Volume Total	131	131	282	922	108	636
Volume Left	131	131	0	0	108	0
Volume Right	0	0	282	432	0	0
cSH	72	72	446	863	668	1700
Volume to Capacity	1.81	1.81	0.63	0.00	0.16	0.37
Queue Length 95th (ft)	288	288	107	0	14	0
Control Delay (s)	508.1	508.1	26.0	0.0	11.4	0.0
Lane LOS	F	F	D		B	
Approach Delay (s)	257.7			0.0	1.7	
Approach LOS	F					

Intersection Summary				
Average Delay	63.9			
Intersection Capacity Utilization	108.0%	ICU Level of Service	G	
Analysis Period (min)	15			

ROUNDABOUT OPERATIONS ANALYSIS

Type of Design		Roundabout with Double-Lane Circulating Roadway						
Period (hr)	0.25	Date	1/1/2002	6/16/2005	E-W	Union Road		
PHF	0.95	Time	AM	PM Peak	N-S	Golden Hill Road		
Approach	**Total Volume (vph)**	**Lanes**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	1095	2	377	2147	0.54	4	A	75
South	1465	2	777	1863	0.83	10	B	275
East	451	2	1815	1126	0.42	6	A	50
West	765	2	781	1860	0.43	3	A	50
All	3776					6	A	



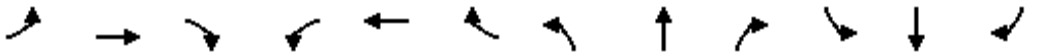
Source: Roundabouts: An Informational Guide (FHWA, 2000)

Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).

Does not account for flared entry lanes or pedestrian effects.

**** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000***

***** Assumes a queued vehicle length of 25 feet***

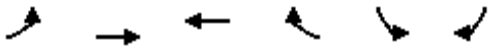


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.91		0.97	0.95						1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		4741		2968	3343						1388	1404
Flt Permitted		1.00		0.95	1.00						0.95	1.00
Satd. Flow (perm)		4741		2968	3343						1388	1404
Volume (vph)	0	1205	362	2030	1943	0	0	0	0	399	0	181
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1268	381	2137	2045	0	0	0	0	420	0	191
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	20
Lane Group Flow (vph)	0	1649	0	2137	2045	0	0	0	0	0	420	171
Confl. Peds. (#/hr)			10	10								
Heavy Vehicles (%)	0%	5%	5%	18%	8%	0%	0%	0%	0%	30%	0%	15%
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)		26.4		56.2	86.7						23.9	23.9
Effective Green, g (s)		27.0		57.0	88.0						24.0	24.0
Actuated g/C Ratio		0.22		0.48	0.73						0.20	0.20
Clearance Time (s)		4.6		4.8	5.3						4.1	4.1
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		1067		1410	2452						278	281
v/s Ratio Prot		c0.35		c0.72	0.61							
v/s Ratio Perm											0.30	0.12
v/c Ratio		1.55		1.52	0.83						1.51	0.61
Uniform Delay, d1		46.5		31.5	11.0						48.0	43.7
Progression Factor		1.00		1.16	0.65						1.00	1.00
Incremental Delay, d2		250.1		232.4	0.3						247.6	3.7
Delay (s)		296.6		268.8	7.4						295.6	47.4
Level of Service		F		F	A						F	D
Approach Delay (s)		296.6			141.0			0.0			218.0	
Approach LOS		F			F			A			F	

Intersection Summary			
HCM Average Control Delay	188.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

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			0.86			1.00	0.88			
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1467	3252			5662			1556	2515			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1467	3252			5662			1556	2515			
Volume (vph)	108	1515	0	0	3552	347	421	0	1322	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	1595	0	0	3739	365	443	0	1392	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	100	0	0	0
Lane Group Flow (vph)	114	1595	0	0	4104	0	0	443	1292	0	0	0
Confl. Peds. (#/hr)	10					10						
Heavy Vehicles (%)	23%	11%	0%	0%	12%	30%	16%	0%	13%	0%	0%	0%
Turn Type	Prot						Split		Perm	Split		
Protected Phases	5	2			6		8	8		7	7	
Permitted Phases									8			
Actuated Green, G (s)	9.0	78.9			64.8			30.9	30.9			
Effective Green, g (s)	9.0	80.0			67.0			32.0	32.0			
Actuated g/C Ratio	0.08	0.67			0.56			0.27	0.27			
Clearance Time (s)	4.0	5.1			6.2			5.1	5.1			
Vehicle Extension (s)	3.0	3.0			3.0			4.5	4.5			
Lane Grp Cap (vph)	110	2168			3161			415	671			
v/s Ratio Prot	c0.08	0.49			c0.72			0.28				
v/s Ratio Perm									c0.51			
v/c Ratio	1.04	0.74			1.30			1.07	1.93			
Uniform Delay, d1	55.5	13.1			26.5			44.0	44.0			
Progression Factor	0.99	2.31			1.00			1.00	1.00			
Incremental Delay, d2	35.6	0.2			136.7			63.3	422.2			
Delay (s)	90.8	30.4			163.2			107.3	466.2			
Level of Service	F	C			F			F	F			
Approach Delay (s)		34.5			163.2			379.5			0.0	
Approach LOS		C			F			F			A	

Intersection Summary			
HCM Average Control Delay	186.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	3335	3195	3167	1497	1719	1538
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3335	3195	3167	1497	1719	1538
Volume (vph)	246	2592	3667	239	212	233
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	259	2728	3860	252	223	245
RTOR Reduction (vph)	0	0	0	0	0	80
Lane Group Flow (vph)	259	2728	3860	252	223	165
Confl. Peds. (#/hr)	10			10		
Heavy Vehicles (%)	5%	13%	14%	5%	5%	5%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2 7!	6		7!	
Permitted Phases				6		7
Actuated Green, G (s)	7.5	120.0	86.7	86.7	10.5	10.5
Effective Green, g (s)	7.0	120.0	90.0	90.0	11.0	11.0
Actuated g/C Ratio	0.06	1.00	0.75	0.75	0.09	0.09
Clearance Time (s)	3.5		7.3	7.3	4.5	4.5
Vehicle Extension (s)	3.5		3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	195	3195	2375	1123	158	141
v/s Ratio Prot	0.08	c0.85	c1.22		c0.13	
v/s Ratio Perm				0.17		0.11
v/c Ratio	1.33	0.85	1.63	0.22	1.41	1.17
Uniform Delay, d1	56.5	0.0	15.0	4.5	54.5	54.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	178.6	2.5	283.3	0.1	218.3	129.0
Delay (s)	235.1	2.5	298.3	4.6	272.8	183.5
Level of Service	F	A	F	A	F	F
Approach Delay (s)		22.6	280.3		226.0	
Approach LOS		C	F		F	

Intersection Summary			
HCM Average Control Delay	175.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	123.7%	ICU Level of Service	H
Analysis Period (min)	15		

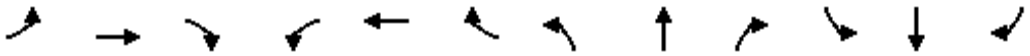
! Phase conflict between lane groups.

c Critical Lane Group

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		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	4510	1538	3335	4472	1538	3335	3331		3335	1810	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	4510	1538	3335	4472	1538	3335	3331		3335	1810	1538
Volume (vph)	500	1861	513	166	2705	339	448	414	108	472	732	793
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	1959	540	175	2847	357	472	436	114	497	771	835
RTOR Reduction (vph)	0	0	15	0	0	70	0	0	0	0	0	6
Lane Group Flow (vph)	526	1959	525	175	2847	287	472	550	0	497	771	829
Heavy Vehicles (%)	5%	15%	5%	5%	16%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	12.5	45.8	58.3	8.4	41.7	54.2	12.5	34.1		12.5	34.1	46.6
Effective Green, g (s)	12.0	49.1	61.1	7.9	45.0	57.0	12.0	35.0		12.0	35.0	47.0
Actuated g/C Ratio	0.10	0.41	0.51	0.07	0.38	0.48	0.10	0.29		0.10	0.29	0.39
Clearance Time (s)	3.5	7.3	3.5	3.5	7.3	3.5	3.5	4.9		3.5	4.9	3.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.5		2.0	3.5	2.0
Lane Grp Cap (vph)	334	1845	834	220	1677	782	334	972		334	528	654
v/s Ratio Prot	c0.16	0.43	0.06	0.05	c0.64	0.04	0.14	0.17		c0.15	c0.43	c0.13
v/s Ratio Perm			0.28			0.15						0.41
v/c Ratio	1.57	1.06	0.63	0.80	1.70	0.37	1.41	0.57		1.49	1.46	1.27
Uniform Delay, d1	54.0	35.5	21.3	55.3	37.5	20.0	54.0	36.1		54.0	42.5	36.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	272.7	39.6	1.1	16.7	316.5	0.1	202.8	0.8		235.0	217.4	132.2
Delay (s)	326.7	75.0	22.3	72.0	354.0	20.1	256.8	36.9		289.0	259.9	168.7
Level of Service	F	E	C	E	F	C	F	D		F	F	F
Approach Delay (s)		109.4			304.2			138.5			230.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	208.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	131.2%	ICU Level of Service	H
Analysis Period (min)	15		

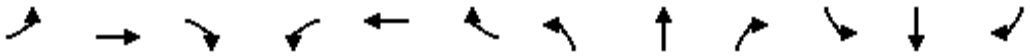
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	372	0	22	234	248	0	0	668	717
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	392	0	23	246	261	0	0	703	755
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1727	1834	1081	1834	2212	131	1458			261		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1727	1834	1081	1834	2212	131	1458			261		
tC, single (s)	7.9	6.9	7.3	7.9	6.9	7.3	4.5			4.5		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	0	100	97	34			100		
cM capacity (veh/h)	21	21	184	18	12	838	375			1173		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	415	333	174	1458
Volume Left	392	246	0	0
Volume Right	23	0	0	755
cSH	19	375	1700	1700
Volume to Capacity	21.74	0.66	0.10	0.86
Queue Length 95th (ft)	Err	112	0	0
Control Delay (s)	Err	28.7	0.0	0.0
Lane LOS	F	D		
Approach Delay (s)	Err	18.8		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	1746.4		
Intersection Capacity Utilization	124.6%	ICU Level of Service	H
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	272	0	268	0	0	0	0	482	441	103	565	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	286	0	282	0	0	0	0	507	464	108	595	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1551	1783	595	1833	1551	739	595			972		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1551	1783	595	1833	1551	739	595			972		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	0	100	40	100	100	100	100			83		
cM capacity (veh/h)	73	61	471	18	86	387	895			639		

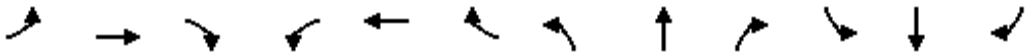
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1	SB 2
Volume Total	143	143	282	972	108	595
Volume Left	143	143	0	0	108	0
Volume Right	0	0	282	464	0	0
cSH	73	73	471	895	639	1700
Volume to Capacity	1.97	1.97	0.60	0.00	0.17	0.35
Queue Length 95th (ft)	324	324	96	0	15	0
Control Delay (s)	575.5	575.5	23.4	0.0	11.8	0.0
Lane LOS	F	F	C		B	
Approach Delay (s)	301.5			0.0	1.8	
Approach LOS	F					

Intersection Summary				
Average Delay	77.0			
Intersection Capacity Utilization	108.7%	ICU Level of Service	G	
Analysis Period (min)	15			

MITIGATED CUMULATIVE WITH ADDITIONAL MITIGATION INTERSECTION LOS CALCULATIONS

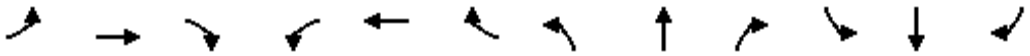
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor					0.95	0.95	0.97	0.95			0.95	0.88
Frt					0.89	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1306	1268	2894	2983			2983	2349
Flt Permitted					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1306	1268	2894	2983			2983	2349
Volume (vph)	0	0	0	106	0	747	534	1173	0	0	970	721
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	112	0	786	562	1235	0	0	1021	759
RTOR Reduction (vph)	0	0	0	0	49	49	0	0	0	0	0	467
Lane Group Flow (vph)	0	0	0	0	423	377	562	1235	0	0	1021	292
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)					39.0	39.0	24.6	72.1			43.5	43.5
Effective Green, g (s)					39.0	39.0	24.6	72.1			43.5	43.5
Actuated g/C Ratio					0.33	0.33	0.21	0.61			0.37	0.37
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					428	415	598	1806			1090	858
v/s Ratio Prot							c0.19	0.41			c0.34	
v/s Ratio Perm					0.32	0.30						0.12
v/c Ratio					0.99	0.91	0.94	0.68			0.94	0.34
Uniform Delay, d1					39.8	38.3	46.5	15.8			36.5	27.4
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					40.0	23.1	22.7	1.1			14.4	0.2
Delay (s)					79.8	61.4	69.2	16.9			50.9	27.6
Level of Service					E	E	E	B			D	C
Approach Delay (s)		0.0			71.1			33.3			41.0	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	119.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



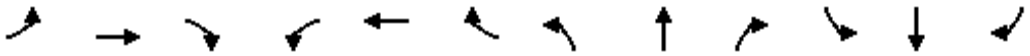
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00						0.95	1.00	0.97	0.95	
Frt	1.00	0.85						1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00						1.00	1.00	0.95	1.00	
Satd. Flow (prot)	2894	1335						2983	1335	2894	2983	
Flt Permitted	0.95	1.00						1.00	1.00	0.95	1.00	
Satd. Flow (perm)	2894	1335						2983	1335	2894	2983	
Volume (vph)	1151	0	533	0	0	0	0	1290	208	506	469	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1212	0	561	0	0	0	0	1358	219	533	494	0
RTOR Reduction (vph)	0	237	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1212	324	0	0	0	0	0	1358	219	533	494	0
Turn Type	Perm								Perm	Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4								2			
Actuated Green, G (s)	42.0	42.0						48.0	48.0	18.0	70.0	
Effective Green, g (s)	42.0	42.0						48.0	48.0	18.0	70.0	
Actuated g/C Ratio	0.35	0.35						0.40	0.40	0.15	0.58	
Clearance Time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1013	467						1193	534	434	1740	
v/s Ratio Prot		0.24						c0.46		c0.18	0.17	
v/s Ratio Perm	c0.42								0.16			
v/c Ratio	1.20	0.69						1.14	0.41	1.23	0.28	
Uniform Delay, d1	39.0	33.5						36.0	25.8	51.0	12.5	
Progression Factor	1.00	1.00						1.00	1.00	1.00	1.00	
Incremental Delay, d2	98.1	4.4						72.8	0.5	121.5	0.1	
Delay (s)	137.1	37.9						108.8	26.4	172.5	12.6	
Level of Service	F	D						F	C	F	B	
Approach Delay (s)		105.7			0.0			97.4			95.6	
Approach LOS		F			A			F			F	

Intersection Summary			
HCM Average Control Delay	100.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



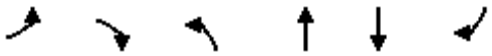
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				1.00	1.00		0.97	0.95			0.95	
Frt				1.00	0.85		1.00	1.00			0.92	
Flt Protected				0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)				1492	1335		2894	2983			2755	
Flt Permitted				0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)				1492	1335		2894	2983			2755	
Volume (vph)	0	0	0	391	0	121	201	585	0	0	216	224
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	412	0	127	212	616	0	0	227	236
RTOR Reduction (vph)	0	0	0	0	80	0	0	0	0	0	181	0
Lane Group Flow (vph)	0	0	0	412	47	0	212	616	0	0	282	0
Turn Type				Perm			Prot					
Protected Phases					8		5	2			6	
Permitted Phases				8								
Actuated Green, G (s)				17.0	17.0		6.5	21.3			10.8	
Effective Green, g (s)				17.0	17.0		6.5	21.3			10.8	
Actuated g/C Ratio				0.37	0.37		0.14	0.46			0.23	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				548	490		406	1372			643	
v/s Ratio Prot					0.03		0.07	c0.21			0.10	
v/s Ratio Perm				c0.28								
v/c Ratio				0.75	0.10		0.52	0.45			0.44	
Uniform Delay, d1				12.8	9.6		18.5	8.5			15.2	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				5.8	0.1		1.2	0.2			0.5	
Delay (s)				18.6	9.7		19.7	8.7			15.6	
Level of Service				B	A		B	A			B	
Approach Delay (s)		0.0			16.5			11.5			15.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	46.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



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	0.91	0.95					0.95		1.00	0.95	
Frt	1.00	1.00	0.85					0.97		1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1417	1357	1268					2889		1492	2983	
Flt Permitted	0.95	0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1417	1357	1268					2889		1492	2983	
Volume (vph)	757	0	184	0	0	0	0	786	209	18	198	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	797	0	194	0	0	0	0	827	220	19	208	0
RTOR Reduction (vph)	0	0	130	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	399	398	65	0	0	0	0	1021	0	19	208	0
Turn Type	Perm		Perm							Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	25.8	25.8	25.8					37.9		1.9	43.8	
Effective Green, g (s)	25.8	25.8	25.8					37.9		1.9	43.8	
Actuated g/C Ratio	0.33	0.33	0.33					0.49		0.02	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	471	451	422					1411		37	1684	
v/s Ratio Prot								c0.35		c0.01	0.07	
v/s Ratio Perm	0.28	0.29	0.05									
v/c Ratio	0.85	0.88	0.15					0.72		0.51	0.12	
Uniform Delay, d1	24.1	24.5	18.2					15.7		37.4	7.9	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	13.2	18.1	0.2					3.3		11.5	0.2	
Delay (s)	37.3	42.5	18.4					19.0		48.9	8.1	
Level of Service	D	D	B					B		D	A	
Approach Delay (s)		35.7			0.0			19.0			11.5	
Approach LOS		D			A			B			B	

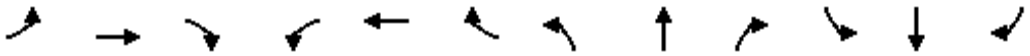
Intersection Summary			
HCM Average Control Delay	25.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	3531	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	1863	3531	
Volume (vph)	8	257	385	660	303	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	271	405	695	319	5
RTOR Reduction (vph)	0	237	0	0	0	0
Lane Group Flow (vph)	8	34	405	695	324	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	5.4	5.4	12.0	29.6	13.6	
Effective Green, g (s)	5.4	5.4	12.0	29.6	13.6	
Actuated g/C Ratio	0.13	0.13	0.28	0.69	0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	222	199	494	1282	1117	
v/s Ratio Prot	0.00		c0.23	c0.37	0.09	
v/s Ratio Perm		c0.02				
v/c Ratio	0.04	0.17	0.82	0.54	0.29	
Uniform Delay, d1	16.5	16.8	14.5	3.3	11.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4	10.2	0.5	0.1	
Delay (s)	16.6	17.2	24.7	3.8	11.2	
Level of Service	B	B	C	A	B	
Approach Delay (s)	17.2			11.5	11.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	43.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	25	0	214	0	0	20	560
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	26	0	225	0	0	21	589
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	567	541	316	541	836	225	611			225		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567	541	316	541	836	225	611			225		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	393	422	683	424	283	769	882			1239		

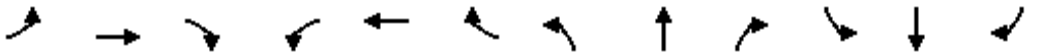
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	225	611
Volume Left	0	0	0
Volume Right	26	0	589
cSH	769	882	1700
Volume to Capacity	0.03	0.00	0.36
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	10	214	0	0	20	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	225	0	0	21	0

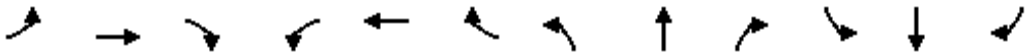
Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	11	225	0	21
Volume Left (vph)	11	0	0	21
Volume Right (vph)	0	225	0	0
Hadj (s)	0.56	-0.24	0.00	0.56
Departure Headway (s)	4.5	3.2	3.9	4.5
Degree Utilization, x	0.01	0.20	0.00	0.03
Capacity (veh/h)	789	1121	900	797
Control Delay (s)	7.6	7.0	6.9	7.6
Approach Delay (s)	7.0		0.0	7.6
Approach LOS	A		A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		



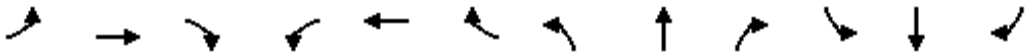
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor					1.00	1.00	0.97	0.95			0.95	0.88
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1492	1335	2894	2983			2983	2349
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1492	1335	2894	2983			2983	2349
Volume (vph)	0	0	0	145	0	565	414	662	0	0	1392	1026
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	153	0	595	436	697	0	0	1465	1080
RTOR Reduction (vph)	0	0	0	0	0	199	0	0	0	0	0	462
Lane Group Flow (vph)	0	0	0	0	153	396	436	697	0	0	1465	618
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)					33.0	33.0	18.0	79.0			57.0	57.0
Effective Green, g (s)					33.0	33.0	18.0	79.0			57.0	57.0
Actuated g/C Ratio					0.28	0.28	0.15	0.66			0.48	0.48
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					410	367	434	1964			1417	1116
v/s Ratio Prot							c0.15	0.23			c0.49	
v/s Ratio Perm					0.10	c0.30						0.26
v/c Ratio					0.37	1.08	1.00	0.35			1.03	0.55
Uniform Delay, d1					35.1	43.5	51.0	9.1			31.5	22.4
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.6	69.4	44.4	0.5			33.1	2.0
Delay (s)					35.7	112.9	95.4	9.6			64.6	24.4
Level of Service					D	F	F	A			E	C
Approach Delay (s)		0.0			97.1			42.6			47.5	
Approach LOS		A			F			D			D	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



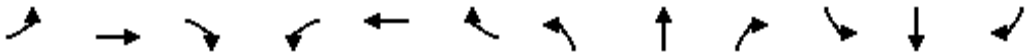
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00						0.95		0.97	0.95	
Frt	1.00	0.85						0.98		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	2894	1335						2938		2894	2983	
Flt Permitted	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (perm)	2894	1335						2938		2894	2983	
Volume (vph)	762	0	496	0	0	0	0	814	92	544	848	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	802	0	522	0	0	0	0	857	97	573	893	0
RTOR Reduction (vph)	0	96	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	802	426	0	0	0	0	0	947	0	573	893	0
Turn Type	Perm									Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	38.5	38.5						38.6		24.0	66.6	
Effective Green, g (s)	38.5	38.5						38.6		24.0	66.6	
Actuated g/C Ratio	0.34	0.34						0.34		0.21	0.59	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	985	454						1003		614	1757	
v/s Ratio Prot		c0.32						c0.32		c0.20	0.30	
v/s Ratio Perm	0.28											
v/c Ratio	0.81	0.94						0.94		0.93	0.51	
Uniform Delay, d1	34.0	36.2						36.2		43.8	13.6	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	5.2	27.2						16.5		21.3	0.2	
Delay (s)	39.3	63.4						52.7		65.1	13.9	
Level of Service	D	E						D		E	B	
Approach Delay (s)		48.8			0.0			52.7			33.9	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	113.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



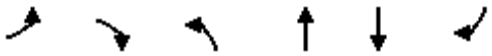
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				1.00	1.00		0.97	0.95			0.95	
Frt				1.00	0.85		1.00	1.00			0.92	
Flt Protected				0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)				1492	1335		2894	2983			2749	
Flt Permitted				0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)				1492	1335		2894	2983			2749	
Volume (vph)	0	0	0	330	0	22	234	232	0	0	707	775
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	347	0	23	246	244	0	0	744	816
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	198	0
Lane Group Flow (vph)	0	0	0	347	6	0	246	244	0	0	1362	0
Turn Type				Perm			Prot					
Protected Phases					8		5	2			6	
Permitted Phases				8								
Actuated Green, G (s)				24.0	24.0		12.0	66.0			50.0	
Effective Green, g (s)				24.0	24.0		12.0	66.0			50.0	
Actuated g/C Ratio				0.24	0.24		0.12	0.67			0.51	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				365	327		354	2009			1403	
v/s Ratio Prot					0.00		c0.09	0.08			c0.50	
v/s Ratio Perm				c0.23								
v/c Ratio				0.95	0.02		0.69	0.12			0.97	
Uniform Delay, d1				36.4	28.1		41.2	5.7			23.3	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				34.3	0.0		5.8	0.0			17.4	
Delay (s)				70.8	28.1		47.1	5.7			40.7	
Level of Service				E	C		D	A			D	
Approach Delay (s)		0.0			68.1			26.5			40.7	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



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	0.91	0.95					0.95		1.00	0.95	
Frt	1.00	0.95	0.85					0.93		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1417	1310	1268					2774		1492	2983	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1417	1310	1268					2774		1492	2983	
Volume (vph)	248	0	268	0	0	0	0	466	410	103	604	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	261	0	282	0	0	0	0	491	432	108	636	0
RTOR Reduction (vph)	0	32	179	0	0	0	0	190	0	0	0	0
Lane Group Flow (vph)	150	142	40	0	0	0	0	733	0	108	636	0
Turn Type	Perm		Perm							Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	12.2	12.2	12.2					35.0		7.9	46.9	
Effective Green, g (s)	12.2	12.2	12.2					35.0		7.9	46.9	
Actuated g/C Ratio	0.18	0.18	0.18					0.52		0.12	0.70	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	258	238	231					1447		176	2085	
v/s Ratio Prot								c0.26		c0.07	0.21	
v/s Ratio Perm	0.11	0.11	0.03									
v/c Ratio	0.58	0.60	0.17					0.51		0.61	0.31	
Uniform Delay, d1	25.1	25.2	23.2					10.4		28.1	3.9	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	3.3	4.0	0.4					1.3		6.2	0.4	
Delay (s)	28.4	29.2	23.5					11.7		34.4	4.2	
Level of Service	C	C	C					B		C	A	
Approach Delay (s)		26.7			0.0			11.7			8.6	
Approach LOS		C			A			B			A	

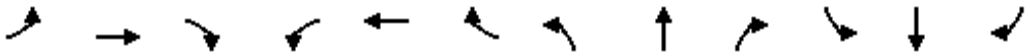
Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	3534	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	1863	3534	
Volume (vph)	3	305	352	190	738	8
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	3	321	371	200	777	8
RTOR Reduction (vph)	0	273	0	0	0	0
Lane Group Flow (vph)	3	48	371	200	785	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.7	7.7	15.1	35.5	16.4	
Effective Green, g (s)	7.7	7.7	15.1	35.5	16.4	
Actuated g/C Ratio	0.15	0.15	0.29	0.69	0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	266	238	522	1292	1132	
v/s Ratio Prot	0.00		c0.21	0.11	c0.22	
v/s Ratio Perm		c0.03				
v/c Ratio	0.01	0.20	0.71	0.15	0.69	
Uniform Delay, d1	18.5	19.1	16.1	2.7	15.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.4	4.5	0.1	1.9	
Delay (s)	18.5	19.5	20.6	2.8	17.1	
Level of Service	B	B	C	A	B	
Approach Delay (s)	19.5			14.4	17.1	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	51.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	29	0	0	0	0	26	349
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	31	0	0	0	0	27	367
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	242	211	211	211	395	0	395			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242	211	211	211	395	0	395			0		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	655	654	784	707	514	1032	1068			1507		

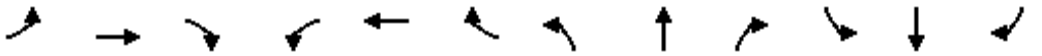
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	0	395
Volume Left	0	0	0
Volume Right	31	0	367
cSH	1032	1700	1507
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	2	411	0	0	26	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	433	0	0	27	0

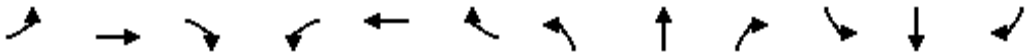
Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	2	433	0	27
Volume Left (vph)	2	0	0	27
Volume Right (vph)	0	433	0	0
Hadj (s)	0.56	-0.24	0.00	0.56
Departure Headway (s)	4.5	3.2	3.9	4.5
Degree Utilization, x	0.00	0.38	0.00	0.03
Capacity (veh/h)	785	1114	910	802
Control Delay (s)	7.5	8.2	6.9	7.6
Approach Delay (s)	8.2		0.0	7.6
Approach LOS	A		A	A

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



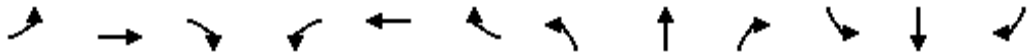
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor					1.00	1.00	0.97	0.95			0.95	0.88
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1492	1335	2894	2983			2983	2349
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1492	1335	2894	2983			2983	2349
Volume (vph)	0	0	0	166	0	578	414	662	0	0	1409	1026
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	175	0	608	436	697	0	0	1483	1080
RTOR Reduction (vph)	0	0	0	0	0	194	0	0	0	0	0	456
Lane Group Flow (vph)	0	0	0	0	175	415	436	697	0	0	1483	624
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)					34.0	34.0	16.0	78.0			58.0	58.0
Effective Green, g (s)					34.0	34.0	16.0	78.0			58.0	58.0
Actuated g/C Ratio					0.28	0.28	0.13	0.65			0.48	0.48
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					423	378	386	1939			1442	1135
v/s Ratio Prot							c0.15	0.23			c0.50	
v/s Ratio Perm					0.12	c0.31						0.27
v/c Ratio					0.41	1.10	1.13	0.36			1.03	0.55
Uniform Delay, d1					34.9	43.0	52.0	9.6			31.0	21.8
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.7	74.8	85.9	0.1			31.3	0.5
Delay (s)					35.6	117.8	137.9	9.7			62.3	22.4
Level of Service					D	F	F	A			E	C
Approach Delay (s)		0.0			99.5			59.0			45.5	
Approach LOS		A			F			E			D	

Intersection Summary			
HCM Average Control Delay	58.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



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	0.97	1.00						0.95		0.97	0.95	
Frt	1.00	0.85						0.98		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	2894	1335						2931		2894	2983	
Flt Permitted	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (perm)	2894	1335						2931		2894	2983	
Volume (vph)	762	0	496	0	0	0	0	814	108	557	852	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	802	0	522	0	0	0	0	857	114	586	897	0
RTOR Reduction (vph)	0	103	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	802	419	0	0	0	0	0	971	0	586	897	0
Turn Type	Perm									Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	37.8	37.8						40.0		24.9	68.9	
Effective Green, g (s)	37.8	37.8						40.0		24.9	68.9	
Actuated g/C Ratio	0.33	0.33						0.35		0.22	0.60	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	954	440						1022		628	1792	
v/s Ratio Prot		c0.31						c0.33		c0.20	0.30	
v/s Ratio Perm	0.28											
v/c Ratio	0.84	0.95						0.95		0.93	0.50	
Uniform Delay, d1	35.7	37.6						36.4		44.1	13.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	6.8	31.0						17.4		20.9	0.2	
Delay (s)	42.4	68.6						53.8		65.0	13.3	
Level of Service	D	E						D		E	B	
Approach Delay (s)		52.7			0.0			53.8			33.7	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM Average Control Delay	45.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	114.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

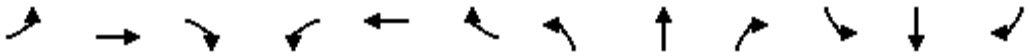


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				1.00	1.00		0.97	0.95			0.95	
Frt				1.00	0.85		1.00	1.00			0.92	
Flt Protected				0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)				1492	1335		2894	2983			2752	
Flt Permitted				0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)				1492	1335		2894	2983			2752	
Volume (vph)	0	0	0	372	0	22	234	248	0	0	668	717
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	392	0	23	246	261	0	0	703	755
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	392	6	0	246	261	0	0	1458	0
Turn Type				Perm			Prot					
Protected Phases					8		5	2			6	
Permitted Phases				8								
Actuated Green, G (s)				32.5	32.5		12.0	79.5			63.5	
Effective Green, g (s)				32.5	32.5		12.0	79.5			63.5	
Actuated g/C Ratio				0.27	0.27		0.10	0.66			0.53	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				404	362		289	1976			1456	
v/s Ratio Prot					0.00		c0.09	0.09			c0.53	
v/s Ratio Perm				c0.26								
v/c Ratio				0.97	0.02		0.85	0.13			1.05dr	
Uniform Delay, d1				43.3	32.1		53.1	7.5			28.2	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				36.9	0.0		20.7	0.1			23.9	
Delay (s)				80.1	32.1		73.8	7.6			52.2	
Level of Service				F	C		E	A			D	
Approach Delay (s)		0.0			77.5			39.7			52.2	
Approach LOS		A			E			D			D	

Intersection Summary			
HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

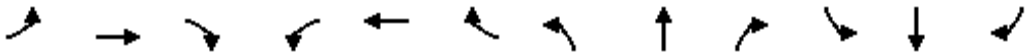
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group



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	0.91	0.95					0.95		1.00	0.95	
Frt	1.00	0.98	0.85					0.93		1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1417	1340	1268					2770		1492	2983	
Flt Permitted	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1417	1340	1268					2770		1492	2983	
Volume (vph)	272	0	268	0	0	0	0	482	441	103	565	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	286	0	282	0	0	0	0	507	464	108	595	0
RTOR Reduction (vph)	0	11	215	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	151	147	44	0	0	0	0	971	0	108	595	0
Turn Type	Perm		Perm							Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	10.3	10.3	10.3					30.2		7.5	41.7	
Effective Green, g (s)	10.3	10.3	10.3					30.2		7.5	41.7	
Actuated g/C Ratio	0.17	0.17	0.17					0.50		0.12	0.70	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	243	230	218					1394		187	2073	
v/s Ratio Prot								c0.35		c0.07	0.20	
v/s Ratio Perm	0.11	0.11	0.04									
v/c Ratio	0.62	0.64	0.20					0.70		0.58	0.29	
Uniform Delay, d1	23.0	23.1	21.3					11.4		24.8	3.5	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	4.9	6.0	0.5					2.9		4.3	0.3	
Delay (s)	27.9	29.1	21.8					14.3		29.0	3.8	
Level of Service	C	C	C					B		C	A	
Approach Delay (s)		25.4			0.0			14.3			7.7	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	31	0	371	0	0	34	315
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	33	0	391	0	0	36	332
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	625	592	202	592	758	391	367			391		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	625	592	202	592	758	391	367			391		
tC, single (s)	7.3	6.7	6.4	7.3	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.7	4.2	3.5	2.4			2.4		
p0 queue free %	100	100	100	100	100	95	100			100		
cM capacity (veh/h)	352	394	793	391	315	618	1094			1072		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	391	367
Volume Left	0	0	0
Volume Right	33	0	332
cSH	618	1094	1072
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (ft)	4	0	0
Control Delay (s)	11.1	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.1	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	2	373	0	0	34	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	393	0	0	36	0

Direction, Lane #	WB 1	WB 2	SB 1
Volume Total (vph)	2	393	36
Volume Left (vph)	2	0	36
Volume Right (vph)	0	393	0
Hadj (s)	0.56	-0.24	0.56
Departure Headway (s)	4.5	3.2	4.5
Degree Utilization, x	0.00	0.35	0.04
Capacity (veh/h)	781	1114	794
Control Delay (s)	7.6	7.9	7.7
Approach Delay (s)	7.9		7.7
Approach LOS	A		A

Intersection Summary			
Delay	7.9		
HCM Level of Service	A		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C:
RAMP JUNCTION LOS CALCULATIONS

NB_46E_OffRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing AM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1029	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	679	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1029		679			vph
Peak-hour factor, PHF	0.87		0.87			
Peak 15-min volume, v15	296		195			v
Trucks and buses	11		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.948		0.980			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1248		796			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 1248 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1248	4700	No
v_{12}	1248	4400	No
$v_{FO} = v_F - v_R$	452	4700	No
v_R	796	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 13.6$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S	= 0.370
Space mean speed in ramp influence area,	S_R	= 56.5 mph
Space mean speed in outer lanes,	S_0	= N/A mph
Space mean speed for all vehicles,	S	= 56.5 mph

NB_46E_OnRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing Weekday AM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	190	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	350	190		vph
Peak-hour factor, PHF	0.87	0.87		
Peak 15-min volume, v15	101	55		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	439	226		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

NB_46E_OnRamp AM

$v_{12} = v_F (P_{FM}) = 439$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	665	4700	No
v_{R12}	665	4600	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 7.4 \text{ pc/mi/ln}$$

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

Speed Estimation

Intermediate speed variable,	$M_S = 0.289$	
Space mean speed in ramp influence area,	$S_R = 58.4$	mph
Space mean speed in outer lanes,	$S_0 =$ N/A	mph
Space mean speed for all vehicles,	$S = 58.4$	mph

SB_46E_OffRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing AM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	580	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	170	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	580		170			vph
Peak-hour factor, PHF	0.87		0.87			
Peak 15-min volume, v15	167		49			v
Trucks and buses	18		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.917		0.966			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	727		202			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 727 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	727	4700	No
v_{12}	727	4400	No
$v_{FO} = v_F - v_R$	525	4700	No
v_R	202	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 9.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.316$
Space mean speed in ramp influence area,	$S_R = 57.7$ mph
Space mean speed in outer lanes,	S_0 = N/A mph
Space mean speed for all vehicles,	$S = 57.7$ mph

SB_46E_OnRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing Weekday AM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	410	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	814	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	410	814		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	114	226		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	481	936		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

SB_46E_OnRamp AM

$v_{12} = v_{FM} (P_{FM}) = 481$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1417	4700	No
v_{R12}	1417	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 13.0$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $M_S = 0.297$

Space mean speed in ramp influence area, $S_R = 58.2$ mph

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

Space mean speed for all vehicles, $S = 58.2$ mph

NB_46E_OffRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1625	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	879	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1625		879			vph
Peak-hour factor, PHF	0.93		0.93			
Peak 15-min volume, v15	437		236			v
Trucks and buses	11		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.948		0.980			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1843		964			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 1843$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1843	4700	No
v_{12}	1843	4400	No
$v_{FO} = v_F - v_R$	879	4700	No
v_R	964	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 18.8$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $D_S = 0.385$

Space mean speed in ramp influence area, $S_R = 56.2$ mph

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

Space mean speed for all vehicles, $S = 56.2$ mph

NB_46E_OnRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing Weekday PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	746	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	254	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	746	254		vph
Peak-hour factor, PHF	0.93	0.93		
Peak 15-min volume, v15	201	68		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	874	283		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

NB_46E_OnRamp PM

$v_{12} = v_F (P_{FM}) = 874$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1157	4700	No
v_{R12}	1157	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 11.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $M_S = 0.293$

Space mean speed in ramp influence area, $S_R = 58.3$ mph

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

Space mean speed for all vehicles, $S = 58.3$ mph

SB_46E_OffRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1020	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1020		310			vph
Peak-hour factor, PHF	0.89		0.89			
Peak 15-min volume, v15	287		87			v
Trucks and buses	18		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.917		0.966			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1249		361			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{12} = v_{FD} + (v_R - v_F) P_{FD} = 1249 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1249	4700	No
v_{12}	1249	4400	No
$v_{FO} = v_F - v_R$	888	4700	No
v_R	361	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 13.6$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.330	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 57.4	mph

SB_46E_OnRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing Weekday PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	710	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	784	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	710	784		vph
Peak-hour factor, PHF	0.89	0.89		
Peak 15-min volume, v15	199	220		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	842	912		pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

SB_46E_OnRamp PM

$v_{12} = v_F (P_{FM}) = 842$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1754	4700	No
v_{R12}	1754	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.304

Space mean speed in ramp influence area, S_R = 58.0 mph

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

Space mean speed for all vehicles, S = 58.0 mph

NB_46E_OffRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing Fri PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1862	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	928	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1862		928			vph
Peak-hour factor, PHF	0.91		0.91			
Peak 15-min volume, v15	512		255			v
Trucks and buses	11		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.948		0.980			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2159		1040			pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

NB_46E_OffRamp FR

$v_{12} = v_R + (v_F - v_R) P_{FD} = 2159$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2159	4700	No
v_{12}	2159	4400	No
$v_{FO} = v_F - v_R$	1119	4700	No
v_R	1040	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 21.5$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.392	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 56.0	mph

NB_46E_OnRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing Fri PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	934	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	934	250		vph
Peak-hour factor, PHF	0.91	0.91		
Peak 15-min volume, v15	257	69		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1119	284		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

NB_46E_OnRamp FR

$v_{12} = v_F (P_{FM}) = 1119$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1403	4700	No
v_{R12}	1403	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$M_S = 0.297$
Space mean speed in ramp influence area,	$S_R = 58.2$ mph
Space mean speed in outer lanes,	S_0 = N/A mph
Space mean speed for all vehicles,	$S = 58.2$ mph

SB_46E_OffRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing Fri PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	392	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1250		392			vph
Peak-hour factor, PHF	0.89		0.89			
Peak 15-min volume, v15	351		110			v
Trucks and buses	18		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.917		0.966			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1531		456			pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

SB_46E_OffRamp FR

$v_{12} = v_R + (v_F - v_R) P_{FD} = 1531$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1531	4700	No
v_{12}	1531	4400	No
$v_{FO} = v_F - v_R$	1075	4700	No
v_R	456	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 16.1$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $D_S = 0.339$

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

SB_46E_OnRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing Fri PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	858	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	1119	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	858	1119		vph
Peak-hour factor, PHF	0.89	0.89		
Peak 15-min volume, v15	241	314		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1017	1301		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

SB_46E_OnRamp FR

$v_{12} = v_{FM} (P_{FM}) = 1017$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2318	4700	No
v_{R12}	2318	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 19.8$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $M_S = 0.321$

Space mean speed in ramp influence area, $S_R = 57.6$ mph

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

Space mean speed for all vehicles, $S = 57.6$ mph

NB_46E_OffRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj AM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1073	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	723	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1073		723			vph
Peak-hour factor, PHF	0.87		0.87			
Peak 15-min volume, v15	308		208			v
Trucks and buses	11		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.948		0.980			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1301		848			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

NB_46E_OffRamp AM

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 1301 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1301	4700	No
v_{12}	1301	4400	No
$v_{FO} = v_F - v_R$	453	4700	No
v_R	848	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 14.1$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.374	
Space mean speed in ramp influence area,	S_R = 56.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 56.4	mph

NB_46E_OnRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj AM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	196	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	350	196		vph
Peak-hour factor, PHF	0.87	0.87		
Peak 15-min volume, v15	101	56		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	439	233		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

NB_46E_OnRamp AM

$v_{12} = v_F (P_{FM}) = 439$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	672	4700	No
v_{R12}	672	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 7.5$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$M_S = 0.289$	
Space mean speed in ramp influence area,	$S_R = 58.4$	mph
Space mean speed in outer lanes,	$S_0 =$ N/A	mph
Space mean speed for all vehicles,	$S = 58.4$	mph

SB_46E_OffRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj AM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	587	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	177	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	587	177		vph
Peak-hour factor, PHF	0.87	0.87		
Peak 15-min volume, v15	169	51		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	735	211		pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 735 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	735	4700	No
v_{12}	735	4400	No
$v_{FO} = v_F - v_R$	524	4700	No
v_R	211	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 9.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S	= 0.317
Space mean speed in ramp influence area,	S_R	= 57.7 mph
Space mean speed in outer lanes,	S_0	= N/A mph
Space mean speed for all vehicles,	S	= 57.7 mph

SB_46E_OnRamp AM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj AM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	410	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	853	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	410	853		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	114	237		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	481	981		pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

SB_46E_OnRamp AM

$v_{12} = v_F (P_{FM}) = 481$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1462	4700	No
v_{R12}	1462	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.298

Space mean speed in ramp influence area, S_R = 58.1 mph

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

Space mean speed for all vehicles, S = 58.1 mph

NB_46E_OffRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing +Proj PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	944	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1690		944			vph
Peak-hour factor, PHF	0.93		0.93			
Peak 15-min volume, v15	454		254			v
Trucks and buses	11		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.948		0.980			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1917		1035			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{FD} = v_{12} + (v_R - v_F) P_{FD} = 1917 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1917	4700	No
v_{12}	1917	4400	No
$v_{FO} = v_F - v_R$	882	4700	No
v_R	1035	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 19.4$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.391$
Space mean speed in ramp influence area,	$S_R = 56.0$ mph
Space mean speed in outer lanes,	S_0 = N/A mph
Space mean speed for all vehicles,	$S = 56.0$ mph

NB_46E_OnRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	746	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	264	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	746	264		vph
Peak-hour factor, PHF	0.93	0.93		
Peak 15-min volume, v15	201	71		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	874	294		pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

NB_46E_OnRamp PM

$v_{12} = v_F (P_{FM}) = 874$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1168	4700	No
v_{R12}	1168	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 11.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.294

Space mean speed in ramp influence area, S_R = 58.2 mph

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

Space mean speed for all vehicles, S = 58.2 mph

SB_46E_OffRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	320	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1030		320			vph
Peak-hour factor, PHF	0.89		0.89			
Peak 15-min volume, v15	289		90			v
Trucks and buses	18		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.917		0.966			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1261		372			pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{12} = v_{FD} + (v_R - v_F) P_{FD} = 1261 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1261	4700	No
v_{12}	1261	4400	No
$v_{FO} = v_F - v_R$	889	4700	No
v_R	372	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 13.7$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.331$
Space mean speed in ramp influence area,	$S_R = 57.4$ mph
Space mean speed in outer lanes,	S_0 = N/A mph
Space mean speed for all vehicles,	$S = 57.4$ mph

SB_46E_OnRamp PM

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	710	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	850	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	710	850		vph
Peak-hour factor, PHF	0.89	0.89		
Peak 15-min volume, v15	199	239		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	842	988		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{FM} = v_{12} (P_{FM}) = 842$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1830	4700	No
v_{R12}	1830	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 16.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$M_S = 0.305$
Space mean speed in ramp influence area,	$S_R = 58.0$ mph
Space mean speed in outer lanes,	S_0 = N/A mph
Space mean speed for all vehicles,	$S = 58.0$ mph

NB_46E_OffRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj Fri PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1927	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	993	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1927		993			vph
Peak-hour factor, PHF	0.91		0.91			
Peak 15-min volume, v15	529		273			v
Trucks and buses	11		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.948		0.980			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2234		1113			pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

NB_46E_OffRamp FR

$v_{12} = v_R + (v_F - v_R) P_{FD} = 2234$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2234	4700	No
v_{12}	2234	4400	No
$v_{FO} = v_F - v_R$	1121	4700	No
v_R	1113	2100	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/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.398	
Space mean speed in ramp influence area,	S_R = 55.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 55.8	mph

NB_46E_OnRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj Fri PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	934	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	260	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	934	260		vph
Peak-hour factor, PHF	0.91	0.91		
Peak 15-min volume, v15	257	71		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1119	296		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

NB_46E_OnRamp FR

$v_{12} = v_F (P_{FM}) = 1119$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1415	4700	No
v_{R12}	1415	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 13.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

SB_46E_OffRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj Fri PM

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1260	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	402	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1260		402			vph
Peak-hour factor, PHF	0.89		0.89			
Peak 15-min volume, v15	354		113			v
Trucks and buses	18		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.917		0.966			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1543		467			pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

SB_46E_OffRamp FR

$v_{12} = v_R + (v_F - v_R) P_{FD} = 1543$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1543	4700	No
v_{12}	1543	4400	No
$v_{FO} = v_F - v_R$	1076	4700	No
v_R	467	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 16.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.340	
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

SB_46E_OnRamp FR

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	10/6/2006
Analysis time period:	Summertime 2005
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	Existing + Proj Fri PM

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	858	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	1185	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	858	1185		vph
Peak-hour factor, PHF	0.89	0.89		
Peak 15-min volume, v15	241	333		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1017	1378		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

SB_46E_OnRamp FR

$v_{12} = v_F (P_{FM}) = 1017$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2395	4700	No
v_{R12}	2395	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 20.4$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $M_S = 0.324$

Space mean speed in ramp influence area, $S_R = 57.6$ mph

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

Space mean speed for all vehicles, $S = 57.6$ mph

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Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	410	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	976	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	410	976		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	108	257		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	455	1063		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) = 455$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1518	4700	No
v_{R12}	1518	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 13.7$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.299	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative AM
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	644	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	234	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	644		234				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	169		62				v
Trucks and buses	18		7				%
Recreational vehicles	0		0				%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%		%	
Length	0.00	mi	0.00	mi		mi	
Trucks and buses PCE, ET	1.5		1.5				
Recreational vehicle PCE, ER	1.2		1.2				
Heavy vehicle adjustment, fHV	0.917		0.966				
Driver population factor, fP	1.00		1.00				
Flow rate, vp	739		255				pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 739$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	739	4700	No
v_{12}	739	4400	No
$v_{FO} = v_F - v_R$	484	4700	No
v_R	255	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 9.3$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.321	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.6	mph

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Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative AM
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	214	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	350	214		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	92	56		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	402	233		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) = 402$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	635	4700	No
v_{R12}	635	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 7.2$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.288	
Space mean speed in ramp influence area,	S_R = 58.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.4	mph

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Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative AM
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1651	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1301	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1651	1301		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	434	342		v
Trucks and buses	11	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.980		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1833	1397		pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1833 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1833	4700	No
v_{12}	1833	4400	No
$v_{FO} = v_F - v_R$	436	4700	No
v_R	1397	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 18.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.424

Space mean speed in ramp influence area, S_R = 55.3 mph

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

Space mean speed for all vehicles, S = 55.3 mph

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Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative AM
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	710	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	1410	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	710	1410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	187	371		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	788	1536		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) = 788$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2324	4700	No
v_{R12}	2324	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.321	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.6	mph

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Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative PM
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1054	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	344	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1054		344			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	277		91			v
Trucks and buses	18		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	%	
Length	0.00	mi	0.00	mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.917		0.966			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1209		375			pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 1209$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1209	4700	No
v_{12}	1209	4400	No
$v_{FO} = v_F - v_R$	834	4700	No
v_R	375	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 13.3$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.332$	
Space mean speed in ramp influence area,	$S_R = 57.4$	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	$S = 57.4$	mph

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Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative PM
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	746	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	326	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	746	326		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	196	86		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	856	355		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) = 856$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1211	4700	No
v_{R12}	1211	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 11.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative PM
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1842	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1096	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1842		1096				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	485		288				v
Trucks and buses	11		4				%
Recreational vehicles	0		0				%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%		%	
Length	0.00	mi	0.00	mi		mi	
Trucks and buses PCE, ET	1.5		1.5				
Recreational vehicle PCE, ER	1.2		1.2				
Heavy vehicle adjustment, fHV	0.948		0.980				
Driver population factor, fP	1.00		1.00				
Flow rate, vp	2046		1177				pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$$v_{12} = v_R + (v_{FD} - v_F) P_{FD} = 2046 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2046	4700	No
v_{12}	2046	4400	No
$v_{FO} = v_F - v_R$	869	4700	No
v_R	1177	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 20.5$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.404	
Space mean speed in ramp influence area,	S_R = 55.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.7	mph

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative Fri PM
Freeway/Dir of Travel:	101 SB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	858	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	1780	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	858	1780		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	226	468		v
Trucks and buses	11	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.948	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	953	1939		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) = 953$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2892	4700	No
v_{R12}	2892	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 24.0$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $M_S = 0.351$

Space mean speed in ramp influence area, $S_R = 56.9$ mph

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

Space mean speed for all vehicles, $S = 56.9$ mph

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Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative Fri PM
Freeway/Dir of Travel:	US-101 SB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1291	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	433	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1291		433				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	340		114				v
Trucks and buses	18		7				%
Recreational vehicles	0		0				%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%		%	
Length	0.00	mi	0.00	mi		mi	
Trucks and buses PCE, ET	1.5		1.5				
Recreational vehicle PCE, ER	1.2		1.2				
Heavy vehicle adjustment, fHV	0.917		0.966				
Driver population factor, fP	1.00		1.00				
Flow rate, vp	1481		472				pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 1481$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1481	4700	No
v_{12}	1481	4400	No
$v_{FO} = v_F - v_R$	1009	4700	No
v_R	472	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 15.6$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.340$	
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

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Diverge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative Fri PM
Freeway/Dir of Travel:	US-101 NB
Junction:	SR-46 E OffRamp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2092	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1158	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2092		1158				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	551		305				v
Trucks and buses	11		4				%
Recreational vehicles	0		0				%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%		%	
Length	0.00	mi	0.00	mi		mi	
Trucks and buses PCE, ET	1.5		1.5				
Recreational vehicle PCE, ER	1.2		1.2				
Heavy vehicle adjustment, fHV	0.948		0.980				
Driver population factor, fP	1.00		1.00				
Flow rate, vp	2323		1243				pcph

Estimation of V12 Diverge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 2323$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2323	4700	No
v_{12}	2323	4400	No
$v_{FO} = v_F - v_R$	1080	4700	No
v_R	1243	2100	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 22.9$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.410	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.6	mph

HCS+: Ramps and Ramp Junctions Release 5.2

Merge Analysis

Analyst:	NH
Agency/Co.:	
Date performed:	04/06/2007
Analysis time period:	Near-Term Cumulative Fri PM
Freeway/Dir of Travel:	101 NB
Junction:	SR-46 E On-Ramp
Jurisdiction:	
Analysis Year:	
Description:	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	934	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	325	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?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	934	325		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	246	86		v
Trucks and buses	18	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.917	0.966		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1072	354		pcph

Estimation of V12 Merge Areas

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

P = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) = 1072$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1426	4700	No
v_{R12}	1426	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.297

Space mean speed in ramp influence area, S_R = 58.2 mph

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

Space mean speed for all vehicles, S = 58.2 mph

APPENDIX D:
SIGNAL WARRANTS

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

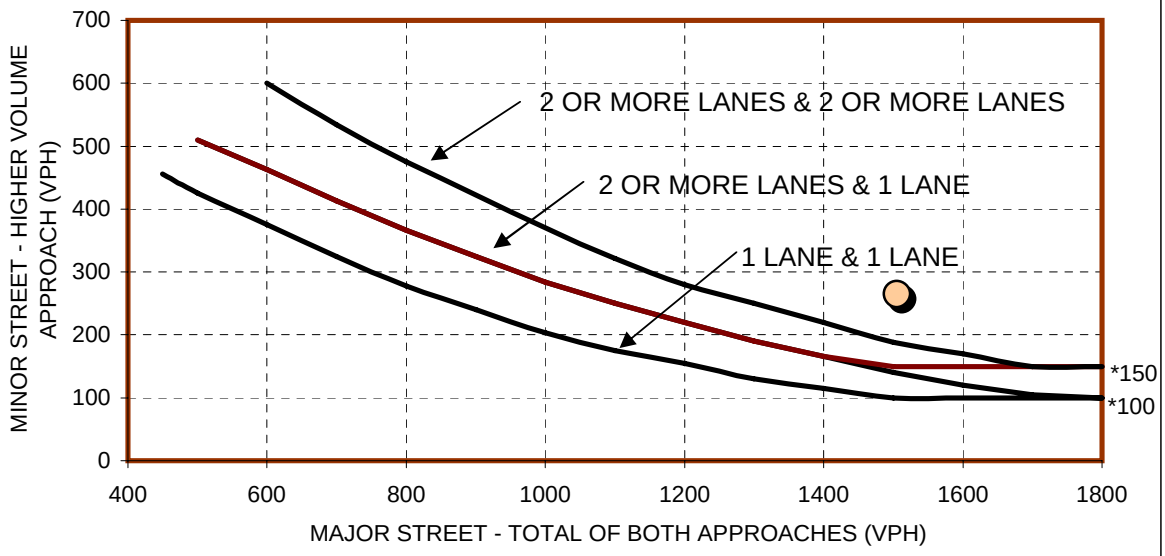
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	1,506	265

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

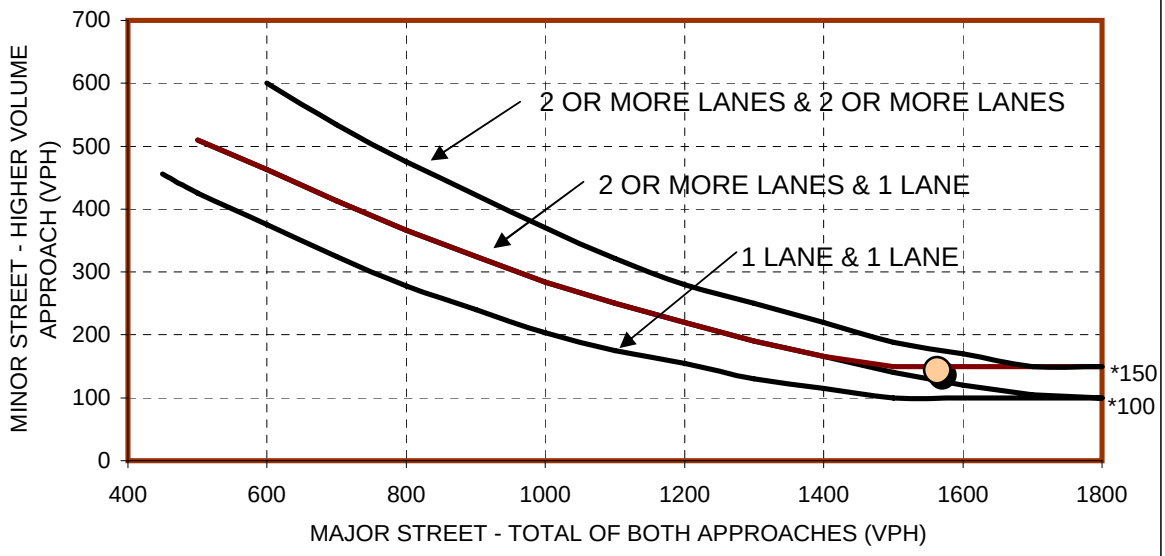
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	1,564	143

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Peak Hour

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

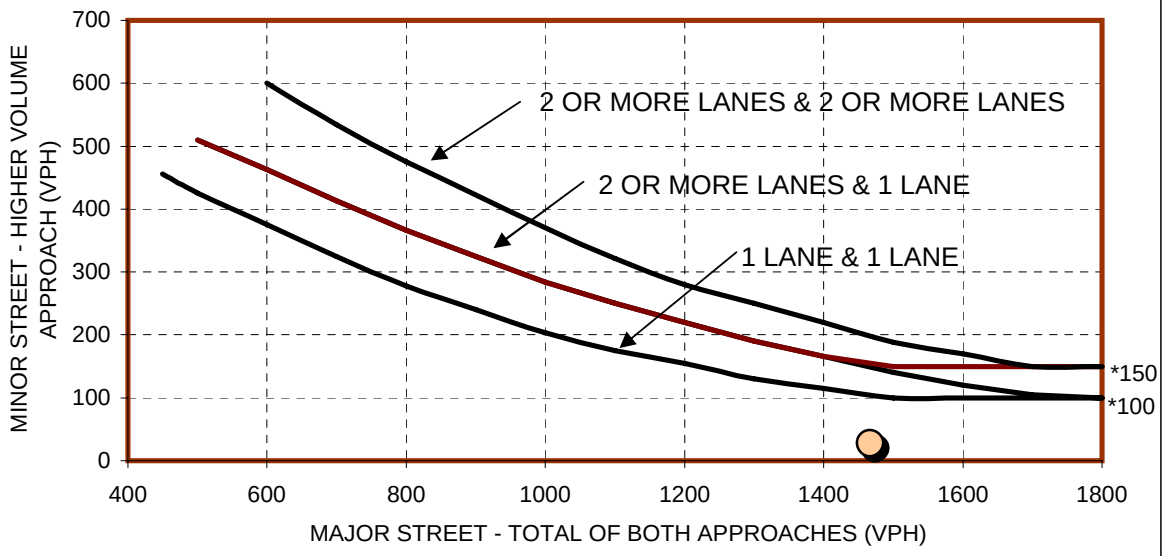
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	1,467	27

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

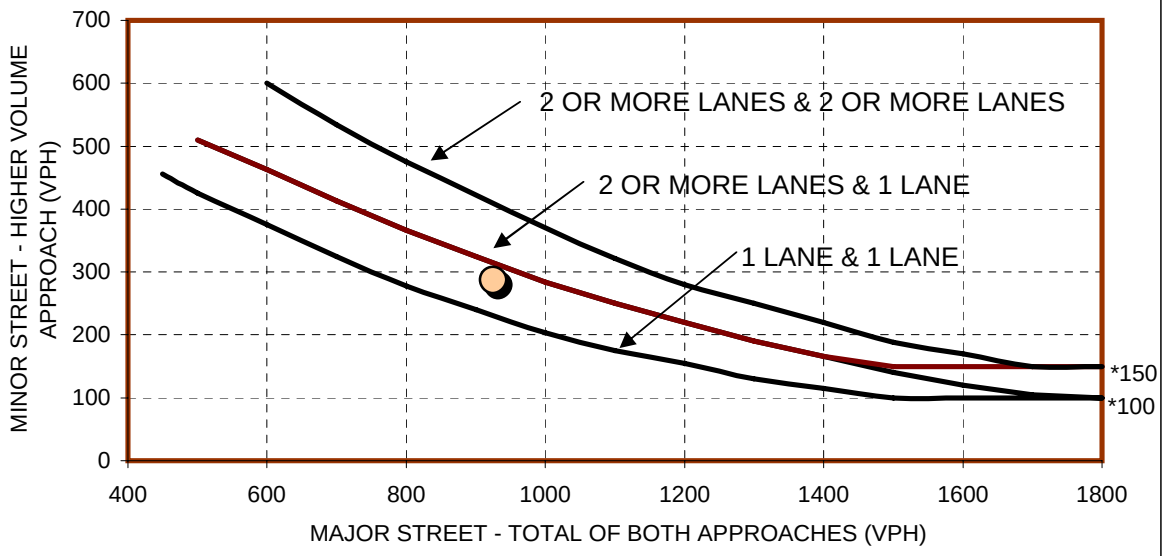
Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	925	287

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

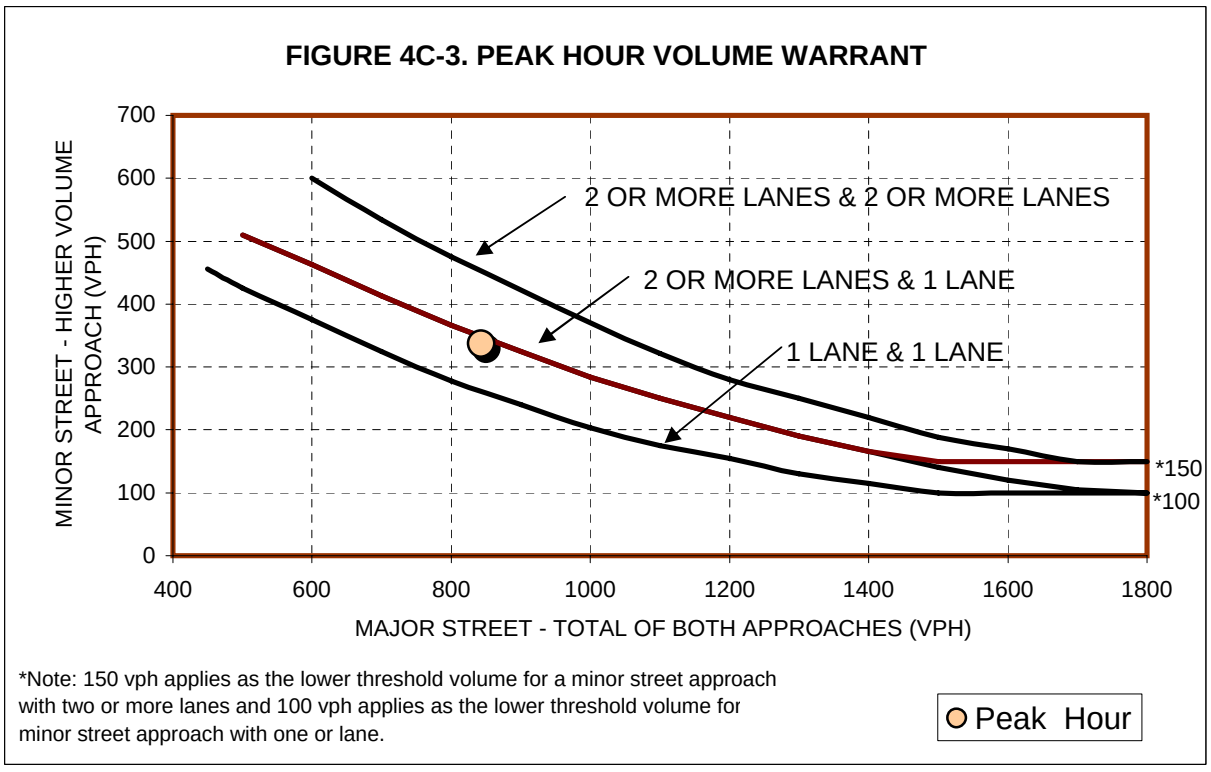
The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	843	337



Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

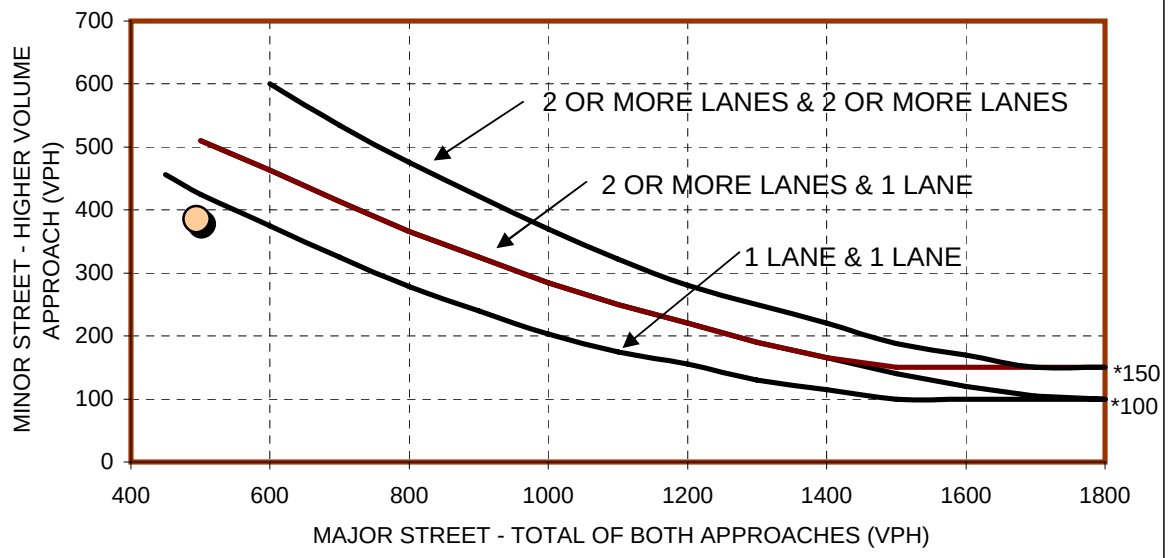
Analysis

	No of lanes
Major Street	2
Minor Street	2

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	495	385

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

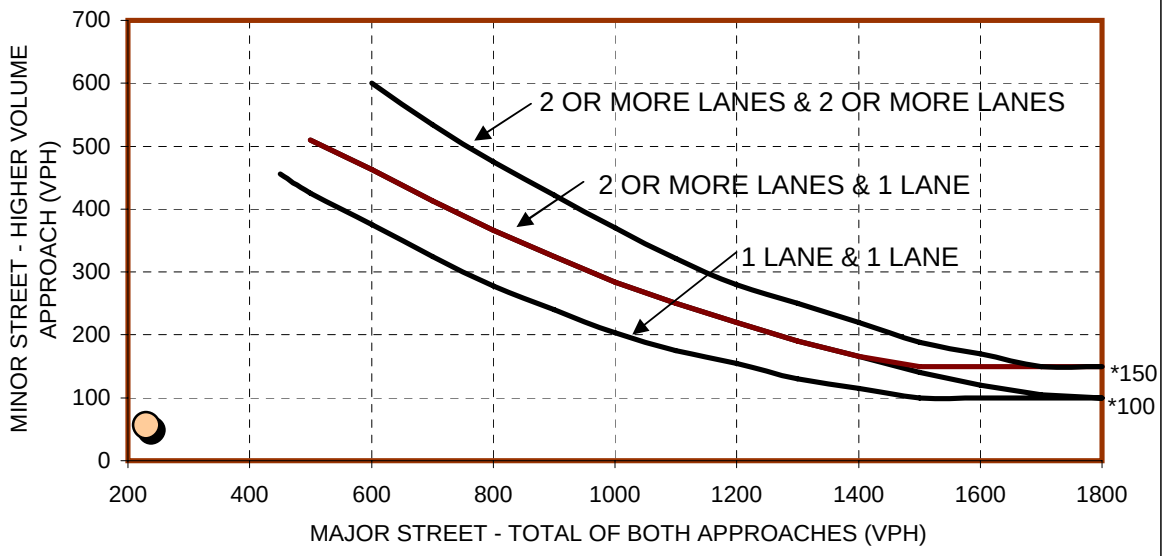
Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	230	56

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Peak Hour

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

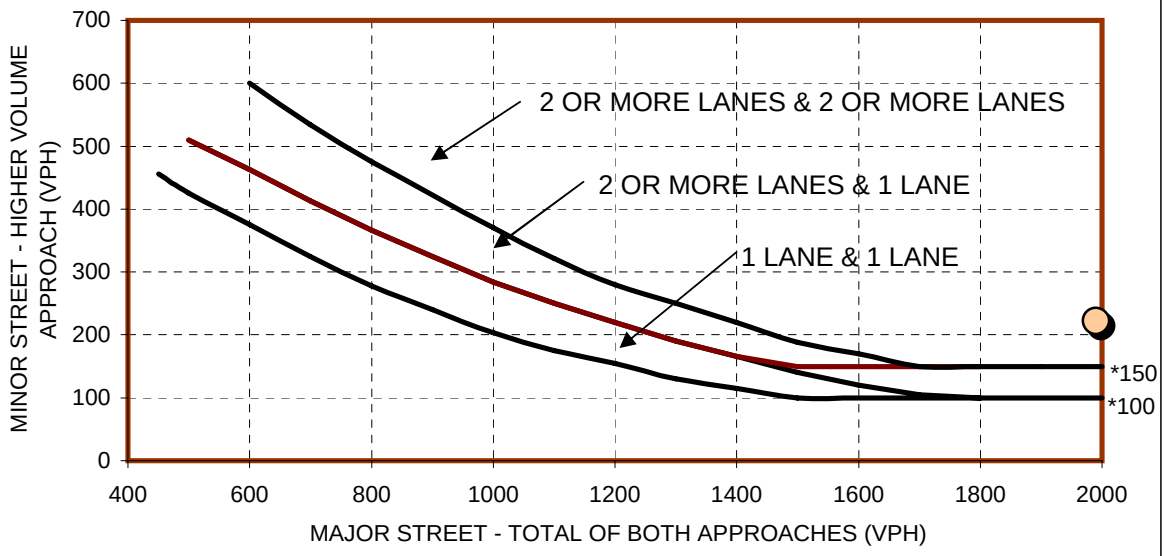
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,991	222

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Peak Hour

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

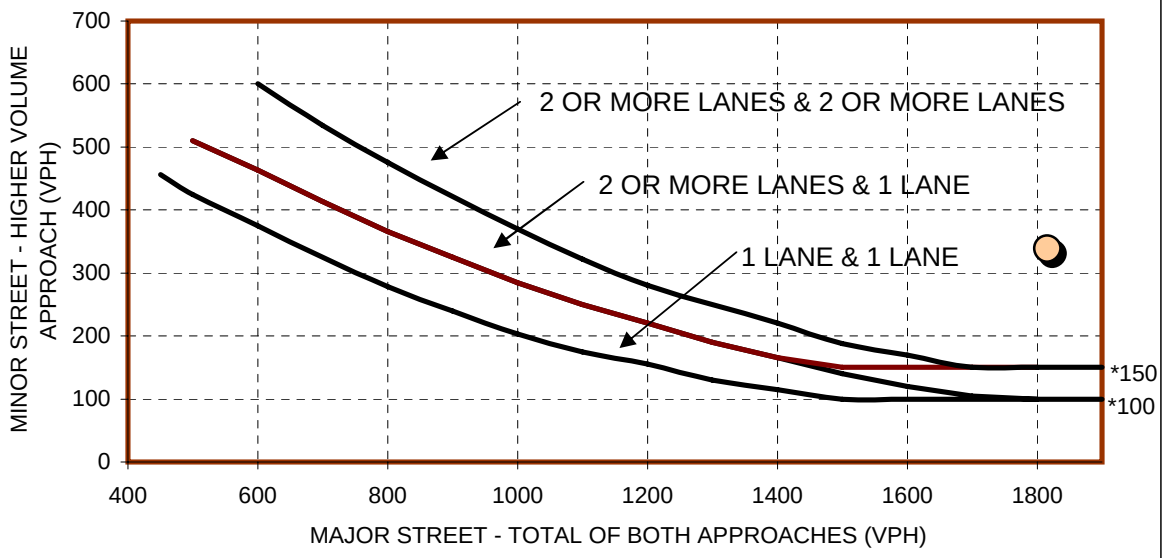
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,816	338

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

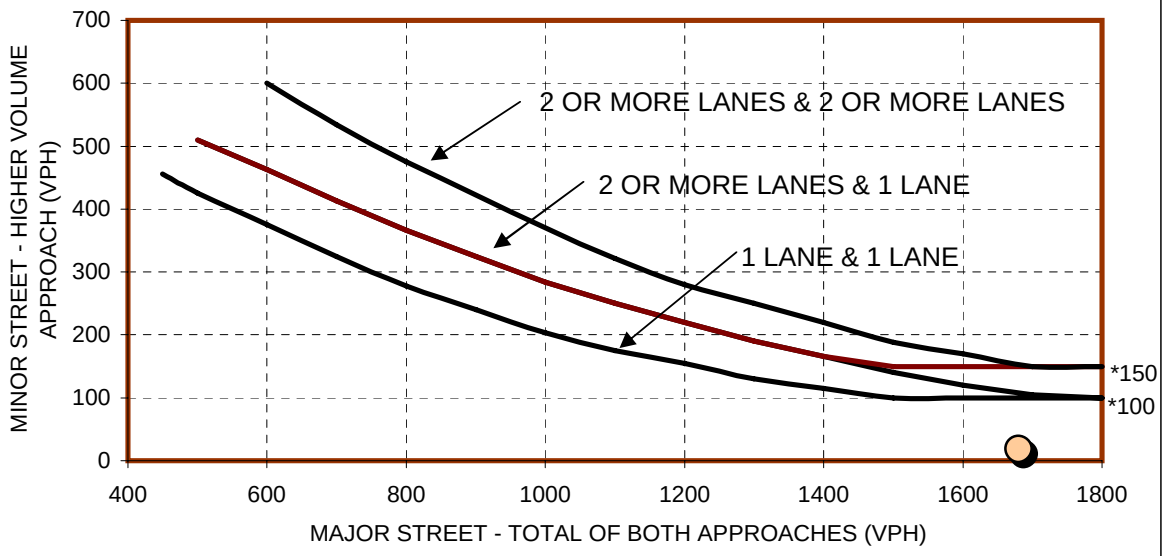
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,680	18

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

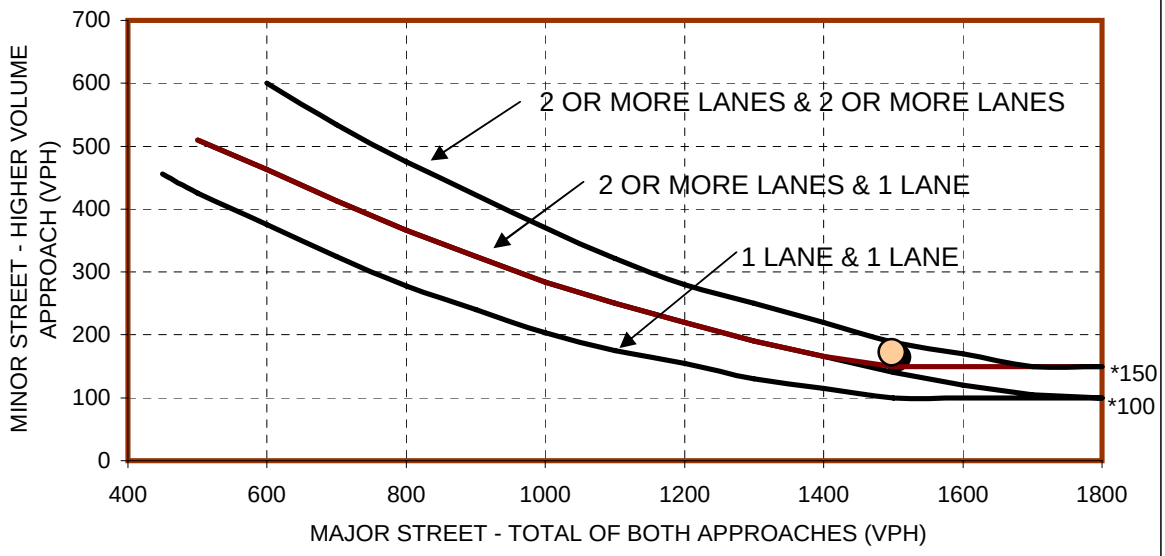
Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,498	172

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

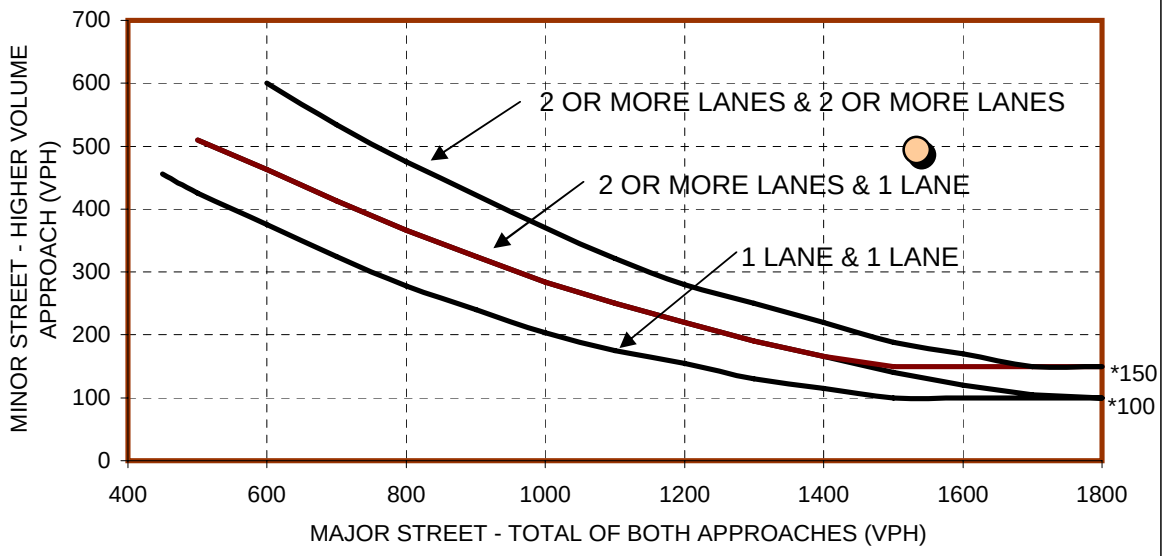
Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,534	493

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

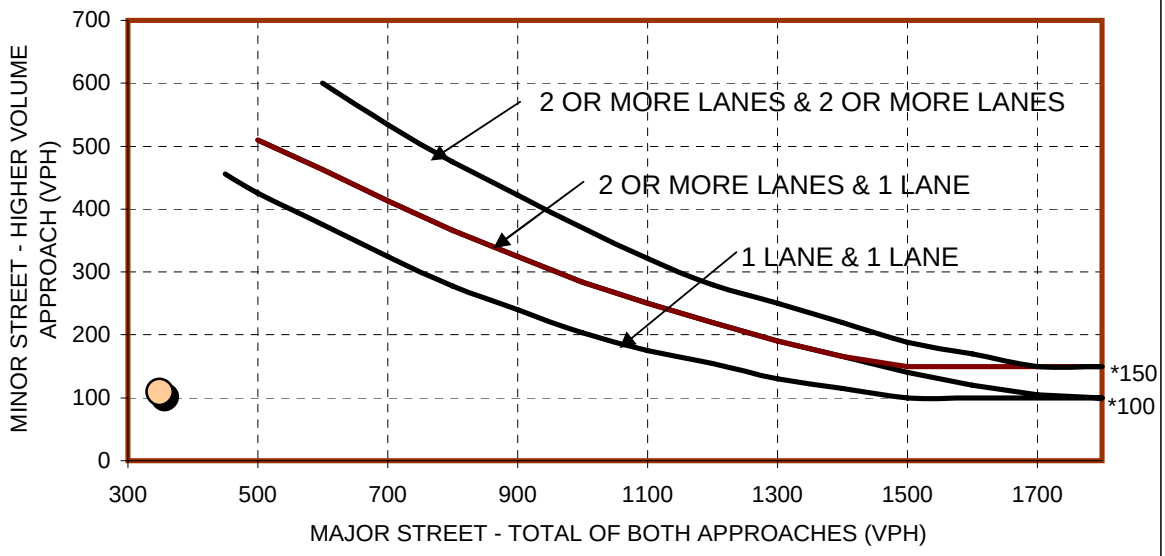
Analysis

	No of lanes
Major Street	2
Minor Street	2

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	349	109

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

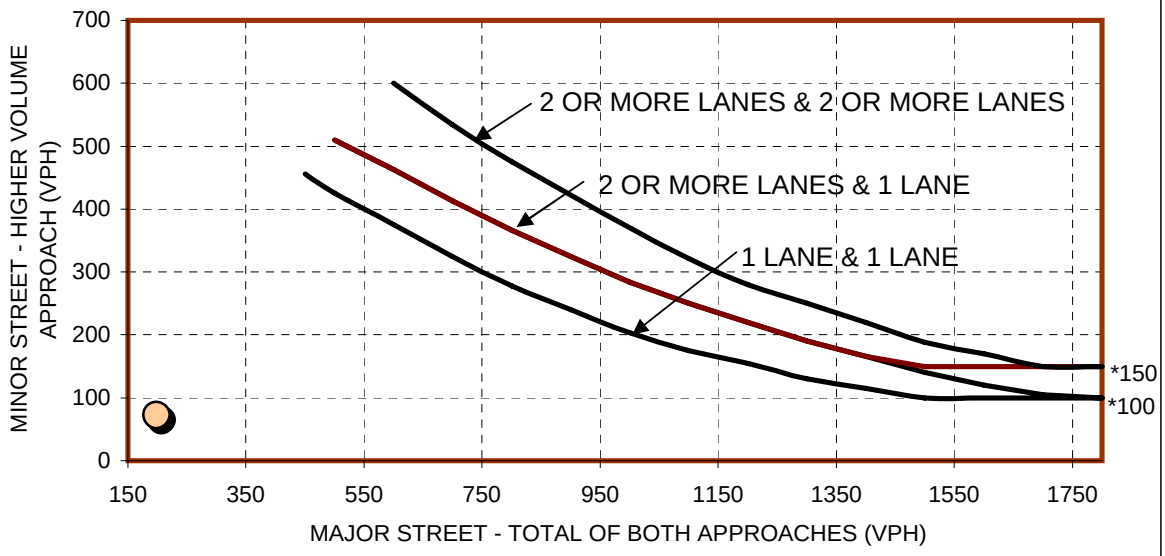
Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	199	72

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Peak Hour

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

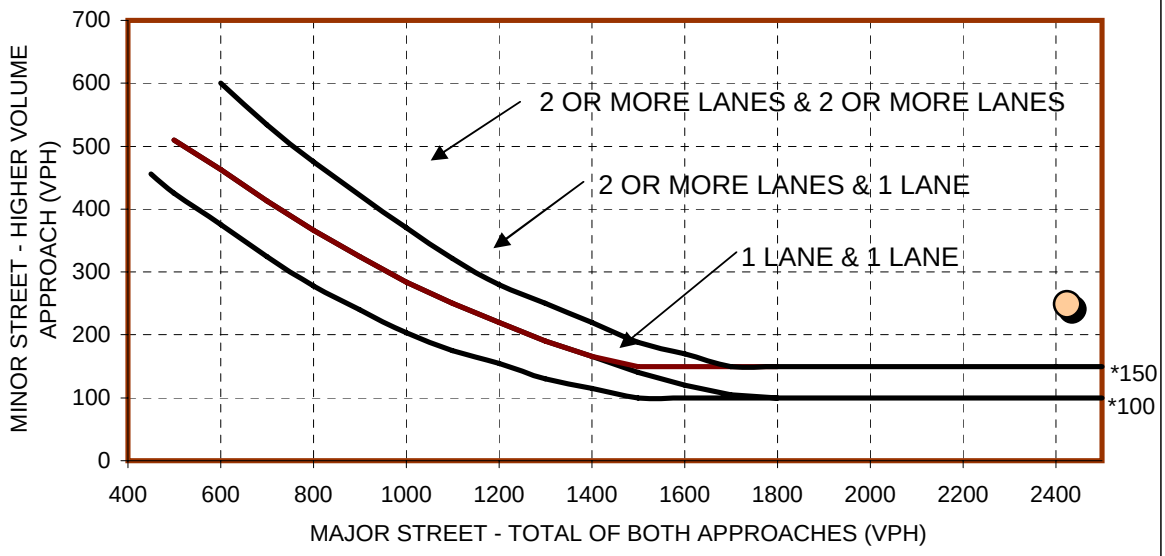
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	2,426	248

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

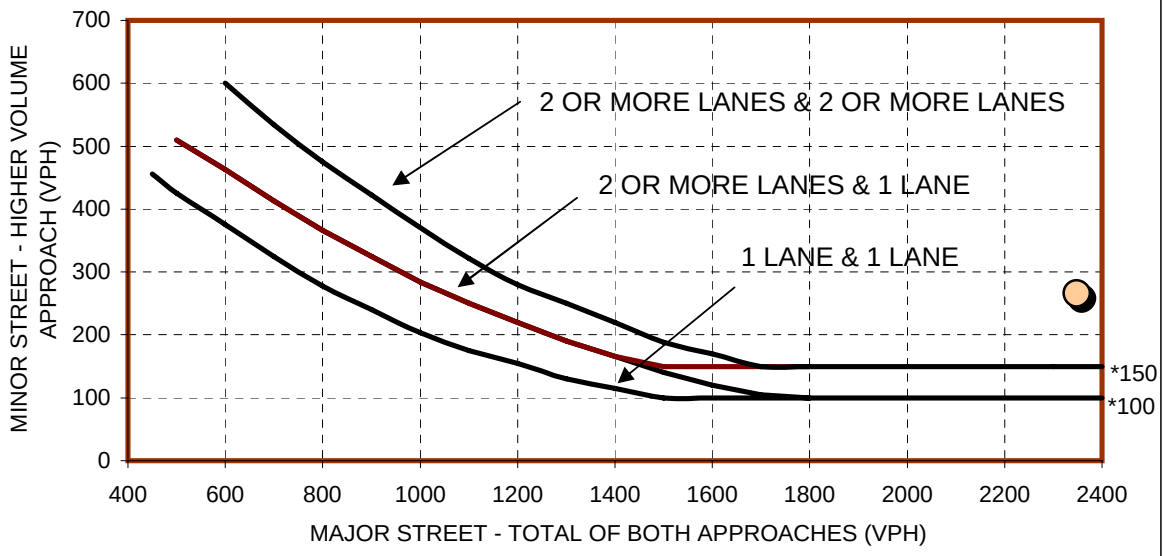
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	2,349	266

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

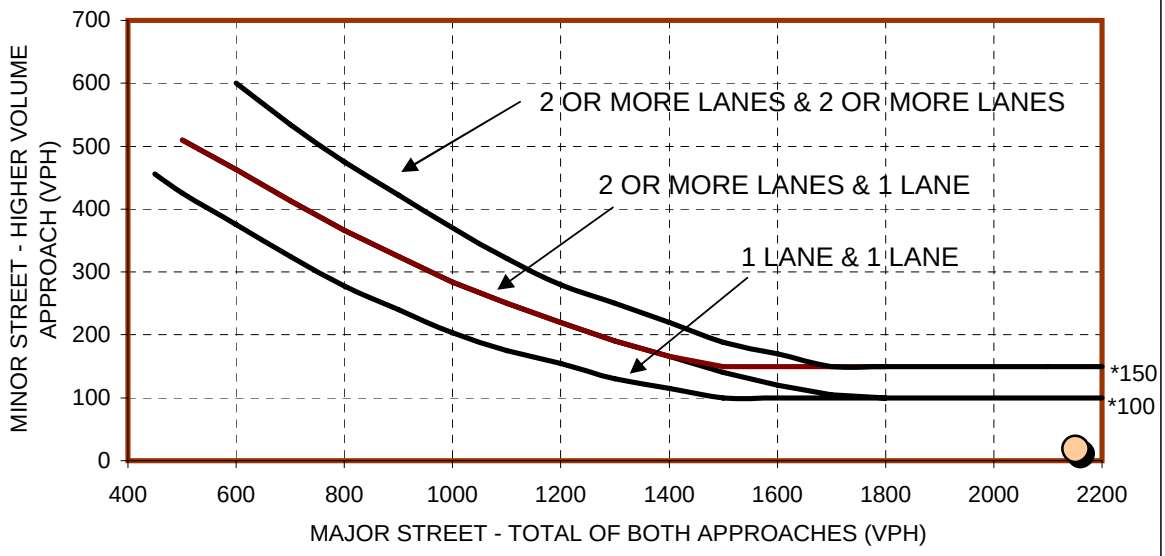
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	2,151	18

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

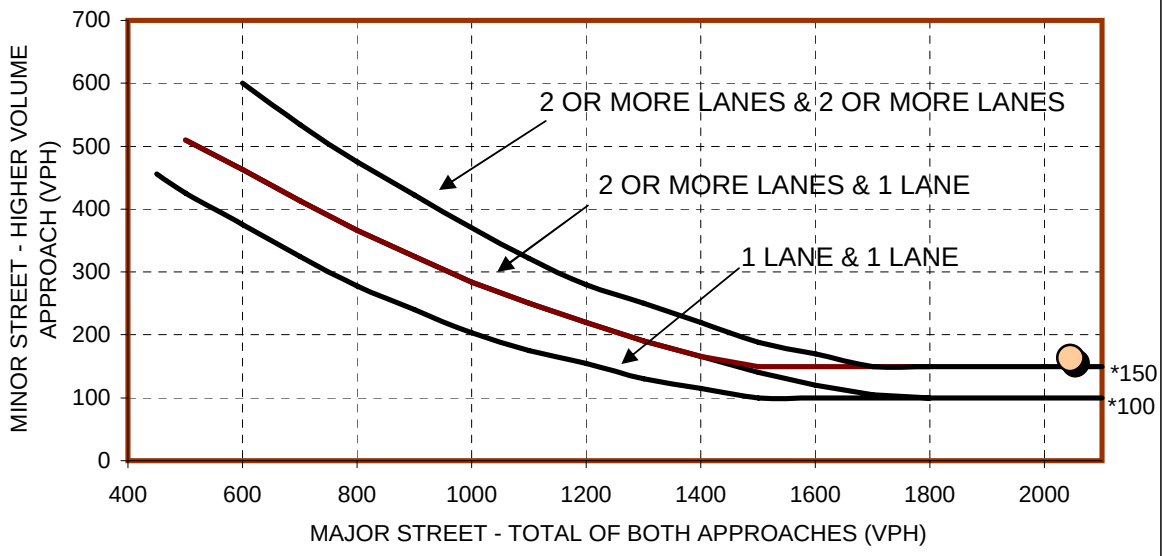
Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	2,045	163

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Peak Hour

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

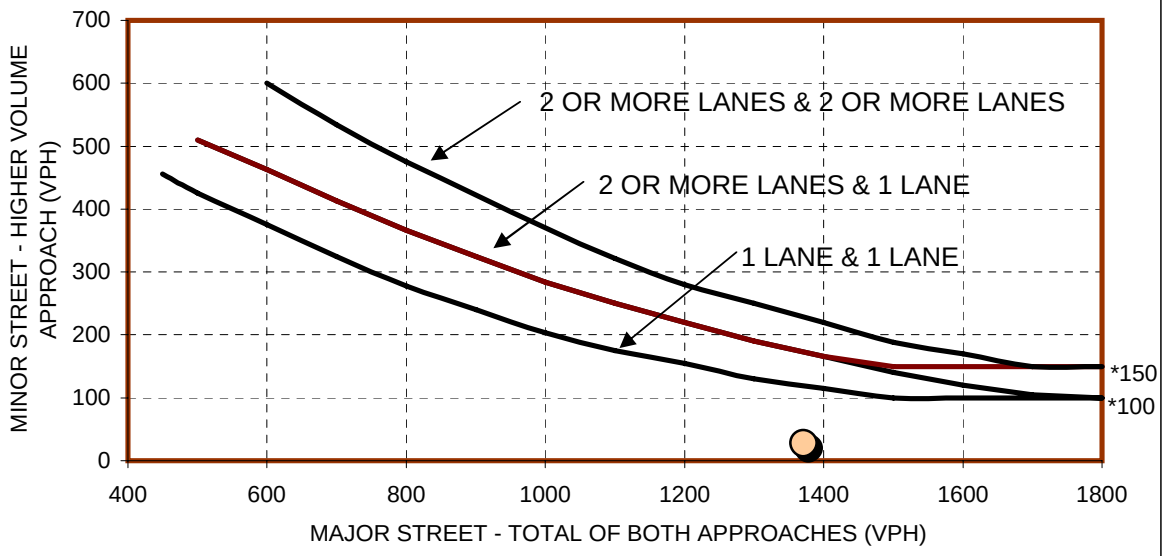
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
8:00 AM	1,371	27

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Peak Hour

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

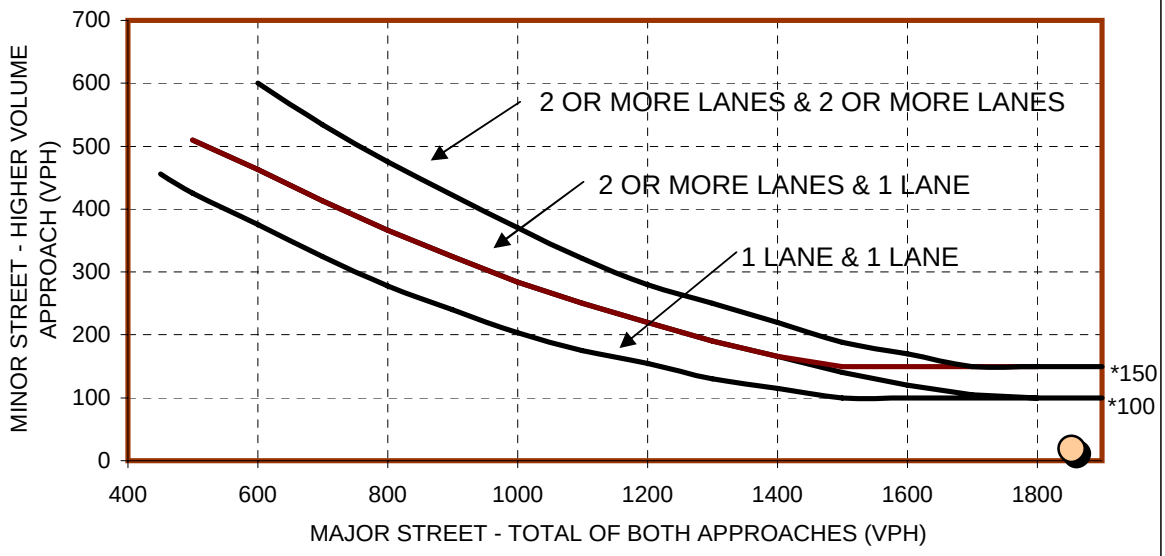
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,854	18

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

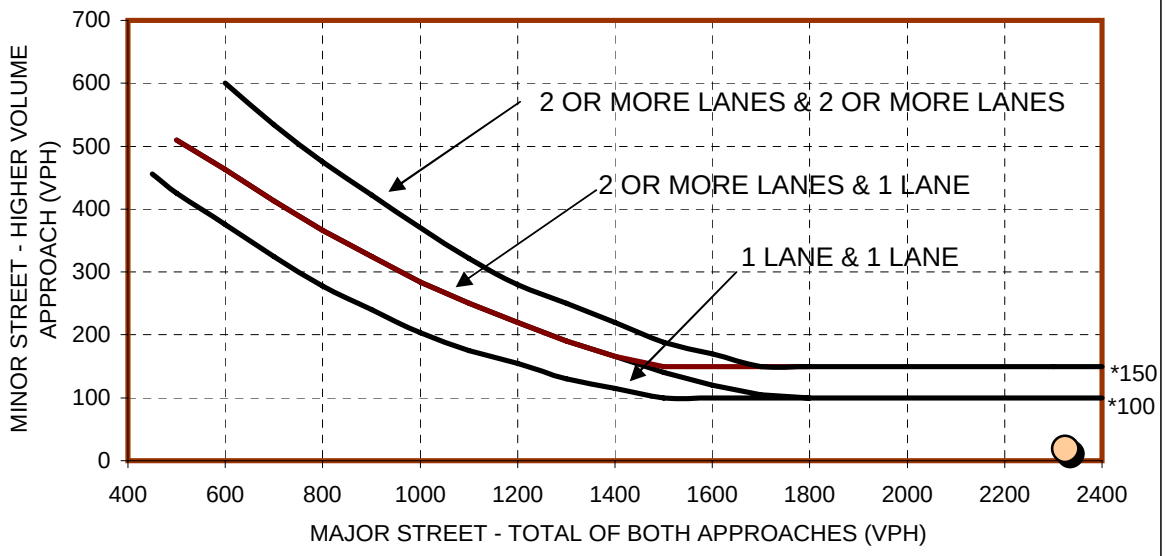
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	2,325	18

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*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 minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

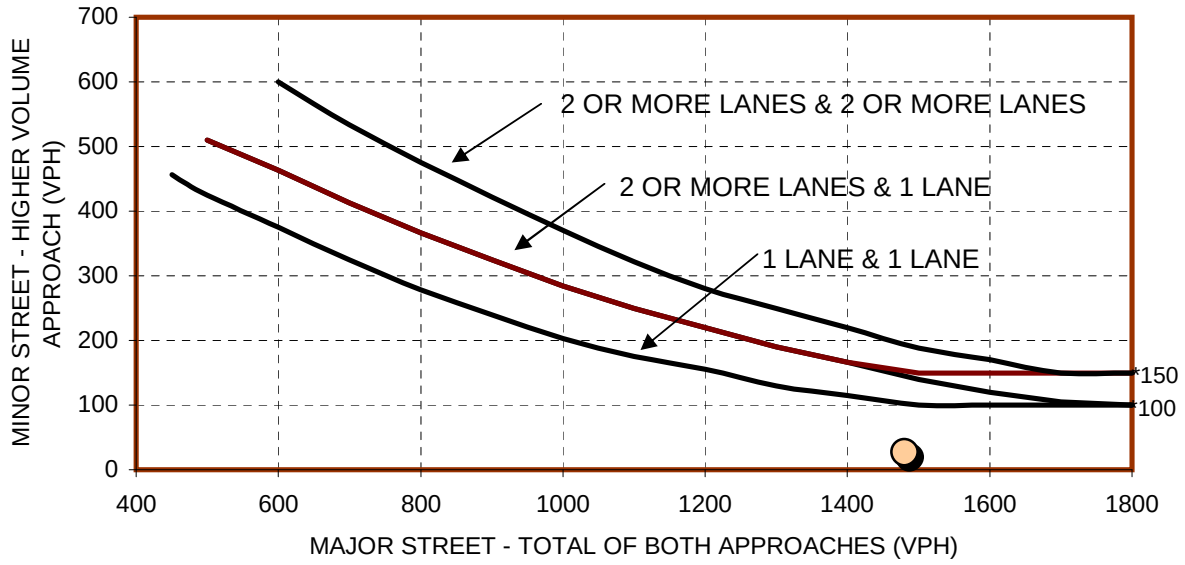
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	1,481	27

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

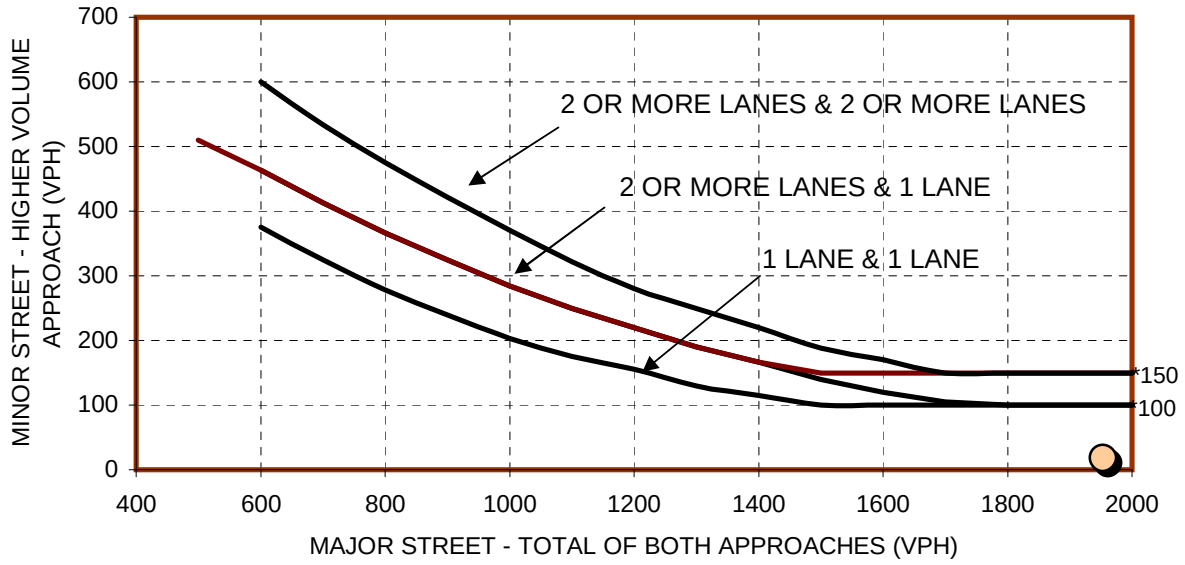
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	1,954	18

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one or lane.

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

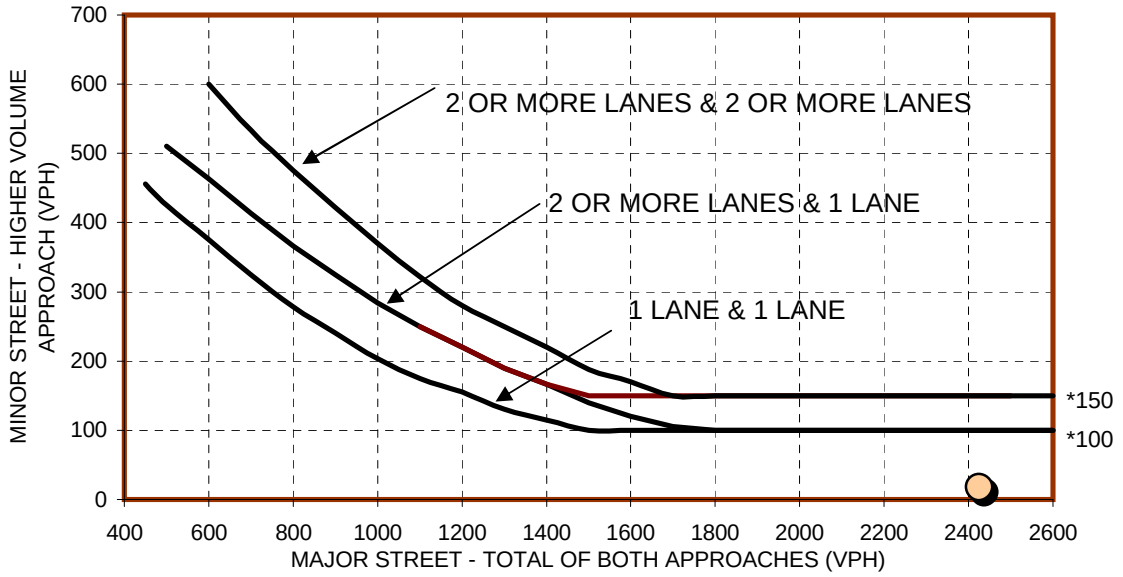
Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	2,425	18

FIGURE 4C-3. PEAK HOUR VOLUME WARRANT



*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one or lane.

Peak Hour

Warrant	Not Met