County of Santa Cruz

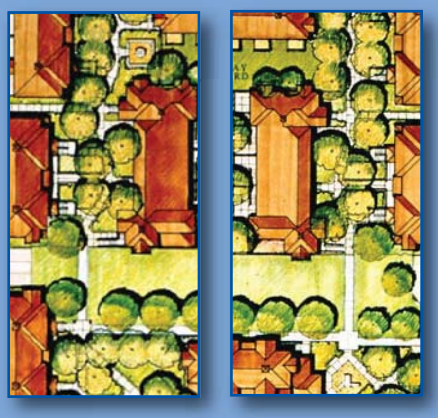
Atkinson Lane
Specific Plan and PUD

Draft Environmental Impact Report

Volume IV: Technical Appendices

March 2009

RBF CONSULTING



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Draft Environmental Impact Report

Atkinson Lane Specific Plan and PUD

Technical Appendices Volume IV

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T A B L E O F C O N T E N T S

TECHNICAL APPENDICES VOLUME IV

APPENDIX I
TRANSPORTATION AND CIRCULATION

RBF Consulting. Traffic Impact Analysis. January 2009.

Atkinson Lane Specific Plan and PUD

SANTA CRUZ COUNTY, CALIFORNIA

TRAFFIC IMPACT ANALYSIS

Draft Report

Prepared for the County of Santa Cruz

RBF Consulting

February 11, 2009

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1 EXECUTIVE SUMMARY

The Atkinson Lane Specific Plan and PUD (hereinafter "project") is a Measure U project designed to address housing needs in the City of Watsonville, California. The project will accommodate a maximum of 450 dwelling units comprised of townhouses, apartments, and single-family houses on approximately 65.8 acres. However, this traffic impact analysis analyzes a total of 498 dwelling units based on a prior site plan, which would be considered a conservative analysis. The 450 units would generate 42 trips less in the AM peak hour and 58 trips less during the PM peak hour. The distribution of traffic onto the City road network for the project would not result in a change in the findings of this study. The location of the proposed development is on the north eastern side of the City of Watsonville east of Freedom Boulevard and north of Crestview Drive. The site will be accessed from three routes. The primary access route will be from an extension of Brewington Avenue to the site. The alternative access route will connect to Wagner Avenue. Wagner Avenue would be extended to connect to East Lake Avenue. Alternative access routes also include two access points from Atkinson Lane which would provide secondary access from Freedom Boulevard.

The purpose of this report is to provide traffic analyses on intersections and roadways to determine the impact from traffic generated by the proposed development, and to provide recommendations for possible mitigation measures.

The project would generate 3,814 daily trips; with 292 AM peak hour trips (62 in, 230 out) and 372 PM peak hour trips (239 in, 133 out). The AM and PM peak hours were analyzed at the following intersections and street segments.

Intersections

1. Freedom Boulevard / Atkinson Lane
2. Freedom Boulevard / Gardner Avenue
3. Brewington Avenue / Crestview Drive
4. Freedom Boulevard / Crestview Drive
5. East Lake Avenue / Wagner Avenue (Caltrans Jurisdiction)
6. East Lake Avenue / Holohan Road (Caltrans Jurisdiction)
7. Green Valley Road / Holohan Road
8. Green Valley Road / Main Street (Caltrans Jurisdiction)
9. Highway 1 NB Ramps / Harkins Slough Road (Caltrans Jurisdiction)
10. Highway 1 SB Ramps / Harkins Slough Road (Caltrans Jurisdiction)
11. Airport Boulevard / Freedom Boulevard
12. Green Valley Boulevard / Freedom Boulevard
13. Brewington Avenue / Martinelli Street
14. Highway 1 NB Ramps / Riverside Drive (Caltrans Jurisdiction)
15. Highway 1 SB Ramps / Riverside Drive (Caltrans Jurisdiction)
16. Airport Boulevard / Ranport Road
17. Highway 1 NB Ramps / Larkin Valley Road (Caltrans Jurisdiction)
18. Airport Boulevard / Larkin Valley Road

Roadways

1. Holohan Road between Green Valley Road and East Lake Avenue
2. Airport Boulevard between Freedom Boulevard and Green Valley Road
3. Airport Boulevard between Freedom Boulevard and Highway 1
4. Green Valley Road between Freedom Boulevard and Holohan Road
5. Green Valley Road between Main Street and Freedom Boulevard
6. Freedom Boulevard between Airport Boulevard and Green Valley Road
7. Freedom Boulevard between Green Valley Road and Gardner Avenue
8. Freedom Boulevard between Gardner Avenue and Crestview Drive
9. Highway 1 between Airport Boulevard and Harkins Slough Road
10. Highway 1 between Harkins Slough Road and Riverside Drive
11. Highway 1 between Highway 152 and Harkins Slough Road
12. Highway 1 between Harkins Slough Road and Riverside Drive
13. Highway 1 between Airport Boulevard and Buena Vista Drive
14. Highway 1 south of Highway 129
15. East Lake Avenue (Highway 152) between Wagner Avenue and Holohan Road
16. East Lake Avenue (Highway 152) north of Holohan Road.
17. Main Street between Green Valley Road and Highway 1
18. Main Street between Green Valley Road and Ohlone Parkway
19. Highway 1 Ramps at the study interchanges.

The study analyzed traffic conditions under the following development scenarios:

- Existing Conditions
- Existing Plus Background Conditions
- Existing Plus Background Plus Project Conditions
- Cumulative Conditions without the project
- Cumulative Plus Project Conditions

For project conditions (including background traffic), the following intersections operate at unacceptable level of service:

- East Lake Avenue / Holohan Road
- Green Valley Road / Holohan Road
- Green Valley Road / Main Street
- Highway 1 NB Ramps / Harkins Slough Road
- Airport Boulevard / Freedom Boulevard
- Highway 1 NB Ramps / Riverside Drive
- Highway 1 SB Ramps / Riverside Drive
- Highway 1 NB Ramps / Airport Boulevard-Larkin Valley Road

The project has significant impacts at the following intersections based on the County significance criteria:

- East Lake Avenue / Holohan Road

- Highway 1 NB Ramps / Harkins Slough Road
- Airport Boulevard / Freedom Boulevard
- Highway 1 NB Ramps / Larkin Valley Road

Many of the intersections would continue to operate at unacceptable levels of service for both project and cumulative conditions, even with the construction of extensive improvements. Some of these Improvements may be regarded as infeasible. For cumulative conditions, the intersection of East Lake Avenue/Wagner Avenue would meet signal warrants and the project has a significant impact at this intersection. No additional feasible improvements have been identified for cumulative conditions. The project would pay the City and County traffic impact fees or fair share contributions to required improvements.

The improvements recommended for project conditions would suffice for cumulative conditions at the following intersections.

- East Lake Avenue/Holohan Road
- Green Valley Road / Holohan Road
- Highway 1 NB Ramps / Harkins Slough Road
- Airport Boulevard / Freedom Boulevard
- Highway 1 NB Ramps / Larkin Valley Road

The project would lengthen the existing southbound left turn pocket from Freedom Boulevard onto Crestview Drive.

The project would have to plan and implement traffic calming measures in the neighborhoods in the area of Gardener Avenue, Atkinson Lane, Brewington Avenue, Crestview Drive and Martinelli Street.

2 INTRODUCTION

2.1 Project Description

The project would be located on the north side of the City of Watsonville, California. The planning area is bordered by the Corralitos Creek to the north, agricultural land to the east and residential neighborhoods to the south and west. The project would accommodate up to 450 dwelling units comprised of townhouses, apartments, and single-family houses on approximately 65.8 acres. However, this traffic impact analysis analyzes a total of 498 dwelling units based on a prior site plan, which would be considered a conservative analysis. The 450 units will generate 42 trips less in the AM peak hour and 58 trips less during the PM peak hour. The distribution of traffic onto the City road network for the reduced land use would not result in a change in the findings of this study.

Access points from Atkinson Lane, Wagner Avenue and Brewington Avenue would be provided for the development. Exhibits 1, 2 and 3 provide a Regional Location Map, Vicinity Map, and Site Plan for the proposed project, respectively.

The *City of Watsonville General Plan* designates the planning area as a "Specific Plan Area" and one of three main future growth areas in the City. With the exception of an approximately 2.3 acre portion fronting Atkinson Lane, the planning area is located outside of the City Limits and a portion is located with the City's SOI. According to the *City of Watsonville General Plan*, the planning area is expected to accommodate 600 residential units, 50 percent of which are to be affordable work force housing units. The *County of Santa Cruz General Plan* designates the majority of the planning area as "Urban Residential-Low Density (R-1)" and "Agriculture," with the PG&E electrical substation parcel designated as "Public Facility." Approximately two-thirds of the planning area is currently in agricultural production as strawberries and apple orchards. Access to the agricultural land is located off Wagner Avenue from the east and Atkinson Lane from the west. The current number of trips going to and from the agricultural land is negligible and therefore was not factored into the project trip generation rates.

This report presents the results from traffic analyses indicating the potential traffic impacts from the proposed project. The traffic generated by the project would travel on Caltrans, the County of Santa Cruz, and the City of Watsonville roadways.

2.2 Scope of Work

The study identifies potential traffic impacts that may be associated with the development of the proposed project. It includes traffic analyses on intersections and street segment traffic operations during typical weekday AM and PM peak hours.

The following intersections and roadways were included in the analysis. All intersections fall under the jurisdiction of the City of Watsonville except where otherwise indicated.

Intersections

1. Freedom Boulevard / Atkinson Lane
2. Freedom Boulevard / Gardner Avenue
3. Brewington Avenue / Crestview Drive
4. Freedom Boulevard / Crestview Drive
5. East Lake Avenue / Wagner Avenue (Caltrans Jurisdiction)
6. East Lake Avenue / Holohan Road (Caltrans Jurisdiction)
7. Green Valley Road / Holohan Road – Airport Boulevard (Santa Cruz County Jurisdiction)
8. Green Valley Road / Main Street (Caltrans Jurisdiction)
9. Highway 1 NB Ramps / Harkins Slough Road (Caltrans Jurisdiction)
10. Highway 1 SB Ramps / Harkins Slough Road (Caltrans Jurisdiction)
11. Airport Boulevard / Freedom Boulevard
12. Green Valley Boulevard / Freedom Boulevard
13. Brewington Avenue / Martinelli Street
14. Highway 1 NB Ramps / Riverside Drive (Caltrans Jurisdiction)

15. Highway 1 SB Ramps / Riverside Drive (Caltrans Jurisdiction)
16. Airport Boulevard / Ranport Road
17. Highway 1 NB Ramps / Larkin Valley Road (Caltrans Jurisdiction)
18. Airport Boulevard / Larkin Valley Road

Roadways

1. Holohan Road between Green Valley Road and East Lake Avenue
2. Airport Boulevard between Freedom Boulevard and Green Valley Road
3. Airport Boulevard between Freedom Boulevard and Highway 1
4. Green Valley Road between Freedom Boulevard and Holohan Road
5. Green Valley Road between Main Street and Freedom Boulevard
6. Freedom Boulevard between Airport Boulevard and Green Valley Road
7. Freedom Boulevard between Green Valley Road and Gardner Avenue
8. Freedom Boulevard between Gardner Avenue and Crestview Drive
9. Freedom Boulevard south of Crestview Drive
10. Highway 1 between Airport Boulevard and Highway 152
11. Highway 1 between Highway 152 and Harkins Slough Road
12. Highway 1 between Harkins Slough Road and Riverside Drive
13. Highway 1 between Airport Boulevard and Buena Vista Drive
14. Highway 1 south of Highway 129
15. East Lake Avenue (Highway 152) between Wagner Avenue and Holohan Road
16. East Lake Avenue (Highway 152) north of Holohan Road.
17. Main Street between Green Valley Road and Highway 1
18. Main Street between Green Valley Road and Ohlone Parkway
19. Highway 1 Ramps at the study interchanges

The study analyzed traffic conditions under the following development scenarios:

- Existing Traffic Conditions
- Existing Plus Background Conditions
- Existing Plus Background Plus Project Conditions
- Cumulative Conditions without the project
- Cumulative Conditions with the project

2.3 Trip Generation

Trip generation rates contained in *Trip Generation 7th Edition*, published by the Institute of Transportation Engineers (ITE), 2003, were used to estimate project trips.

2.4 Traffic Operation Evaluation Methodologies

The methodologies used to perform the operational analyses and provide quantitative levels of service (LOS) were based on the *2000 Highway Capacity Manual* (HCM). The evaluation of intersection operations was performed using the Synchro analysis software.

Traffic flow operations at intersections are evaluated using a LOS concept. The LOS concept uses a grading scale of "LOS A" through "LOS F", with "LOS A" representing free flowing conditions and "LOS F" representing forced flow conditions.

Factors used in determining intersection LOS vary depending on the control device at the intersection. For all-way (four-way) stop intersections, average delay per vehicle is used to define the LOS of the intersection operation. The average delay is determined based on the roadway capacity (number of travel lanes) provided on each intersection approach and the traffic demand. Appendix A shows the relationship between vehicle delay and the all-way stop intersection level of service categories.

For one and two-way stop controlled intersections, the operating efficiency of vehicle movements is analyzed. Vehicles on minor street approaches must yield to the through movements of the major streets. The level of service for stopped/yielding vehicles is based on the distribution of gaps in the traffic stream along the major streets and driver judgment on the minor street approach in selecting gaps. The LOS reported includes both the overall or average value at the intersection for all movements and also the worst approach of the minor street stopped vehicles. Appendix A shows the relationship between vehicle delay and level of service for one and two-way stop controlled intersections.

The HCM calculates the level of service of the minor street approaches and the overall intersection level of service based on this data. It should be noted that both the overall intersection level of service and the minor approach level of service are provided in this report. This is because traffic on the minor street approaches has the lowest priority of right-of-way at the intersection and therefore is the most critical in terms of delay.

Average control delay per vehicle is used to define the level of service for signalized intersections. The average control delay per vehicle is determined based on the signal cycle length, the roadway capacity (number of travel lanes) provided on each intersection approach and the traffic demand. Appendix A shows the relationship between vehicle delay and the signalized intersection level of service categories.

The California Manual on Uniform Traffic Control Devices (MUTCD) requires that an engineering study be performed before traffic signals are installed. Recommendations in this study to provide signals are based on limited planning level data for the peak hour signal warrants only and may not be sufficient for installing signals.

2.5 Traffic Operation Evaluation Methodologies

The City of Watsonville has established LOS D is the minimum acceptable LOS for overall intersection operations, except for those accepted to operate at less than LOS D.

The standard for Caltrans level of service is the LOS C/D threshold in which LOS C is acceptable in all cases and LOS D is acceptable on a case-by-case basis.

The County of Santa Cruz LOS standard is C, but LOS D as a minimum acceptable standard where costs, right-of way requirements, or environmental impacts of maintaining LOS under this policy are excessive and where such capacity enhancements may be considered infeasible.

If the overall LOS is acceptable and the worst approach LOS is unacceptable at unsignalized intersections and signal warrants are not met, the intersection is regarded as operating at acceptable conditions.

2.6 Standards of Significance Criteria

Caltrans, the County of Santa Cruz, and the City of Watsonville have jurisdiction over the roadways studied. The standards of significance criteria apply to project and cumulative project traffic being added to roadways operating at an LOS that does not meet the required standard of the agency. The following is the significance criteria for the relevant jurisdictions:

Caltrans

The Caltrans Guide for the Preparation of Traffic Impact Studies (Caltrans, 2002) states that if an existing State Highway facility is operating at less than the target LOS, the existing LOS should be maintained, thus adding any trips to a facility operating at adverse LOS would be a significant impact.

City of Watsonville Significance Criteria

The City of Watsonville significance criteria states that street improvements are required when traffic volumes exceed LOS D on roadway segments and at signalized intersections.

The City of Watsonville does not have a specific LOS threshold for unsignalized intersections. The City's criteria states that unsignalized intersections may exceed LOS D during peak hour operations. It also states that if the intersection operates worse than LOS D, it should be evaluated for feasible operational improvements.

County of Santa Cruz

The County of Santa Cruz requires that proposed projects that would add traffic at intersections or on highway segments already at LOS E or F shall mitigate any traffic volumes resulting in a 1% increase in the v/c ratio of the sum of all the critical movements.

For unsignalized intersections significant impacts are defined to occur when:

1. The addition of project traffic causes intersection operations to degrade from LOS D or better to LOS E or F, and the peak hour signal warrant from the MUTCD is satisfied, or

2. Project traffic is added to an intersection operating at LOS E or F, and the peak hour signal warrant from the MUTCD is satisfied.

For unsignalized intersections, the critical v/c ratios were identified from the LOS worksheet. The highest v/c ratio was selected, since this would represent the critical movement at the intersection.

For signalized intersections the signal phasing and corresponding volumes determine the critical movements and corresponding v/c ratios. For protected phasing, the left turn and opposing through movements were evaluated. For split phasing and permitted phasing the highest v/c rations for the movement were utilized.

Since the project is located in the County of Santa Cruz, the County significance criteria for impacts are utilized to identify project mitigation.

3 EXISTING TRAFFIC CONDITIONS

The following sections provide a description of the existing traffic network, existing traffic volumes, intersection LOS, and an overview of traffic flow conditions within the study area.

3.1 Existing Traffic Network

Regional access to the project site is provided from Highway 1, Highway 129 – Riverside Drive, and Highway 152. Significant roadways in the vicinity of the project site include Airport Boulevard, Freedom Boulevard, Green Valley Road, Holohan Road, Crestview Drive, and Wagner Avenue.

Highway 1 is a state highway that travels along the coast from south of Los Angeles to north of Fort Bragg. In the project vicinity it is a four-lane freeway. The speed limit is 65 miles per hour. North of Larkin Valley Road the northbound direction has a climbing lane.

Highway 129 – Riverside Drive is a state highway providing Watsonville a connection with Highway 101 to the east and to Highway 1 to the west. In the vicinity of the project, Highway 129 – Riverside Drive is a four-lane divided facility and a two lane undivided facility. The speed limit varies between 30 and 40 miles per hour.

Highway 152 – Main Street / East Lake Avenue is a state highway connecting Watsonville to the City of Gilroy. It terminates at an interchange with Highway 1 in Watsonville. The highway varies between a four-lane highway and two-lane highway and has varying speed limits through the City.

Airport Boulevard is a four-lane undivided arterial that runs from Highway 1 to Freedom Boulevard and a two-lane undivided roadway between Freedom Boulevard and Green Valley Road. Further east it continues as Holohan Road. It provides access to residential neighborhoods, businesses, and the Watsonville Municipal Airport. The speed limit along Airport Boulevard is 35 miles per hour.

Freedom Boulevard is a four-lane divided arterial that runs north-south and east-west through the City of Watsonville. It provides access to primary businesses. The speed limit in the vicinity of the project is 30 miles per hour.

Green Valley Road is a four-lane undivided arterial that runs north-south through the City of Watsonville connecting Highway 1 to the south with areas of unincorporated Santa Cruz County to the north. It provides access to downtown business and residences from Highway 1. In the vicinity of the project the speed limit is 35 miles per hour.

Holohan Road is a two-lane undivided arterial that runs east-west between Highway 152 – East Lake Road and Green Valley Road. It provides access to businesses, residences, and agricultural land. The speed limit along Holohan Road varies from 25 to 45 miles per hour.

Wagner Avenue is currently a cul-de-sac local road that runs from East Lake Drive to Broadview Drive. It provides access to residential houses and the local residential neighborhoods to the south and agricultural land to the north. The speed limit along Wagner Avenue is 25 miles per hour.

Atkinson Lane is a local street with a 25 mile per hour speed limit. It runs between Corralitos Creek to the east at the project site and Freedom Boulevard to the west. It provides access to the local residences along the street and community facilities.

Brewington Avenue is a local collector that dead-ends at the project site at its north end and connects to East Lake Avenue to the south. The speed limit on Brewington Avenue is 25 miles per hour.

Crestview Drive is a local road that provides access to residential houses from Freedom Boulevard. It terminates at Freedom Boulevard to the west and at Wagner Avenue with out a connection to the east and has a speed limit of 30 miles per hour. Crestview Drive is identified to continue onto Wagner Avenue in the City of Watsonville General Plan.

Gardner Avenue is a local street with a 25 mile per hour speed limit. It dead-ends at Freedom Blvd. to the east. Clifford Ave. continues southward opposite Gardener Ave. across the Freedom Boulevard intersection as Clifford Avenue.

3.2 Transit

The Watsonville Transit Center is part of the Santa Cruz Metropolitan Transit District (SCMTD), which provides mass transit for the County of Santa Cruz. The transit center is located in downtown Watsonville at the Rodriquez Street / West Lake Avenue intersection and provides local bus service along 5 routes (Route 72, 74, 75, 76, and 79) throughout the City. It also provides regional bus service to the City of Santa Cruz on Route 71 (SCMTD routes), to the City of Marina on Route 27 (Monterey Salinas Transit – MST routes), and to the City of Salinas on Routes 28 and 29 (MST routes). Appendix K provides further detail on these bus routes.

Currently, Route 71 (Santa Cruz to Watsonville) is the only bus route that travels in the vicinity of the project. It travels north and south on Freedom Boulevard and the closest bus stops to the project are located at the Atkinson Lane / Freedom Boulevard intersection and the Crestview Drive / Freedom Boulevard intersection. These bus stops are located within a quarter mile of the proposed site access locations and approximately 0.7 miles from the center the project site. See Exhibit 20 for a map of the bus stops and the bus routes in the vicinity of the project.

3.3 Bicycle Facilities

The County of Santa Cruz has adopted a Master Plan of County Bikeways for the Watsonville area. Holohan Road, the Corralitos Creek, Atkinson Lane, Brewington Avenue, Wagner Avenue, and Martinelli Street are all included in the Master Plan. The Master Plan has not assigned Class of bikeway in the Master Plan. The County bikeway system in the study area in indicated in Exhibit 25.

The City of Watsonville provides bicycle facilities throughout the City. The facilities range from Class I to Class III Bikeways. Descriptions of the bicycle facility classifications are provided in the following sections.

Class I Bikeway (Bike Path) – A Class I Bikeway is a physically separated bike path that does not share the roadway with motorized vehicles. They can be separated by either open space or a physical barrier and are generally two-way facilities.

Class II Bikeway (Bike Lane) – A Class II Bikeway is a bike lane that shares a portion of the roadway with motorized vehicles. They are separated by striping and are signed and marked for exclusive use by bicycle traffic. Class II Bikeways provide service for one-way bicycle traffic and are located outside of the through lanes for motorized vehicles.

Class III Bikeway (Bike Route) – A Class III Bikeway is a bike route that shares the roadway with motorized vehicles. They are identified by signs and not separated by striping. Class III Bikeways are utilized in locations that do not have Class I or Class II facilities or to connect Class II Bikeways to provide a continuous bikeway system.

Both the SCMTD and MST buses are equipped with bike racks to allow riders to combine biking and busing to there destinations and back. Typically, one-quarter mile to one-third mile is viewed as the maximum walking distance to transit stops.

In the vicinity of the proposed project there are Class III Bikeways located along Freedom Boulevard and Arthur Road. The Freedom Boulevard Bikeway travels from West Riverside Drive in the downtown area northward to Airport Road. The Arthur Road Bikeway (just east of Atkinson Lane) continues from Freedom Boulevard southward to Main Street where it connects to a Class I Bikeway eastward and westward along Main Street.

The City plans to implement bikeways along Brewington Avenue and Martinelli Avenue in the project vicinity, which would encourage biking to and from the project. Exhibit 23 indicates the existing and planned bike facilities.

3.4 Existing Traffic Data

Traffic counts were collected for the intersections included in this analysis in April 2008. Counts were performed during the AM and PM peak hour per the City of Watsonville guidelines. The intersection counts were collected on April 2, April 22, April 29, and April 30, 2008. The 24-hour

tube counts were performed over 7 consecutive days during the April 2, 2008 week to determine the average daily traffic volumes. One traffic count was performed on November 5, 2008 at the intersection of Larkin Valley Road / Highway 1 NB ramp terminus to update counts conducted by Hexagon at the ramp terminal. The counts conducted by Hexagon were also used in the analysis.

3.5 Existing Conditions Intersection Operations

Synchro Traffic analyses were performed to determine the LOS for the weekday Existing AM and PM peak hour at each of the intersections within the project area. The results of these analyses are listed in a matrix in Exhibit 7. All intersections operate at an acceptable LOS during the existing weekday AM and PM peak hours except for the following intersections.

At the intersection of Freedom Boulevard / Crestview Drive field observations revealed that the southbound left turn queue overflows into the through lane during the PM peak hour.

The East Lake Avenue / Wagner Avenue intersection is currently operating at an overall LOS A in both the AM and PM peak hours and has a worst approach LOS of E and D in the AM and PM peak hours, respectively. The worst approach is in the eastbound direction.

The East Lake Avenue / Holohan Road intersection is currently operating at LOS D in the AM peak hour and LOS E in the PM peak hour. Field observations indicate that queues buildup at the northbound, eastbound and southbound directions.

The Green Valley Road / Holohan Road intersection currently operates at LOS D during the AM and LOS E during the PM peak hours. Field observations indicate adverse levels of service as well. The pavement condition at this intersection is severely deteriorated and subsequently the saturation flow rates are lower than what would occur otherwise. This would result in worse operational conditions when compared to the Synchro results.

The Green Valley Road / Main Street intersection currently operates at LOS E and LOS F in the AM and PM peak hours, respectively.

The Highway 1 NB / Harkins Slough Road ramp terminal intersection currently operates at LOS F in the AM peak hour and LOS A in the PM peak hour. The large difference between the AM and PM peak hours is due to the high northbound left turn volume and the conflicting high westbound through volume. The worst approach is currently operating at LOS F in the AM and LOS B in the PM peak hours. The worst approach is in the northbound direction.

The Airport Boulevard / Freedom Boulevard intersection is currently operating at LOS E in both the AM and PM peak hours.

The Highway 1 NB / Highway 129 – Riverside Drive ramp terminal intersection is currently operating at an overall LOS A, and a worst approach LOS E during the AM peak hours and LOS F during the PM peak hour. The worst approach is in the northbound direction.

The Highway 1 SB / Highway 129 – Riverside Drive ramp terminal intersection is currently operating at an overall LOS C and a worst approach LOS E in both the AM and PM peak hours. The worst approach is measured on the SB off ramp and field observations indicate queue build-up on the ramp, which substantiates the LOS result. The worst approach is in the southbound direction.

The Airport Boulevard / Ranport Road intersection currently operates at LOS B and LOS A in the AM and PM peak hours, respectively. The worst approach operates at LOS F in both the AM and PM peak hours. The worst approach is in the northbound direction, but includes only a few vehicles (less than 10) during both peak hours. This intersection does not satisfy signal warrants and is thus is not operating at adverse conditions and does not require to be improved.

The Highway 1 NB / Larkin Valley Road ramp terminal intersection is currently operating at LOS E in the AM peak hour and LOS F in the PM peak hour. The worst approach operates at LOS F in both the AM and PM peak hours. The worst approach is in the eastbound direction.

The Synchro output calculations are provided in Appendix B.

3.6 Existing Conditions Segment Operations

The County of Santa Cruz and City of Watsonville criteria for roadway segment operations was used to evaluate the street segments in the vicinity of the project site. The criteria are consistent with the methodologies outlined in the HCM and based on thresholds of peak hour traffic volumes and roadway facility type and both the County and the City uses the same methodology. This is a planning level of service criteria and the thresholds are indicated in Appendix A. The roadway segments and ramps along Highway 1 were evaluated using the methodologies established in the HCM.

The LOS results are indicated in Exhibit 8 and Exhibit 9 for existing conditions. All the street segments currently operate at acceptable conditions (LOS D or better per the County of Santa Cruz standards; the Caltrans is LOS C/D).

4 EXISTING PLUS BACKGROUND CONDITIONS

The following sections provide a description of the analyses performed during the AM and PM Existing plus Background conditions. Existing plus Background conditions include existing traffic plus the traffic generated by approved projects within the vicinity of the project. The background project description and land uses were provided by the City of Watsonville Community Development Department. The Background projects are located throughout the City of Watsonville as indicated in Exhibit 4.

The trip generation for each project was calculated using the Institute of Transportation Engineers (ITE) Manual, *Trip Generation 7th Edition*, 2003. The trip distribution was calculated based on typical travel patterns in the City and engineering judgment. The background trips would generate approximately 9,252 daily trips, 689 (350 in and 339 out) during the AM peak hour, and 946 (459 in

and 487 out) during the PM peak hour and are indicated in Exhibit 5. The Existing plus Background traffic volumes are indicated in Exhibit 12.

4.1 Existing plus Background Conditions Intersection Operations

Synchro traffic analyses were performed for the weekday Existing plus Background AM and PM peak hour at each of the study intersections within the project area. The results of the analyses are summarized in Exhibit 7. All intersections would operate at an acceptable LOS during the Existing plus Background weekday AM and PM peak hours with the exception of the following intersections.

The southbound left turn queue overflow into the through lane is expected to continue for background conditions at the intersection of Freedom Boulevard / Crestview Drive.

The East Lake Avenue / Wagner Avenue intersection is anticipated to operate at an overall LOS A in both the AM and PM peak hours and has a worst approach LOS of F and D in the AM and PM peak hours, respectively.

The East Lake Avenue / Holohan Road intersection is anticipated to operate at LOS D in the AM peak hour and LOS E in the PM peak hour.

The Green Valley Road / Holohan Road intersection is anticipated to operate at LOS D during the AM peak period and LOS E during the PM peak period. The County of Santa Cruz is planning to construct a second eastbound left turn lane from Airport Boulevard onto Green Valley Road. This improvement has been included in the intersection geometry for background conditions.

The Green Valley Road / Main Street intersection is anticipated to operate at LOS E and LOS F in the AM and PM peak hours, respectively.

The Highway 1 NB Ramps / Harkins Slough Road ramp terminal intersection is anticipated to operate at LOS F in the AM peak hour and LOS A in the PM peak hour. The worst approach is forecast to operate at LOS F in the AM peak hour and LOS B in the PM peak hour.

The Airport Boulevard / Freedom Boulevard intersection is anticipated to operate at LOS E in both the AM and PM peak hours.

The Highway 1 NB Ramps / Highway 129 – Riverside Drive ramp terminal intersection is anticipated to operate at an overall LOS A in the AM and LOS B in the PM peak hour. The worst approach (northbound off ramp) is forecast to operate at LOS E during the AM peak hour and LOS F during the PM peak hour.

The Highway 1 SB Ramps / Highway 129 – Riverside Drive ramp terminal intersection is anticipated to operate at an overall LOS D in the AM and LOS C in the PM peak hours. The worst approach (southbound off ramp) is forecast to operate at LOS E in both the AM and PM peak hours.

The Airport Boulevard / Ranport Road intersection is anticipated to operate at overall LOS B in the AM and PM peak hours. The worst approach is forecast to operate at LOS F in both the AM and PM peak hours. The worst approach is in the northbound direction, and includes only a few vehicles (less than 10) during both peak hours or about a vehicle every 6 minutes. This intersection does not meet the MUTCD signal warrants and is thus not regarded as operating at adverse conditions and does not require to be improved.

The Highway 1 NB Ramps / Larkin Valley Road ramp terminal intersection is anticipated to operate at LOS E in the AM peak hour and LOS F in the PM peak hour. The worst approach is forecast to operate at LOS F in both the AM and PM peak hours. The off ramp has been observed to queue back onto the freeway.

The Synchro output calculations are provided in Appendix C.

4.2 Existing Plus Background Conditions Segment Operations

The Santa Cruz County and City of Watsonville criteria for roadway segment operations were used to evaluate the street segments in the vicinity of the project site. The criteria are consistent with the methodologies outlined in the HCM and based on thresholds of peak hour traffic volumes and roadway facility type. This is a planning level of service criteria and the thresholds are indicated in Appendix A. The roadway segments along Highway 1 were analyzed using HCS software. The worksheets are attached in Appendix L.

The LOS results are indicated in Exhibit 8 and Exhibit 9 for existing plus background conditions. All the street segments would continue to operate at acceptable conditions.

5 EXISTING PLUS BACKGROUND PLUS PROJECT CONDITIONS

The following sections describe the analysis performed during the AM and PM Existing plus Background plus Project traffic conditions and provide an explanation of the project trip generation, distribution, and assignment. For this development scenario the project trips were added to the Existing and Background trips, and analyzed. The project is expected to be built out over several years. To analyze the worst case conditions, full build out of the project was analyzed. This included the assumption that the connection between Crestview Avenue and Wagner Avenue would be constructed as well as the extension of Wagner to East Lake Ave.

5.1 Project Trip Generation

Exhibit 6 contains the trip generation estimates for the projects ultimate build out. The trips are based upon rates published in the Institute of Transportation Engineers' (ITE) *Trip Generation*, *7th Edition, 2003*. The project will accommodate up to 450 dwelling units comprised of townhouses, apartments, and single-family houses on approximately 65.8 acres. However, this traffic impact analysis analyzes a total of 498 dwelling units based on a prior site plan, which would be considered a conservative analysis. The 450 units will generate 42 trips less in the AM peak hour and 58 trips less during the PM peak hour. The distribution of traffic onto the City road network for the reduced land use will not result in a change in the findings of this study.

The project would be comprised of the following uses:

1. 220 Apartments
2. 118 Condominium/Townhouses
3. 160 Single-Family Detached Homes

The ultimate build out of the project is forecast to generate 3,814 daily trips; with 292 trips (62 in, 230 out) occurring during the AM peak hour 372 trips (239 in, 133 out) occurring during the PM peak hour.

5.2 Project Trip Distribution and Assignment

The 2030 AMBAG model was utilized to estimate the trip distribution for the project. The Watsonville VISTA 2030 General Plan model was also used. In the vicinity of the project, the AMBAG model was reviewed to ensure that it accurately represented the existing and future road network within and adjacent to the project study area. It was concluded that the model did accurately represent the existing network within and adjacent to the project study area and accurately represented the current development project details. A select zone analysis was performed and the project trip distribution on the road network determined.

The 2030 AMBAG model as well as engineering judgment based on the knowledge of the existing traffic distribution was used to determine the trip distribution along the road network in the vicinity of the proposed project. It is estimated that 60% of the project generated trips would use the Atkinson Lane access points and 40% would access the project site for Brewington Avenue and Wagner Avenue extension. Approximately 5% of the project trips would distribute along Wagner Avenue to Eastlake Avenue. Approximately 21% of the trips would distribute north on Highway 1and 5% to the south. The trip distribution at the study intersections is indicated in Exhibit 15 and the project trip assignment is indicated in Exhibit 16.

5.3 Existing plus Background plus Project Analysis (with Wagner Connection)

This section indicates the results of the analysis of the project conditions.

5.3.1 Existing plus Background plus Project Conditions Intersection Operations

The project trips were added to the Existing and Background traffic volumes. Traffic analyses were performed for the weekday AM and PM peak hours at each of the study intersections. The results of the analyses are summarized in Exhibit 7. All of the study intersections would continue to operate at acceptable levels of service except for the following. Since the project is located in the County of Santa Cruz, the County significance criteria for impacts are utilized to identify project mitigation.

At the intersection of Freedom Boulevard / Crestview Drive field observations revealed that the southbound left turn lane overflows during the PM peak hour. The southbound left turn queue from Freedom onto Crestview would continue to overflow into the thru lane and the addition of the

project traffic would exacerbate adverse operational conditions. Left turn vehicles spill back into the through lane and vehicles traveling straight through the intersection would have to change lanes or stop behind the back of the queue. The project adds traffic in the left turn lane and needs to mitigate this impact.

The East Lake Avenue / Wagner Avenue intersection is anticipated to operate at an overall LOS A in both the AM and PM peak hours and has a worst approach LOS of F and D in the AM and PM peak hours, respectively. The intersection does not meet signal warrants for project conditions.

The County of Santa Cruz significance standards are used to identify impacts. The addition of the project traffic does not decrease the LOS from acceptable to unacceptable during the PM peak hour and during the AM peak hour the v/c ratio does not increase. Also, the intersection does not satisfy the MUTCD signal warrants and are thus not impacted by the project, nor is it considered to be operating at unacceptable conditions. Thus the project does not have a significant impact at this intersection. Exhibit 24 indicates the v/c ratios for the critical movements where the LOS is unacceptable.

The East Lake Avenue (Highway 152) / Holohan Road intersection is anticipated to continue to operate at LOS D in the AM peak hour and LOS E in the PM peak hour. In terms of the Caltrans requirements the project would result in a significant impact. In terms of the County of Santa Cruz significance criteria the project causes a significant impact since the v/c ratio for the critical movements increase by more than 1% with the addition of the project traffic (See Exhibit 24).

The Green Valley Road / Holohan Road intersection is anticipated to operate at LOS E during both the AM and PM peak hours. The addition of the project traffic does not increase the v/c ratio by more than 1% per the County of Santa Cruz significance standards, and thus project mitigation is not required.

The Green Valley Road / Main Street intersection is anticipated to operate at LOS F in both the AM and PM peak hours. No feasible improvements have been identified at this intersection unless significant improvements are constructed and right-of way is acquired. ROW acquisition may include the building on the southeast corner of the intersection, and landscaping on the remaining three corners. Adding lanes to provide protected signal phasing would include the following: add a northbound through lane and restripe the northbound approach to include two left turn lanes; and add a second southbound through lane and restripe the approach to include two left turn lanes. With these improvements, the delay would decrease, but not to acceptable conditions (LOS D during the AM and LOS E during the PM). The project does not increase the v/c ratio of the critical movements by more than 1% and thus the project has no impact.

The Highway 1 NB Ramp / Harkins Slough Road intersection is anticipated to operate at LOS F in the AM peak hour and LOS A in the PM peak hour. The worst approach is forecast to operate at LOS F in the AM peak hour and LOS B in the PM peak hour. The County of Santa Cruz significance standards are used to identify impacts. The addition of the project traffic increases the critical v/c ratio by more than 1% (See Exhibit 24) and thus the project causes a significant impact at the intersection.

The project will be required to mitigate its impact and improve the intersection to at least Existing Plus Background operating conditions.

The Airport Boulevard / Freedom Boulevard intersection is anticipated to operate at LOS E in both the AM and PM peak hours. The County of Santa Cruz significance standards are used to identify impacts.

The addition of the project traffic increases the critical v/c ratio by more than 1% (See Exhibit 24) and thus the project causes a significant impact at the intersection.

The Highway 1 NB Ramps / Highway 129 – Riverside Drive ramp terminal intersection is anticipated to operate at an overall LOS A in the AM and LOS B in the PM peak hour. The worst is forecast to operate at LOS E during the AM peak hour and LOS F during the PM peak hour.

The County of Santa Cruz significance standards are used to identify impacts. The addition of the project traffic does not increase the v/c ratio by more than 1% for either of the peak hours per the County of Santa Cruz significance standards, and thus no project mitigation is required. In terms of the Caltrans requirements the addition of the project traffic would result in a significant impact. With signalization the intersections would operate at acceptable levels of service.

The Highway 1 SB Ramps / Highway 129 – Riverside Drive ramp terminal intersection is anticipated to operate at an overall LOS D in the AM and LOS C in the PM peak hours. The worst approach is forecast to operate at LOS E in both the AM and PM peak hours.

The County of Santa Cruz significance standards are used to identify impacts. The addition of the project traffic does not increase the v/c ratio by more than 1% for either of the peak hours per the County of Santa Cruz significance standards, and thus no project mitigation is required. In terms of the Caltrans requirements the addition of the project traffic would result in a significant impact. With signalization the intersections would operate at acceptable levels of service.

The Airport Boulevard / Ranport Road intersection is anticipated to operate at LOS B in the AM and PM peak hours. The worst approach is forecast to operate at LOS F in both the AM and PM peak hours. The intersection does not meet the MUTCD signal warrants with and without the project traffic and are thus considered to be operating at acceptable conditions.

The Highway 1 NB Ramps / Larkin Valley Road ramp terminal intersection is anticipated to operate at overall LOS E in the AM peak hour and LOS F in the PM peak hour. The worst approach is forecast to operate at LOS F in both the AM and PM peak hours.

The County of Santa Cruz significance standards are used to identify impacts. The addition of the project traffic increases the critical v/c ratio by more than 1% (See Exhibit 24), and thus the project causes a significant impact at the intersection.

In terms of the Caltrans requirements the project would result in a significant impact.

The project would be required to mitigate its impact and improve the intersection to at least Existing Plus Background operating conditions.

The Synchro output calculations are provided in Appendix D.

5.3.2 Existing plus Background plus Project Conditions Segment Operations

The City of Watsonville and County of Santa Cruz criteria for roadway segment operations was used to evaluate the street segments in the vicinity of the project site. The criteria are consistent with the methodologies outlined in the HCM and based on thresholds of peak hour traffic volumes and roadway facility type. This is a planning level of service criteria and the thresholds are indicated in Appendix A. The roadway segments and ramps along Highway 1 were analyzed using HCS software and the worksheets are attached in Appendix L. All roadway segments would continue to operate at LOS D or better. The LOS results are indicated in Exhibit 8 and Exhibit 9 for project conditions.

The Wagner Avenue extension would be a long straight roadway with two-way stop controlled intersections and speeding could occur. Therefore, traffic calming measures e.g. roundabouts and chicanes should be constructed to slow down traffic speeds.

The project would add 6% trips to the Wagner Avenue extension, if Wagner Avenue were connected to the project. If the Wagner extension were not constructed, the project trips would instead distribute onto Brewington Avenue and Martinelli Street east of Crestview. The LOS for these intersections would remain acceptable in terms of the City standards. A TIRE analysis was also performed and is indicated in Section 9.

5.3.3 Project Intersection Mitigations

The project would pay a fair share contribution towards the various intersection improvements as mitigation unless otherwise indicted. The fair share contribution is either calculated based on a fee per trip/ land use type or a fair share contribution for the cost of the improvement based on the proportionate traffic of the project.

Freedom Boulevard / Crestview Drive: The project will mitigate its impact by lengthening the southbound left turn pocket by at least 50 feet. The existing storage length is 150 feet and the SimTraffic analysis indicates a 95% queue of 195 feet.

The intersection of East Lake Avenue / Holohan Road is constrained by the creek to the south, and buildings/right-of-way to the north and south. Feasible improvement opportunities are thus restricted. To improve the LOS to acceptable conditions the following improvements would have to be provided: Reconstruct the eastbound approach on Holohan Road to include a dedicated eastbound right turn lane, a shared eastbound left turn and through lane on Holohan Road and a separate right turn lane. The receiving northerly leg on Eastlake Avenue would have to be widened to accommodate two lanes to receive the dual eastbound turning movements. With this improvement, the intersection operation would improve to an acceptable LOS D during the AM peak period and LOS C during the PM peak period. This improvement would require relocation of

utilities and signal equipment and may require right-of-way acquisition. The project would mitigate its impact through payment of the County traffic impact fees. The County and Caltrans are currently conducting a PSR at this study intersection.

The installation of a signal at the intersection of Highway 1 NB Ramps / Harkins Slough Road would improve the LOS to acceptable conditions. Peak hour signal warrants are met. The signal would be coordinated and interconnected with the signal at the intersection of Harkin Slough Road / Green Valley Road and the installation of a new signal at the Southbound Ramp terminal due to the close spacing between and overflow/spillback of queues. The project would mitigate its impact by paying the City traffic impact fee or contribute a fair share contribution towards the improvements. Caltrans and the City would have to prepare a PSR for the improvements.

The Airport Boulevard / Freedom Boulevard intersection is anticipated to operate at LOS E in both the AM and PM peak hours. Improvements at the intersection would require right-of-way acquisition and probably the loss of the Class 2 bike lanes, which may not be feasible.

Improvements have been identified for improving the LOS to acceptable conditions. The feasibility of these improvements would be established if a concept design is prepared. With the addition of a second through and shared right turn lane on the Airport approach from Highway 1 and a second left turn lane on Freedom Boulevard from downtown the LOS would improve to D during both the AM and PM peak hours. The receiving leg on Airport Boulevard would have to be widened to accommodate the two through lanes. As mitigation the project would pay a fair share contribution of the City traffic impact fees towards the improvement.

The Highway 1 NB Ramps / Larkin Valley Road ramp terminal and the intersection of Airport Boulevard / Larkin Valley Road are closely spaced. Thus required improvements should address both intersection operations. Coordinated signal operations would not adequately mitigate the impact, as queues would continue to spill back through both intersections as indicated by the SimTraffic analysis. The provision of two roundabouts (one at the northbound hook ramp terminal and one at the Airport Boulevard/Larkin Valley intersection) indicates adequate operations and the LOS would improve to an acceptable level (LOS A). The project will be required to mitigate its impact and pay a fair share contribution towards the improvement at the intersections. Caltrans and the City would have to prepare a PSR for the improvements.

The LOS calculation sheets for mitigated intersection conditions are included in Appendix G.

6 CUMULATIVE WITHOUT PROJECT TRAFFIC CONDITIONS

The following sections describe the results of the traffic analysis performed under cumulative traffic conditions (2030 traffic conditions). These conditions do not include trips generated by the project site.

6.1 Cumulative Volumes

The City of Watsonville 2030 traffic model and the 2030 AMBAG model were used to analyze cumulative conditions. Using the 2000 and 2030 AMBAG model and the current 2008 traffic counts, the future traffic volumes for the years between 2008 and 2030 were calculated to provide data necessary for traffic analysis. The methodology used to obtain the traffic volumes consisted of using the difference between the 2000/2008 volumes and the 2030 volumes to determine annual growth. The 2008 traffic volumes were then exponentially grown to 2030 using the annual growth rate calculated from the model/traffic counts.

The 2030 AMBAG model as well as engineering judgment based on the knowledge of the existing traffic distribution was used to determine the trip distribution along the road network in the vicinity of the proposed project.

The provision of the Wagner Avenue Extension would attract traffic from Freedom Boulevard and Martinelli Street for cumulative conditions. This is mainly due to congested conditions occurring eastwards on Freedom Boulevard closer to downtown. Exhibit 18 and 19 indicate the redistribution of traffic with and without the Wagner Avenue Extension.

6.2 Cumulative Without Project Analysis

6.2.1 Cumulative Without Project Conditions Intersection Operations

All of the study intersections would operate at acceptable levels of service with the exception of the following. Intersection levels of service under Cumulative without Project conditions are summarized on Exhibit 7.

The majority of intersections studied require significant improvements to operate at acceptable conditions. These improvements would require right-of-way acquisition. It is not within the scope of this study to prepare concept designs for the improvements, and only practical improvements, where appropriate and per the significance criteria in the County and City have been recommended.

The East Lake Avenue / Wagner Avenue intersection is anticipated to operate at an overall LOS D during the AM peak hour and C during the PM peak hour and has a worst approach LOS of F during both the AM and PM peak hours. The volumes do meet signal warrants for the PM peak hour. The installation of a traffic signal will improve the LOS to acceptable conditions during both peak periods i.e. LOS A during both the AM and the PM peak periods. The analysis includes the extension of Wagner Avenue to Crestview Drive. Caltrans would approve the installation of a signal and full signal warrants analysis would be required.

Freedom Boulevard / Crestview Drive: The project will mitigate its impact by lengthening the eastbound left turn pocket by at least 50 feet. The existing queue length is 150 feet and the SimTraffic analysis indicates a 95th percentile queue of 185 feet. The volumes would increase by approximately by 10% to 15% on the eastbound left for cumulative conditions and subsequently the queue could increase as well. However, the simulation indicates that the 95th percentile queue would remain at less than 200 feet with modified signal timing. An overall eastbound left turn pocket length of 200 feet would suffice for cumulative conditions.

The East Lake Avenue / Holohan Road intersection is anticipated to operate at LOS E in the AM peak hour and LOS F in the PM peak hour. With the addition of a dedicated eastbound right turn lane and a shared eastbound left turn lane on Holohan Road, the intersection would operate a LOS D during the AM and LOS D during the PM peak hours. The County and Caltrans are currently pursuing a PSR for the intersection.

The Green Valley Road / Holohan Road intersection is anticipated to operate at LOS E during both the AM and PM peak hours. The addition of an exclusive southbound right turn lane would improve the LOS to C during the AM peak hour and LOS E during the PM peak hour. Additional improvements over and above the added southbound right turn lane would require significant ROW acquisition to retain acceptable levels of service.

The Green Valley Road / Main Street intersection is anticipated to operate at LOS F in the AM and PM peak hours. Additional improvements over those identified for project conditions are infeasible and the LOS would not improve to better than F. The delay would however improve.

The Highway 1 NB Ramps / Harkins Slough Road ramp terminal intersection is anticipated to operate at LOS F in the AM peak hour and LOS A in the PM peak hour. The worst approach is forecast to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The city plans to construct ramps to the north on Highway 1 at this location. Similarly the Highway 1 SB Ramps / Harkins Slough Road ramp terminal intersection is anticipated to operate at LOS F in both the AM peak hour PM peak hour. Signalizing the intersections would improve the signal operation to an acceptable level of service. The close pacing of the two intersections and the intersection of Harkins Slough Road and Green Valley Road would require that the signal timing be coordinated / interconnected and the bridge widened. The City and Caltrans would have to pursue a PSR for the interchange to study the required improvements.

The Airport Boulevard / Freedom Boulevard intersection is anticipated to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. Similar to the improvements identified for project conditions, the planned widening of Airport Boulevard and reconfiguring of the intersection to include the following geometry, would improve the LOS to D during both analysis peak hours. The northbound approach should be reconstructed to include two left turn lanes, one through lane and one shared through and right turn lane. The westbound approach (from downtown) should be reconstructed to include two left turn lanes, one through lane and one shared through and right turn lane. These improvements may result in ROW take and a loss of the bike lanes. A concept design would have to prepared to investigate the feasibility of these improvements.

The Highway 1 NB Ramps / Highway 129 – Riverside Drive ramp terminal intersection is anticipated to operate at an overall LOS A in the AM and PM peak hour. The worst is forecast to operate at LOS E during the AM peak hour and LOS F during the PM peak hour. The worst approach is measured on the NB off ramp. The Highway 1 SB Ramps / Highway 129 – Riverside Drive ramp terminal intersection is anticipated to operate at an overall LOS F in the AM and PM peak hours. The worst approach is forecast to operate at LOS E in both the AM and PM peak hours. Signalization of the ramps would improve the LOS to acceptable conditions.

The Airport Boulevard / Ranport Road intersection is anticipated to operate at LOS B in both the AM and PM peak hours. The worst approach is forecast to operate at LOS F in both the AM and PM peak hours. The eastbound volume at the intersection would continue to remain low and no improvements are recommended for cumulative conditions since signal warrants are not met for cumulative conditions either. Thus this intersection is not impacted.

The Highway 1 NB Ramps / Larkin Valley Road ramp terminal intersection is anticipated to operate at LOS F in the AM peak hour and LOS F in the PM peak hour. The worst approach is forecast to also operate at LOS F in both the AM and PM peak hours. This intersection is closely spaced to the Airport Boulevard / Larkin Valley Road intersection. Thus improvements need to be considered at both intersections. Coordinated signal operations would not mitigate the impact and queues spill back through both intersections as indicated by the SimTraffic analysis. The provision of two roundabouts (one at the northbound hook ramp terminal, and one at the Airport Boulevard/Larkin Valley intersection) indicate adequate operations and would improve the LOS to acceptable levels (LOS A).

Intersection levels of service under Cumulative without Project conditions are summarized on Exhibit 7. The Synchro output calculations are provided in Appendix E.

6.2.2 Cumulative without project Conditions Segment Operations

The City of Watsonville and County of Santa Cruz criteria for roadway segment operations was used to evaluate the street segments in the vicinity of the project site. The criteria are consistent with the methodologies outlined in the HCM and based on thresholds of peak hour traffic volumes and roadway facility type. This is a planning level of service criteria and the thresholds are indicated in Appendix A.

The roadway segments and ramps along Highway 1 were analyzed using HCS software.

The LOS results are indicated in Exhibit 8 and Exhibit 9 for cumulative conditions. All the street segments would continue to operate at acceptable conditions, except for Highway 1 north of Larking Valley Road, which would operate at LOS F during both peak hours, and Highway 1 between Main Street (highway 152) and Larkin Valley Road, which would operate at LOS E during the PM peak hour. The freeway would have to be widened to six lanes to improve the LOS to acceptable conditions.

7 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

This section describes the analysis results of the study intersection operations under cumulative traffic conditions, which includes the project trips.

7.1 Cumulative Projects Trip Generation

The project traffic was added to the cumulative volumes and analyzed. Exhibit 20 indicates the Cumulative plus Project traffic volumes assuming construction of the Wagner Ave. extension connection for the AM and PM peak hours at the study intersections.

7.2 Cumulative With Project Analysis

7.2.1 Cumulative With Project Conditions Intersection and Segment Operations

All of the study intersections and segments would continue to operate at the same levels of service as indicated in cumulative conditions and only delays would increase due to the addition of the project trips, except for the intersection of Airport Boulevard and Freedom Boulevard, where the LOS would further decrease from E to F in the PM peak hour. Thus, intersections that would operate at an acceptable LOS would continue to do so with the addition of the project traffic and intersections operating at adverse levels of service would also continue to do so. The project does not cause any intersection or roadway segment to deteriorate from acceptable LOS to unacceptable LOS for cumulative conditions. The County of Santa Cruz 1% threshold v/c significance criteria was used to identify significant cumulative project impacts.

Highway 1 between Highway 152 and Airport Road/Larkin Valley Road would operate at LOS E during the PM peak hour for cumulative and cumulative plus project conditions. North of Airport Road/Larkin Valley Road in Watsonville, the freeway would operate at LOS F during both the AM and PM peak hours. Caltrans does not have any plans to widen the freeway along these sections, except for north of Larkin Valley Road in Aptos. The project would add less than 1% to the cumulative traffic volumes, and the addition of project traffic is considered statistically insignificant given the fact that the daily variation in traffic volumes are more than 1 %. Thus the project impact for cumulative conditions is less than significant for the two study segments north of Highway 152 (Main Street).

The Synchro output calculations are provided in Appendix F. HCS worksheets for the freeway analysis are provided in Appendix L.

7.2.2 Cumulative Mitigations

The project has a significant cumulative impact at the following intersections, where the v/c ratio would increase by 1% or more.

- Installation of a signal at the intersection of East Lake Avenue / Wagner Avenue would mitigate the project impact for cumulative conditions. Payment of the City traffic impact fee would mitigate the project cumulative impact.

The improvements recommended for project conditions would suffice for cumulative conditions at the following intersections.

- East Lake Avenue/Holohan Road
- Highway 1 NB Ramps / Harkins Slough Road
- Airport Boulevard / Freedom Boulevard
- Highway 1 NB Ramps / Larkin Valley Road

The County of Santa Cruz collects Transportation Improvement Area (TIA) fees from developments with net new trips assigned to the road network. The TIA fees are collected to help fund future transportation needs as established in the five-year Capital Improvement Program. The TIA fees are considered to be mitigation measures for the projects cumulative impacts.

The project would also pay the City of Watsonville Traffic Impact Fees. The City of Watsonville plans to install a signal at the intersection of East Lake Avenue and Wagner Avenue. The project will have to pay a fair share towards the installation of the signal. The intersection falls under Caltrans jurisdiction and they would have to approve the installation of the signal.

8 WAGNER AVENUE EXTENSION

The construction of the Wagner Avenue Extension results in a shift of traffic on the street network for cumulative conditions from existing streets to the new connection. If the Wagner Avenue Extension were not constructed, the traffic would remain on Freedom Boulevard, Martinelli Street and Tuttle Avenue. Project traffic would thus distribute through the neighborhood (approximately 5%). Cumulative volumes with and without the Wagner Avenue Extension and with and without the project are indicated in Exhibits 18 through 21.

In order to perform the intersection LOS analysis without the Wagner Extension, the project generated trips were re-routed to existing routes. These routes would include Brewington Avenue through the Brewington Avenue / Martinelli Street intersection, then further eastward along Martinelli Street to East Lake Avenue. Traffic would also distribute along Tuttle Avenue to East Lake Boulevard. Three intersections were affected by the route changes and include the East Lake Avenue / Wagner Avenue, Brewington Avenue / Crestview Drive, and Brewington Avenue / Martinelli Street intersections.

The LOS analysis indicates that the change in volumes at the intersections did not affect the levels of service operations. The LOS at each intersection would be identical to the “with Wagner extension” analysis indicated in Exhibit 7. Only the delays would change. The results are listed below.

#	N-S Street	E-W Street	Existing Intersection Control	LOS Threshold	Cumulative				Cumulative + Project			
					AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
					Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
3	Freedom Boulevard	Crestview Drive	Signal	**Watsonville LOS D**	**9.2**	**A**	**12.1**	**B**	**10.3**	**B**	**13.6**	**B**
4	Brewington Avenue	Crestview Drive	All-Way Stop (Worst Approach)	**Watsonville LOS D**	**7.7** 8.1	**A** A	**7.5** 7.7	**A** A	**8.0** 8.3	**A** A	**8.2** 8.3	**A** A
5	East Lake Avenue	Wagner Avenue	Stop Sign (EB & WB) (Worst Approach)	**Caltrans LOS C/D**	**24.6** 267.9	**C** F	**6.7** 99.4	**A** F	**35.0** 379.0	**E** F	**16.5** 164.0	**C** F
13	Brewington Avenue	Martinelli Street	Stop Sign (WB) (Worst Approach)	**Watsonville LOS D**	**6.5** 31.8	**A** D	**4.4** 21.9	**A** C	**7.4** 32.2	**A** D	**4.7** 22.4	**A** C

The spillover of cumulative traffic onto the residential streets in the neighborhood continues to grow as the City grows. The TIRE index indicates that the increase in project and cumulative volumes would be experienced by the residents. The City of Watsonville should consider the implementation of a traffic calming plan in the neighborhood to the south east of the project to discourage cut through traffic. However, capacity should also be provided on the main arterials, because the spillover is a result of a congested arterial street network.

9 PROJECT ACCESS AND ON-SITE CIRCULATION

This section documents a review of the project site access and on-site circulation.

9.1 Project Access

The project will have access points off of Atkinson Lane, Brewington Avenue, and possibly Wagner Avenue. Atkinson Lane will have access points at a new cul-de-sac project roadway and at the end of the Atkinson Lane. Brewington will have access points at a new project roadway extension and a new roadway at the Jasmine Lane intersection. Crestview Drive will have access points off of a new Wagner extension into the project area and an extension of Brookshire Drive. The project Site Access and Internal Circulation Map is indicated in Exhibit 3. The roadways on the site are designed to discourage through traffic. The layout of the internal circulation of the project site and the design of the roadways encourage the reduction of greenhouse gases when compared to more standard residential subdivisions and provides for a more sustainable roadway environment through the provision of narrower roadways and bio-swales. Roundabouts will be provided instead of stop controls at key intersections. The following comments and recommendations are made with regards to review of the site plan.

1. The roundabouts on the site should be designed per Caltrans standards. The approach legs should flare at the roundabout and allowance should be made for pedestrians to cross safely.
2. Sight distance along all on-site roadways should be evaluated once the design drawings are submitted.
3. On-street parking should be allowed on the on-site roadways per City of Watsonville standards and as indicated in the Specific Plan.
4. Pedestrian access should be provided throughout the proposed project with links to the existing pedestrian pathways and sidewalks.

10 TIRE INDEX

A TIRE index analysis was performed to determine if the increase in traffic due to the addition of the project traffic to the local roadway network for with and without constructing the Wagner Extension, may affect the quality of life to the residents in the vicinity of the project. It should be noted that existing cut through trips occur along Crestview Avenue, onto Brewington and Martinelli.

The TIRE index was developed by the Goodrich Group based on research by D. Appleyard in 1970. The criteria for the TIRE are provided in Appendix H.

The TIRE index is a measure of the impact of traffic on residents along a street. It is based on the theory that a given increase in traffic volume has a greater impact on a residential environment along a residential street with low traffic volumes than along a street with high pre-existing traffic volumes. These streets would include Brookhaven, Brewington, Jasmine, Atkinson and Gardner.

The TIRE index is not used to determine possible impacts in traffic operations but rather to give an indication of the experience local residents will have due to increased traffic on a local street. It represents the effect of traffic on the comfort of human activities such as walking, cycling, playing near a street and the freedom to maneuver personal autos in and out of residential driveways.

The TIRE index scale ranges from 0 to 5 depending on daily traffic volume. An index of 0 represents the least infusion of traffic and 5 the greatest and, thereby, the poorest residential environment. The table below shows the TIRE Index Chart.

TIRE Index	Daily Traffic Volume	Residential Environment Typical of
0	1 to 8	A cul-de-sac street with one home
1	9 to 89	A cul-de-sac street with 2 to 15 homes
2	90 to 890	A 2-lane minor street
3	891 to 8900	A 2-lane collector or arterial street
4	8901 to 89,000	A 2- to 6-lane arterial
5	89,001 and up	

A TIRE index analysis was performed with and without the Wagner extension on Brewington Avenue between Crestview Drive and Martinelli Street, Martinelli Street just east of Brewington Avenue, Brewington Avenue north of Crestview Drive, Gardener Avenue east of Freedom Boulevard and Atkinson Lane east of Freedom Boulevard. Typically an increase of more than 0.1

indicates that the residents will experience an increase in the traffic volumes. Streets with a TIRE of 3 or above are "traffic dominated". Exhibit 10 indicates the TIRE index values for both scenarios for project and cumulative conditions.

With Wagner Scenario:

1. The increase in traffic for project conditions will be experienced by the neighbors on Brewington Avenue north of Crestview, Gardener Avenue and Atkinson Lane. The TIRE index will increase by 0.7, 0.2 and 0.2 respectively. The addition of the project traffic onto the neighborhood streets is a significant impact and the project would have to develop and implement traffic calming plans in the neighborhoods along the streets where these impacts are identified.

2. For cumulative conditions the TIRE index will increase on Brewington Avenue north of Crestview and south of Crestview and on Atkinson Lane and Gardener Avenue. In addition to the project conditions mitigations, the project will also have a cumulative significant impact on Brewington south of Crestview and would have to develop and implement a traffic calming plan in the neighborhood along the street where these impacts are identified.

Without Wagner scenario:

1. The increase in traffic for project conditions will be experienced by the neighbors on Brewington Avenue north and south of Crestview, Gardener Avenue and Atkinson Lane.

2. In addition to the "With Wagner" mitigations for cumulative conditions, the project would also have to plan and implement traffic calming measures in the Martinelli neighborhood because the TIRE index on Martinelli Street east of Brewingtron Avenue would increase by 0.2.

11 TRAVEL DEMAND MANAGEMENT

The current bus stops are located further than a quarter mile away from the center of the site. A quarter mile is generally regarded as a maximum distance that people would walk to use transit. The site does not include land uses that would result in an internal reduction in trips. Typical low income families have more than 2 vehicles per family, which also increases the trip generation for typical residential units. If gas prices increase significantly, residents will use more non-automobile travel options, which could reduce the trip generation for the project. If the transit service is expanded to go through the project, transit would increase by 10%-15%. For CEQA analysis purposes the worst case trip generation was assumed and thus the project impacts are worst case.

12 NEAR-TERM PHASE 1DEVELOPMENT

The project will develop over an extended period of time. Near term development on Phase 1 includes the development of 108 apartments, 20 town homes and 9 single family homes. This alterative was evaluated to determine project impacts using the County of Santa Cruz significance criteria of 1% for an increase in the v/c for the critical movements. All of the improvements identified for the project buildout would be required for Phase 1 as well for the intersections listed below.

The following intersections were determined to be impacted by the Phase 1 development. The LOS worksheets are attached in Appendix K and the v/c ratios are included in Exhibit 24.

- Green Valley Road / Holohan Road
- Highway 1 NB Ramps / Harkins Slough Road
- Airport Boulevard / Freedom Boulevard
- Highway 1 NB Ramps / Airport Boulevard-Larkin Valley Road

Source: ESRI (2007)

RBF CONSULTING

0 2.5 5 10 Miles

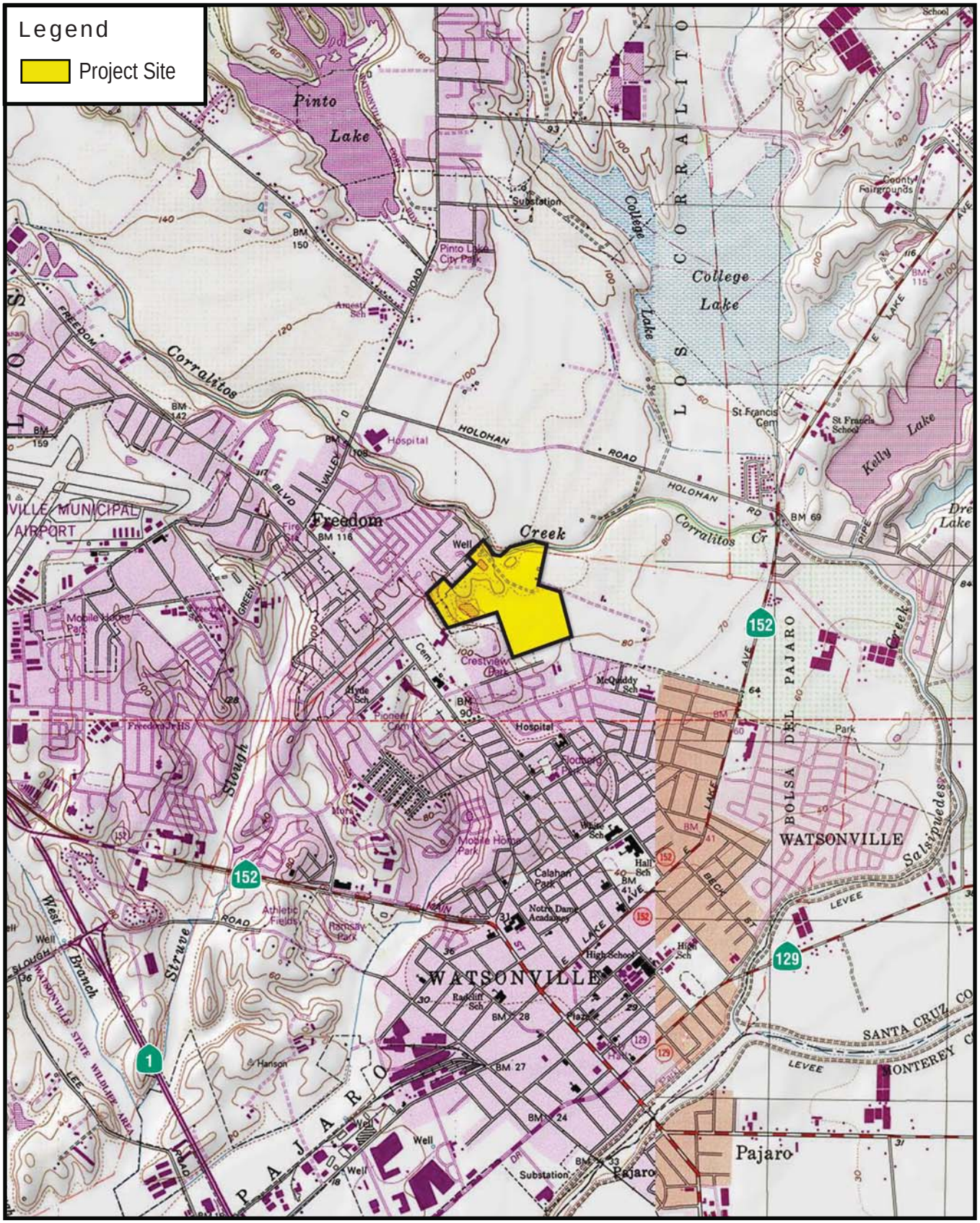
APPROXIMATE

11/4/08 JN 70-100160

ATKINSON LANE SPECIFIC PLAN

Regional Location

Exhibit 1



Source: RBF Consulting (2008)

RBF CONSULTING

0 0.5 1 Mile

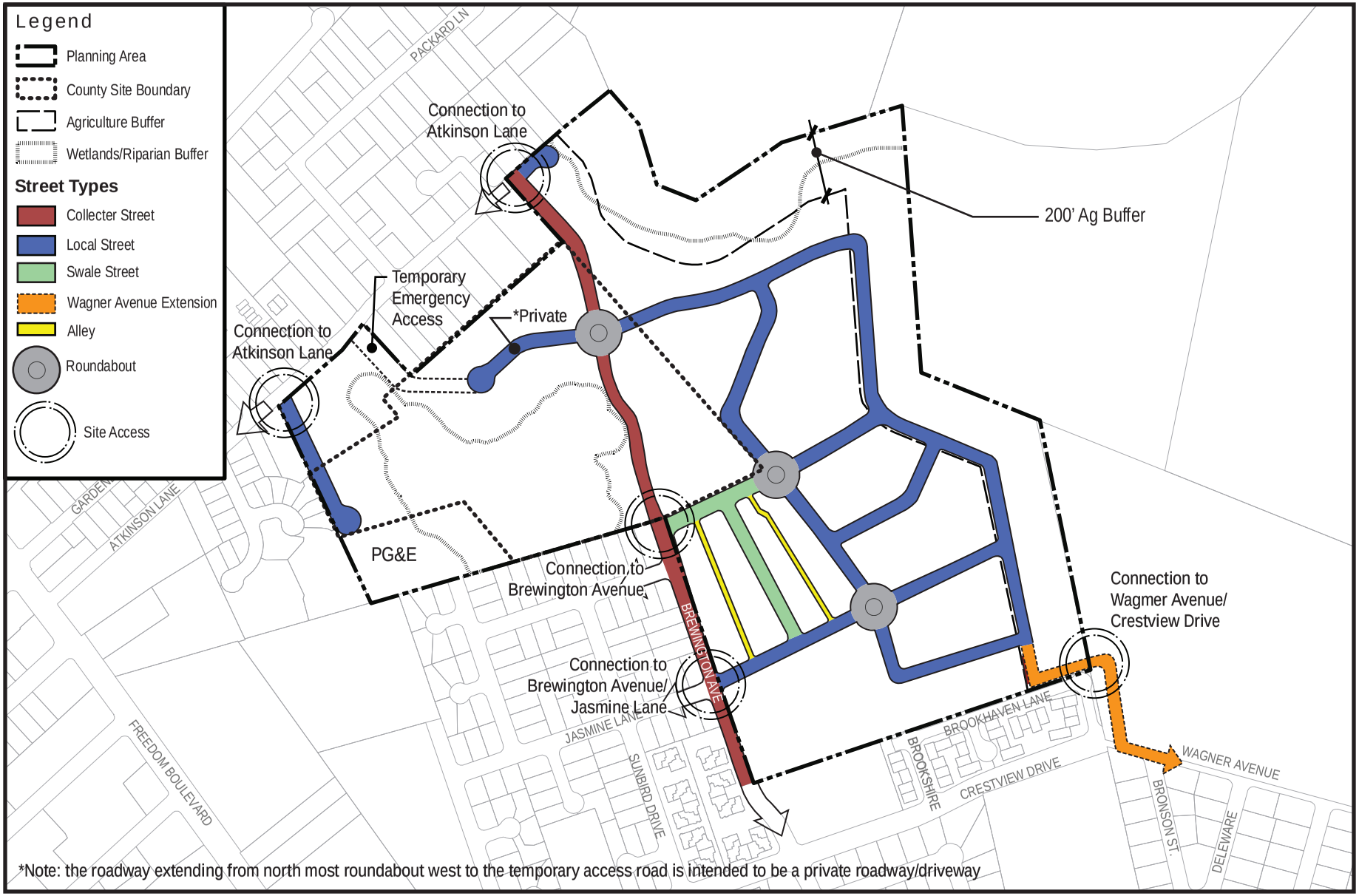
APPROXIMATE

11/4/08 JN 70-100160

ATKINSON LANE SPECIFIC PLAN

Project Vicinity

Exhibit 2



Source: RBF Consulting (2008)

RBF CONSULTING

0 500 1000 Feet

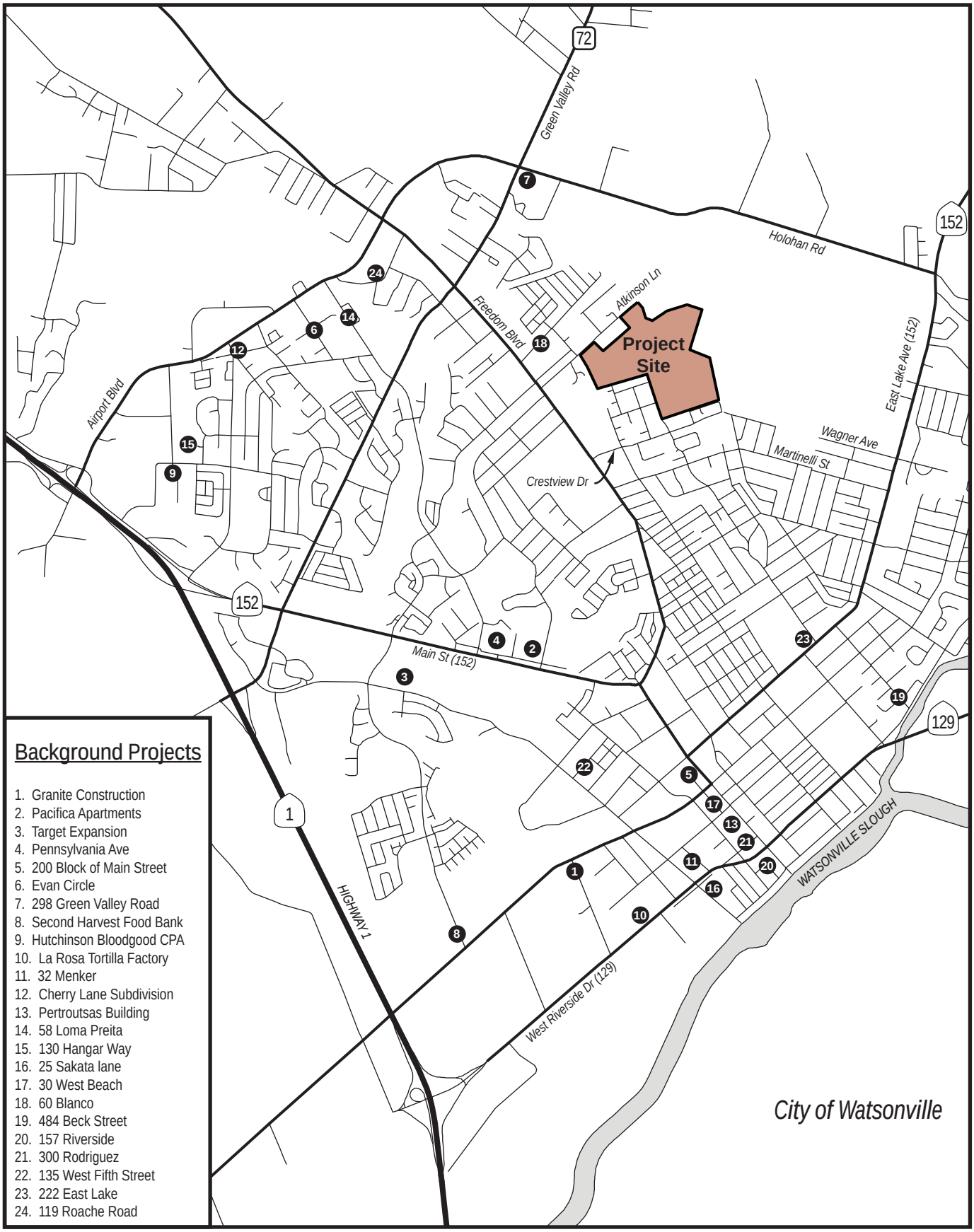
APPROXIMATE

11/17/08 JN 70-100118

ATKINSON LANE SPECIFIC PLAN

Site Plan

Exhibit 3



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

APPROXIMATE

10/30/08 JN 70-100160 • 0160-Exhibit 4-Back Project Map.ai

ATKINSON LANE SPECIFIC PLAN TIA

Background Project Map

Exhibit 4

City of Watsonville, CA

Background Projects Trip Generation

(Revised 8/20/08)

NO	ITE CODE	PROJECT NAME	SIZE	UNITS	WEEKDAY DAILY TRIP RATE	WEEKDAY TRIP GEN. (ADT)	WEEKDAY AM PEAK HOUR PEAK HOUR VOL.	(% OF ADT)	IN / OUT	WEEKDAY PM PEAK HOUR PEAK HOUR VOL.	(% OF ADT)	IN / OUT
		MAJOR PROJECT SUMMARY										
1		Granite Construction										
	110	General Light Industrial	70,000	Sq. Ft.	6.97	488	65	(13%)	58 / 7	69	(14%)	9 / 60
2		Pacifica Apartments										
	220	Apartment	23	Units	6.72	155	12	(8%)	3 / 9	15	(9%)	10 / 5
3		Target Expansion										
	815	Free-Standing Discount Store	34,132	Sq. Ft.	56.02	1,913	29	(1.5%)	20 / 9	173	(9%)	87 / 86
4		Pennsylvania Avenue										
	210	Single Family Detached Housing	6	Units	9.50	57	5	(8%)	2 / 3	6	(11%)	4 / 2
5		200 Block of Main Street[1,2]										
	590	Library	40,000	Sq. Ft.	54.00	108	3	(12.1%)	3 / 0	14	(13%)	7 / 7
	730	Government Office Building[3]	41,000	Sq. Ft.	12.10	25	4	(16.1%)	4 / 0	3	(12%)	1 / 2
	710	General Office Building	35,000	Sq. Ft.	11.01	19	3	(15.6%)	3 / 0	3	(14%)	1 / 2
6		Evan Circle										
	230	Single Family Detached Housing	19	Units	9.57	182	14	(8%)	4 / 10	19	(11%)	13 / 6
7		298 Green Valley Road										
	946	Gas Station, Convenience Store, Car Wash[5]	10	Pumps	48.91	490	41	(8.3%)	21 / 20	59	(12%)	30 / 29
8		Second Harvest Food Bank										
	110	General Light Industrial	14,424	Sq. Ft.	6.97	101	14	(13%)	13 / 1	15	(14%)	2 / 13
9		Hutchinson Bloodgood CPA										
	710	General Office Building	14,745	Sq. Ft.	11.01	162	23	(14.1%)	21 / 2	22	(14%)	4 / 18
10		La Rosa Tortilla Factory										
	110	General Light Industrial	30,000	Sq. Ft.	6.97	210	28	(13%)	25 / 3	30	(14%)	4 / 26
11		32 Menker										
	942	Automotive Care Center[6]	5,000	Sq. Ft.	36	180	15	(8.3%)	10 / 5	18	(10%)	9 / 9
12		Cherry Lane Subdivision										
	210	Single Family Detached Housing[7]	6	Units	9.57	57	5	(8%)	2 / 3	6	(11%)	4 / 2
13		Petroutsas Building										
	230	Residential Condominiums/Townhouse	2	Lots	12.00	24	2	(8.3%)	1 / 1	3	(13%)	3 / 0
	814	Specialty Retail Center[8]	3,300	Sq. Ft.	44.32	146	9	(6.1%)	5 / 4	9	(6%)	4 / 5
14		58 Loma Preita										
	230	Residential Condominiums/Townhouse	8	Units	5.86	47	4	(8%)	1 / 3	4	(9%)	3 / 1
15		130 Hangar Way										
	110	General Light Industrial[9]	36,000	Sq. Ft.	6.97	251	34	(13%)	30 / 4	36	(14%)	5 / 31
16		25 Sakata Lane										
	110	General Light Industrial[9]	54,264	Sq. Ft.	6.97	379	51	(13%)	45 / 6	54	(14%)	7 / 47
17		30 West Beach										
	320	Motel[10]	74	Rooms	5.63	417	33	(8.0%)	12 / 21	35	(8%)	19 / 16
18		60 Blanca										
	230	Residential Condominiums/Townhouse	13	Units	5.86	76	6	(8%)	1 / 5	7	(9%)	5 / 2
19		484 Beck Street										
	210	Single Family Detached Housing	8	Units	9.57	77	6	(7.8%)	2 / 4	8	(11%)	6 / 2
20		157 Riverside										
	230	Residential Condominiums/Townhouse	16	Units	5.86	94	7	(8%)	2 / 5	8	(9%)	6 / 2
21		300 Rodriguez										
	710	General Office Building	6,000	Sq. Ft.	11.01	66	9	(14.1%)	9 / 0	9	(14%)	2 / 7
22		135 West Fifth Street										
	220	Apartment	3	Units	6.72	21	2	(8%)	1 / 1	2	(9%)	2 / 0
23		222 East Lake										
	560	Funeral Home (Church[11])	3,218	Sq. Ft.	9.11	30	3	(7.9%)	2 / 1	3	(7%)	2 / 1
24		119 Roache Road										
	210	Single Family Detached Housing[12]	4	Units	9.57	38	3	(7.8%)	1 / 2	4	(11%)	3 / 1
						5,815	**430**	**(7%)**	**301 / 129**	**634**	**(11%)**	**252 / 382**

Source: City of Watsonville and RBF Consulting (2008)

GENERAL SOURCES/REFERENCES

1. Trip Generation Manual, 7th Edition, Institute of Transportation Engineers.
2. City of Watsonville Community Development Department

SPECIFIC NOTES

1. 200 Block of Main Street has been constructed and is at 95% occupancy. Therefore the background trips generated by this project is 5% of the total build out.
2. Assumed the 200 Block of Main Street is split equally between Library, Government Office Building, and General Office Building.
3. Trip Generation for this land use approximated by using ITE rates for the "Government Office Building" land use for the PM peak hour and assuming the same peak % as for Gen Off (LU Code 710).
4. Assumed "Cluster Lot" would be constructed into "Residential Condominiums/Townhouse."
5. Assumed a total of 10 pumps will be constructed. A 68% reduction in the total number of trips was reduced to reflect pass by trips. This was taken from the ITE Trip Generation Manual.
6. No ITE rates exist for the PM peak hour for "Automotive Car Care." Trip Generation for the PM peak hour was approximated using 10% of the Daily trip rate for "Automotive Car Care."
7. Assumed "Lot major subdivision" would be constructed into "Single Family Detached Housing."
8. Assumed "Mixed use" would be split equally between "Residential Condominiums/Townhouse" and "Specialty Retail Center."
9. No ITE rates exist for the AM peak hour for "Specialty Retail Center." Trip Generation for the AM peak of generator was used to approximate the AM peak hour trip rate, as a worst case.
10. No ITE rates exist for an Inn. Trip Generation for this land use approximated by using ITE rates for the "Motel" land use, as a worst case.
11. No ITE rates exist for a Funeral Home. Trip Generation for this land use approximated by using ITE rates for the "Church" land use, as a worst case.
12. Assumed "Lots" would be constructed into "Single Family Detached Housing."

Atkinson Traffic Study
Watsonville, California
Project Trip Generation

	ITE LAND USE CODE	PROJECT SIZE		WEEKDAY DAILY TRIPS	AM PEAK HOUR					PM PEAK HOUR				
					TOTAL PEAK HOUR	% OF ADT	IN	/	OUT	TOTAL PEAK HOUR	% OF ADT	IN	/	OUT
TRIP GENERATION RATES[1]														
Apartments	220			6.70	0.51	8%	0.20	/	0.80	0.63	9%	0.65	/	0.35
Condominiums/Townhomes (per unit)	230			6.26	0.50	8%	0.17	/	0.83	0.58	9%	0.67	/	0.33
Single-Family Detached Housing	210			10.01	0.76	8%	0.25	/	0.75	1.03	10%	0.63	/	0.37
PROJECT TRIPS[2]														
Apartments	220	220	Unit	1,473	112	8%	22	/	90	139	9%	90	/	49
Condominiums/Townhomes (per unit)	230	118	Unit	739	59	8%	10	/	49	69	9%	46	/	23
Single-Family Detached Housing	210	160	Unit	1,602	121	8%	30	/	91	164	10%	103	/	61
Net Total		498		3,814	292	8%	62	/	230	372	10%	239	/	133

Source: RBF Consulting (2008)

Notes:

1. Trip generation rates published by Institute of Transportation Engineers, "Trip Generation," 7th Edition, 2003.
2. The fitted curve equations were used to calculate the project trip generation.

Intersection Level of Service Summary

	N-S Street	E-W Street	Existing Intersection Control	LOS Threshold	Existing Condition				Existing + Background				Existing + Background + Project				Cumulative				Cumulative + Project			
					AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
					Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	Freedom Boulevard	Atkinson Lane	Stop Sign (WB) (Worst Approach)	**Watsonville LOS D**	**0.1** 12.9	**A** B	**0.1** 14.4	**A** B	**0.0** 13.2	**A** B	**0.1** 14.9	**A** B	**0.8** 16.5	**A** C	**0.5** 17.1	**A** C	**0.0** 15.2	**A** C	**0.1** 17.4	**A** C	**0.0** 16.7	**A** C	**0.5** 21.3	**A** C
2	Freedom Boulevard	Gardner Avenue	Signal	**Watsonville LOS D**	**17.5**	**B**	**19.5**	**B**	**18.6**	**B**	**21.9**	**C**	**20.9**	**C**	**27.3**	**C**	**20.4**	**C**	**23.2**	**C**	**23.5**	**C**	**29.4**	**C**
3	Freedom Boulevard	Crestview Drive	Signal	**Watsonville LOS D**	**9.2**	**A**	**11.0**	**B**	**9.1**	**A**	**11.4**	**B**	**10.1**	**B**	**12.6**	**B**	**10.7**	**B**	**13.5**	**B**	**12.0**	**B**	**15.3**	**B**
					Southbound Left Queue Overflow Observed in Field												Analysis Indicates Southbound Left Queue Overflow							
4	Brewington Avenue	Crestview Drive	All-Way Stop (Worst Approach)	**Watsonville LOS D**	**7.5** 7.8	**A** A	**7.3** 7.5	**A** A	**7.5** 7.8	**A** A	**7.3** 7.5	**A** A	**7.8** 8.1	**A** A	**7.9** 8.2	**A** A	**8.5** 8.7	**A** A	**8.1** 8.3	**A** A	**9.1** 9.2	**A** A	**9.0** 9.6	**A** A
5	East Lake Avenue	Wagner Avenue	Stop Sign (EB & WB) (Worst Approach)	**Caltrans LOS C/D**	**7.4** 49.3	**A** E	**2.5** 33.0	**A** D	**7.6** 51.2	**A** F	**2.6** 34.0	**A** D	**8.0** 52.3	**A** F	**2.7** 34.4	**A** D	**30.5** 191.8	**D** F	**21.6** 121.8	**C** F	**31.8** 236.4	**D** F	**24.8** 165.6	**C** F
					Signal Not Warranted for Existing and Project Conditions												**Signal** **9.2**	**A**	**8.3**	**A**	**Signal** **10.1**	**B**	**9.6**	**A**
6	East Lake Avenue	Holohan Road	Signal	**Caltrans LOS C/D**	**45.2**	**D**	**69.1**	**E**	**45.9**	**D**	**71.4**	**E**	**45.9**	**D**	**73.4**	**E**	**68.3**	**E**	**107.8**	**F**	**68.4**	**E**	**107.6**	**F**
													Reconstruct EB to L, L/T,R **36**	**D**	**31.6**	**C**	**Reconstruct EB to L, L/T,R** **48.2**	**D**	**37.1**	**D**	**Reconstruct EB to L, L/T,R** **48.3**	**D**	**36.5**	**D**
7	Green Valley Road	Holohan Road	Signal	**Santa Cruz County LOS C**	**54.3**	**D**	**64.3**	**E**	**52.5**	**D**	**62.1**	**E**	**52.7**	**D**	**62.2**	**E**	**61.9**	**E**	**71.2**	**E**	**59.7**	**E**	**71.4**	**E**
																	Add SBR **31.5**	**C**	**69.5**	**E**	**Add SBR** **31.5**	**C**	**70.0**	**E**
8	Green Valley Road	Main Street	Signal	**Caltrans LOS C/D**	**74.8**	**E**	**82.9**	**F**	**79.0**	**E**	**87.3**	**F**	**80.1**	**F**	**88.4**	**F**	**154.5**	**F**	**143.1**	**F**	**155.4**	**F**	**145.2**	**F**
																	Add 2nd NBL and excl SBL **89.1**	**F**	**98.8**	**F**	**Add 2nd NBL and excl SBL** **90.5**	**F**	**116.0**	**F**
9	Hwy 1 NB Off Ramp	Harkins Slough Road	Stop Sign (EB & WB) (Worst Approach)	**Caltrans LOS C/D**	**108.2** 420.0	**F** F	**6.4** 13.6	**A** B	**108.4** 420.3	**F** F	**6.4** 13.6	**A** B	**111.4** 432.4	**F** F	**6.6** 13.9	**A** B	**887.4** *	**F** F	**8.1** 42.4	**A** E	**883.3** *	**F** F	**8.7** 42.4	**A** E
													Signalize and widen for LT **17.8**	**B**	**7.7**	**A**	**Signalize and widen for LT** **17.9**	**B**	**9.6**	**A**	**Signalize and widen for LT** **18.3**	**B**	**9.8**	**A**
10	Hwy 1 SB On Ramp	Harkins Slough Road	Stop Sign (WB) (Worst Approach)	**Caltrans LOS C/D**	**5.2** **7.8**	**A** A	**5.4** 7.2	**A** A	**5.2** 7.9	**A** A	**5.4** 7.2	**A** A	**5.6** 8.5	**A** A	**5.5** 7.2	**A** A	*	**F**	*	**F**	*	**F**	*	**F**
																	Signalize and widen for LT **21.9**	**C**	**9.0**	**A**	**Signalize and widen for LT** **22.2**	**C**	**9.2**	**A**
11	Airport Boulevard	Freedom Boulevard	Signal	**Watsonville LOS D**	**61.3**	**E**	**57.8**	**E**	**66.1**	**E**	**62.2**	**E**	**74.3**	**E**	**65.3**	**E**	**85.5**	**F**	**78.4**	**E**	**95.7**	**F**	**81.4**	**F**
													Add WL, NT/R **47.5**	**D**	**43.8**	**D**	**Add WL, NT/R** **51.0**	**D**	**46.2**	**D**	**Add WL, NT/R** **52.4**	**D**	**49.1**	**D**
12	Green Valley Road	Freedom Boulevard	Signal	**Watsonville LOS D**	**34.4**	**C**	**45.0**	**D**	**36.0**	**D**	**47.8**	**D**	**40.8**	**D**	**53.7**	**D**	**41.4**	**D**	**67.4**	**E**	**47.3**	**D**	**79.0**	**E**
					NBL Queue Overflows												**Restripe/widen SB: 2L, 1T, 1TR** **39.9**	**D**	**60.9**	**E**	**Restripe /widen SB: 2L, 1T, 1TR** **45.0**	**D**	**72.5**	**E**
13	Brewington Avenue	Martinelli Street	Stop Sign (WB) (Worst Approach)	**Watsonville LOS D**	**5.6** 22.4	**A** C	**3.3** 17.5	**A** C	**5.7** 22.9	**A** C	**3.3** 18.0	**A** C	**6.3** 23.9	**A** C	**3.8** 18.9	**A** C	**4.8** 21.2	**A** C	**2.5** 16.5	**A** C	**5.8** 23.0	**A** C	**5.9** 22.0	**A** C
14	Hwy 1 NB Ramps	Riverside Drive	Stop Sign (EB & WB) (Worst Approach)	**Caltrans LOS C/D**	**4.6** 39.2	**A** E	**8.9** 87.9	**A** F	**5.2** 43.9	**A** E	**10.5** 106.6	**B** F	**5.2** 44.2	**A** E	**10.7** 108.7	**B** F	**10.1** 106.3	**B** F	**14.4** 165.5	**B** F	**10.2** 107.3	**B** F	**14.7** 168.8	**B** F
																	Signalize **17.8**	**B**	**17.4**	**B**	**Signalize** **17.8**	**B**	**17.4**	**B**
15	Hwy 1 SB Ramps	Riverside Drive	Stop Sign (WB) (Worst Approach)	**Caltrans LOS C/D**	**21.9** 38.9	**C** E	**21.0** 43.8	**C** E	**26.0** 46.2	**D** E	**22.0** 46.0	**C** E	**26.2** 46.4	**D** E	**22.2** 46.5	**C** E	**177.3** 392.6	**F** F	**95.0** 204.1	**F** F	**177.6** 394.0	**F** F	**95.7** 206.0	**F** F
																	Signalize **21.4**	**C**	**18.5**	**B**	**Signalize** **21.4**	**C**	**18.5**	**B**
16	Airport Boulevard	Ranport Road	Stop Sign (EB) (Worst Approach)	**Watsonville LOS D**	**10.7** 120.1 See Note 7	**B** F	**9.9** 56.7	**A** F	**10.9** 131.9 See Note 7	**B** F	**10.0** 59.5	**B** F	**11.0** 138.6 See Note 7	**B** F	**10.2** 69.0	**B** F	**10.7** 59.9 See Note 7	**B** F	**10.1** 46.6	**B** E	**10.7** 62.3 See Note 7	**B** F	**10.2** 53.8	**B** F
17	Hwy 1 NB Ramps	Larkin Valley Road	Stop Sign (EB & NB) (Worst Approach)	**Caltrans LOS C/D**	**36.1** 317.8	**E** F	**82.9** 1093.2	**F** F	**38.5** 350.4	**E** F	**636.5** *	**F** F	**48.6** 484.8	**E** F	**626.0** *	**F** F	* *	**F** F	* *	**F** F	* *	**F** F	* *	**F** F
													Roundabout **5.5**	**A**	**7.2**	**A**	**Roundabout** **6.2**	**A**	**7.1**	**A**	**Roundabout** **6.4**	**A**	**7.4**	**A**
18	Airport Boulevard	Larkin Valley Road	Signal	**Watsonville LOS D**	**12.9**	**B**	**12.2**	**B**	**13.4**	**B**	**12.4**	**B**	**14.2**	**B**	**12.9**	**B**	**19.0**	**B**	**16.5**	**B**	**19.1**	**B**	**16.9**	**B**
													Roundabout **10.7**	**B**	**10.0**	**B**	**Roundabout** **13.2**	**B**	**12.5**	**B**	**Roundabout** **14.8**	**B**	**13.6**	**B**

NOTES:

1. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
2. Analysis performed using 2000 Highway Capacity Manual methodologies.
3. Overall level of service standard for the City of Watsonville and Santa CruzCounty is LOS D. Overall level of service
4. Intersection improvements are highlighted.
5. The overal delay for some intersections actually decreases with the addition of background and project trips. The reduction in delay occurs because the "intersection delay" is the weighted average of all approaches. When traffic volumes increase for an approach that has a free movemnt (zero delay), the "intersection delay" decreases. This can be seen at intersections 1 and 3 during the Existing and Existing plus Background conditions.
6. The asterix (*) indicates that the delay was beyond the capabilities of Synchro.
7. The eastbound approach has 10 or fewer vehicles in the peak hours and improvements would be infeasible
8. Roundabout LOS performed using Traffix and SimTraffic used for simulation

Roadway Segment Level of Service Summary

Roadway	Location	Roadway Type	Lanes	Existing				Existing + Background				Existing + Background + Project				Cumulative				Cumulative + Project			
				AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS
Holohan Road	Between East Lake and Green Valley	Rural Highway	2	1,321	D	1,401	D	1,327	D	1,409	D	1,327	D	1,409	D	1,532	D	1,595	D	1,552	D	1,595	D
Airport Road	Between Green Valley and Freedom	Arterial	2	1,399	C	1,429	C	1,422	C	1,461	D	1,422	C	1,461	D	1,527	D	1,572	D	1,527	D	1,572	D
	Between Freedom and Highway 1	Divided Arterial	4	1,924	A	1,922	A	1,985	A	1,975	A	2,027	A	2,050	A	2,129	A	2,137	A	2,189	A	2,212	B
Freedom Boulevard	Between Airport and Green Valley	Undivided Arterial	4	1,256	A	1,682	B	1,312	A	1,759	B	1,388	A	1,856	B	1,495	A	2,001	C	1,571	A	2,070	C
	Between Green Valley and Gardner	Divided Arterial	4	1,951	A	2,554	C	2,058	A	2,706	C	2,213	B	2,903	D	2,262	B	2,935	D	2,417	B	3,132	D
	Between Gardner and Crestview	Divided Arterial	4	2,021	A	2,520	C	2,117	A	2,633	C	2,228	B	2,697	C	2,314	B	2,874	C	2,425	B	2,938	D
	South of Crestview	Divided Arterial	4	1,846	A	2,177	A	1,954	A	2,306	B	2,035	A	2,403	B	2,091	A	2,457	B	2,167	A	2,554	C
Green Valley	Between Holohan and Freedom	Undivided Arterial	4	1,425	A	1,884	B	1,460	A	1,936	C	1,466	A	1,944	C	1,651	B	2,215	D	1,677	B	2,223	D
	Between Freedom and Main	Undivided Arterial	4	2,102	C	2,151	C	2,122	C	2,179	C	2,158	C	2,223	D	2,190	C	2,238	D	2,226	D	2,282	D
East Lake	North of Holohan	Arterial	2	1,383	C	925	A	1,400	C	951	A	1,415	C	970	A	1,541	D	1,072	A	1,556	D	1,084	A
	Between Holohan and Wagner	Arterial	2	1,258	C	1,239	B	1,273	C	1,264	C	1,291	C	1,286	C	1,505	D	1,467	D	1,523	D	1,482	D
Main Street	Between Green Valley and Highway 1	Arterial	6	3,147	A	3,191	A	3,238	B	3,309	B	3,255	B	3,331	B	4,468	D	4,608	D	4,486	D	4,630	D
	Between Green Valley and Ohlone	Arterial	6	3,399	B	3,693	B	3,487	B	3,828	C	3,487	B	3,828	C	4,103	C	4,290	C	4,103	C	4,290	C
Highway 1	North of Larkin Valley	Freeway	2	2,722	C	3,118	D	2,833	C	3,198	D	2,869	C	3,242	D	4,477	F	5,037	F	4,513	F	5,081	F
	Between Main and Larkin Valley	Freeway	2	2,684	C	3,020	D	2,736	C	3,090	D	2,748	C	3,104	D	3,242	D	3,647	E	3,253	D	3,661	E
	Between Harkin Slough and Main	Freeway	2	1,694	B	1,906	B	1,702	B	1,910	B	1,704	B	1,912	B	2,350	C	2,644	C	2,352	C	2,645	C
	Between Riverside and Harkin Slough	Freeway	2	2,178	C	2,450	C	2,187	C	2,456	C	2,199	C	2,470	C	2,707	C	3,046	D	2,719	C	3,059	D
	South of Riverside	Freeway	2	1,804	B	2,029	C	1,827	B	2,040	C	1,837	B	2,053	C	2,396	C	2,696	C	2,407	C	2,709	C

Source: RBF Consulting (2008)

Freeway Ramp Level of Service Summary

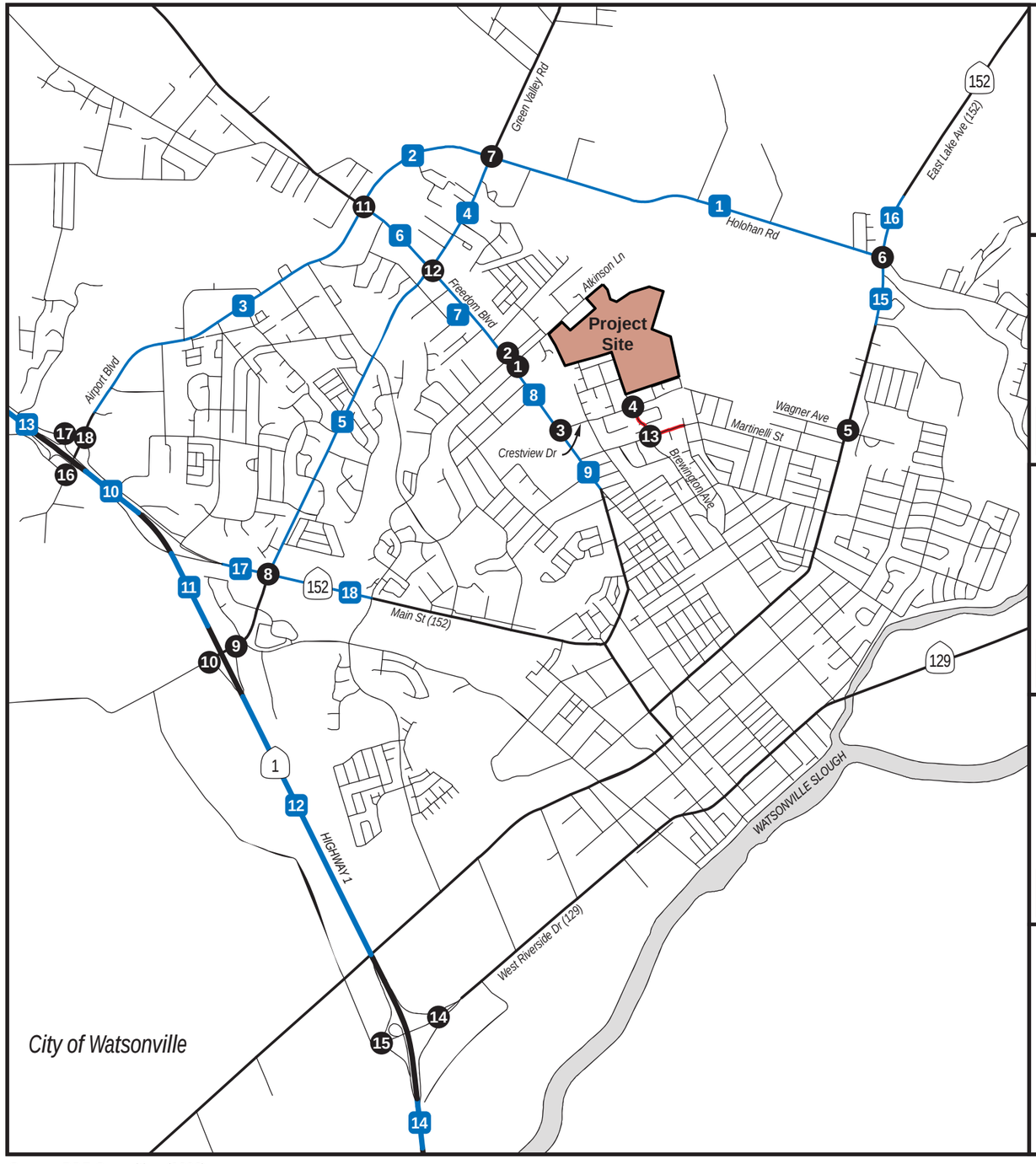
Roadway	Location	Direction	Lanes	Existing				Existing + Background				Existing + Background + Project				Cumulative				Cumulative + Project			
				AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS	AM Peak	LOS	PM Peak	LOS
Highway 1	Larkin Valley Road	SB Off	1	850	A	742	A	869	A	756	A	878	A	795	A	659	A	659	A	669	A	627	A
		SB On	1	330	A	368	A	332	A	381	A	332	A	381	A	496	A	495	A	496	A	477	A
		NB Off	1	384	A	250	A	394	A	252	A	394	A	252	A	356	A	288	A	356	A	288	A
		NB On	1	648	A	750	A	657	A	770	A	696	A	792	A	735	A	851	A	773	A	873	A
	Main Street	SB Off	2	1,782	A	1,811	A	1,838	A	1,868	A	1,842	A	1,883	A	2,477	A	2,506	A	2,482	A	2,521	A
		NB On	2	1,710	A	1,719	A	1,744	A	1,793	A	1,759	A	1,802	A	2,466	A	2,592	A	2,482	A	2,601	A
	Harkin Slough Road	SB On	1	272	A	422	A	273	A	423	A	289	A	431	A	283	A	474	A	299	A	482	A
		NB Off	1	526	A	544	A	527	A	547	A	531	A	562	A	638	A	609	A	643	A	624	A
	Riverside Drive	SB Off	1	722	A	601	A	739	A	603	A	741	A	604	A	788	A	725	A	788	A	725	A
		SB On (from WB Riverside)	1	165	A	166	A	168	A	173	A	168	A	173	A	168	A	173	A	168	A	173	A
		SB On (from EB Riverside)	1	222	A	279	A	230	A	312	A	230	A	312	A	230	A	312	A	230	A	312	A
		NB Off	1	330	A	375	A	372	A	388	A	372	A	388	A	372	A	388	A	372	A	388	A
		NB On	1	835	A	683	A	836	A	691	A	838	A	694	A	1,505	B	1,488	B	1,506	B	1,490	B

Source: RBF Consulting (2008)

TIRE Index

Location	Existing		Existing + Background		Existing + Background + Project (w/ Wagner)		Existing + Background + Project (w/o Wagner)		Cumulative		Cumulative + Project (w/ Wagner)		Cumulative + Project (w/o Wagner)	
	Volume	TIRE Index	Volume	TIRE Index	Volume	TIRE Index	Volume	TIRE Index	Volume	TIRE Index	Volume	TIRE Index	Volume	TIRE Index
Brewington Avenue North of Crestview	360	2.6	360	2.6	1,850	3.3	1,850	3.3	460	2.7	1,950	3.3	2,240	3.4
Brewington Avenue South of Crestview	1,410	3.2	1,410	3.2	1,600	3.2	1,850	3.3	1,100	3.0	1,290	3.1	2,020	3.3
Martinelli Avenue	6,170	3.8	6,340	3.8	6,340	3.8	6,590	3.8	5,520	3.7	5,520	3.7	6,580	3.8

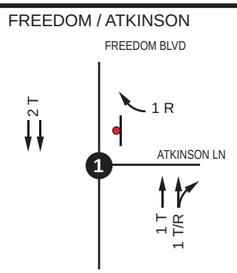
Source: RBF Consulting (2008)



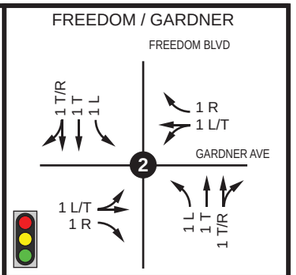
LEGEND

- Intersection Analyzed
- L = Left Turn Lane
  T= Through Lane
  R= Right Turn Lane
- XX Segment Analyzed
- Segment Analyzed for TIRE Index
- Signalized Intersection
- Direction controlled by stop sign

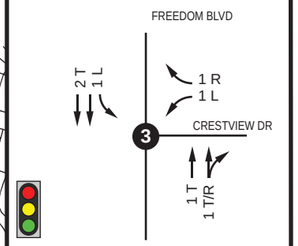
FREEDOM / ATKINSON



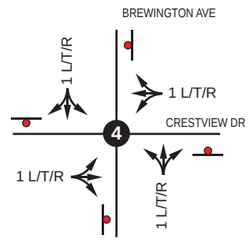
FREEDOM / GARDNER



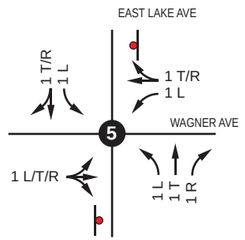
FREEDOM / CRESTVIEW



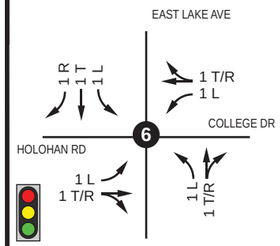
BREWINGTON / CRESTVIEW



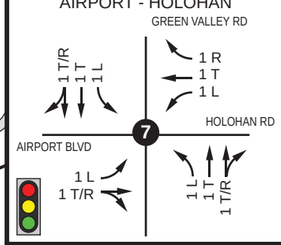
E. LAKE / WAGNER



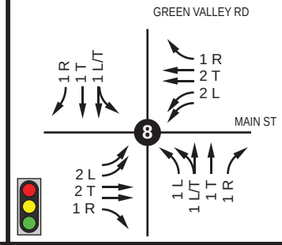
E. LAKE / HOLOHAN - COLLEGE



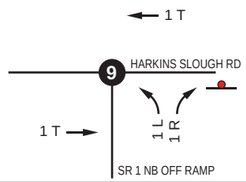
GREEN VALLEY / AIRPORT - HOLOHAN



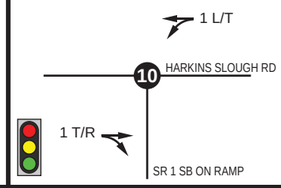
GREEN VALLEY / MAIN



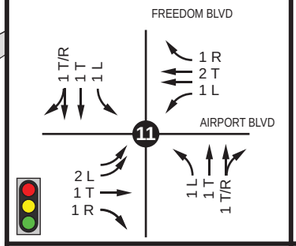
SR 1 NB RAMP / HARKINS SLOUGH



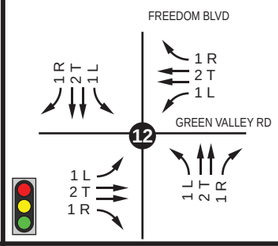
SR 1 SB RAMP / HARKINS SLOUGH



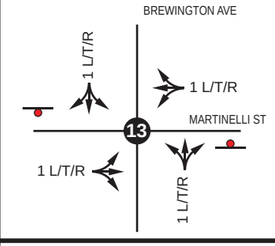
FREEDOM / AIRPORT



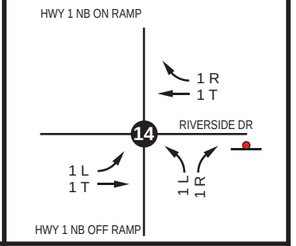
FREEDOM / GREEN VALLEY



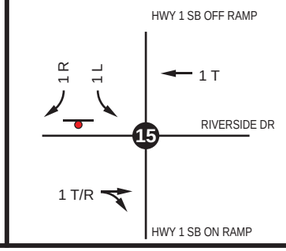
BREWINGTON / MARTINELLI



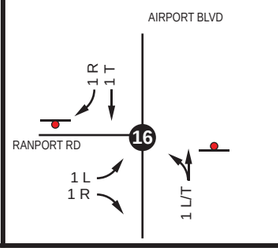
HWY 1 NB RAMPS / RIVERSIDE



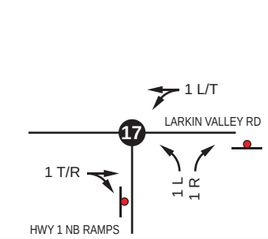
HWY 1 SB RAMPS / RIVERSIDE



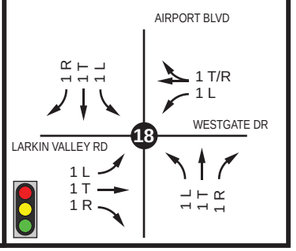
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

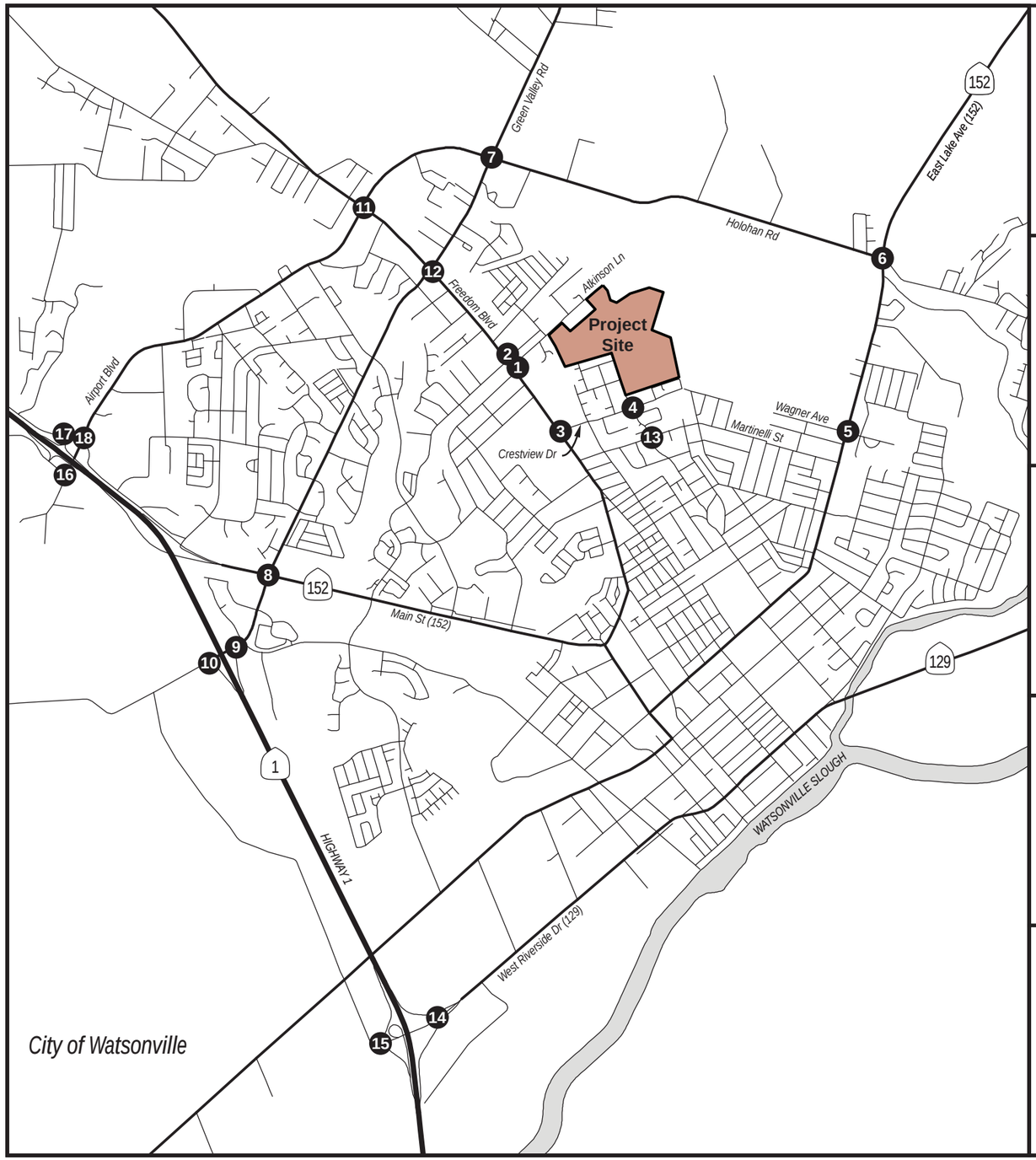
APPROXIMATE

10/30/08 JN 70-100160 • 0160-Exhibit 9-EX Cnfg.ai

ATKINSON LANE SPECIFIC PLAN TIA

Existing Roadway Geometry

Exhibit 11



LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Volumes

1 FREEDOM / ATKINSON

FREEDOM BLVD: 1087//1295 (WB); 8/15 (EB)
ATKINSON LN: 926/1210 (NB); 37/76 (SB)

2 FREEDOM / GARDNER

FREEDOM BLVD: 51/123 883/1094 11/30 (WB); 12/25 55/44 126/112 (EB)
GARDNER AVE: 115/153 21/47 78/89 (NB); 45/76 879/1129 10/20 (SB)

3 FREEDOM / CRESTVIEW

FREEDOM BLVD: 900/1114 86/234 (WB); 113/183 52/43 (EB)
CRESTVIEW DR: 860/981 34/39 (SB)

4 BREWINGTON / CRESTVIEW

BREWINGTON AVE: 13/8 19/8 1/1 (WB); 0/2 10/7 11/5 (EB)
CRESTVIEW DR: 1/8 4/11 39/39 (NB); 67/43 5/9 6/12 (SB)

5 E. LAKE / WAGNER

EAST LAKE AVE: 3/10 475/683 26/22 (WB); 69/23 7/1 116/68 (EB)
WAGNER AVE: 2/8 0/0 8/9 (NB); 3/15 497/531 138/96 (SB)

6 E. LAKE / HOLOHAN - COLLEGE

EAST LAKE AVE: 265/293 341/277 26/14 (WB); 54/16 158/164 129/98 (EB)
HOLOHAN RD: 372/171 113/169 159/315 (NB); 254/289 325/154 50/106 (SB)
COLLEGE DR

7 GREEN VALLEY / AIRPORT - HOLOHAN

GREEN VALLEY RD: 245/188 458/450 192/190 (WB); 118/206 350/299 150/168 (EB)
AIRPORT BLVD: 198/310 296/303 65/49 (NB)
HOLOHAN RD: 18/78 315/535 157/215 (SB)

8 GREEN VALLEY / MAIN

GREEN VALLEY RD: 224/177 459/325 269/315 (WB); 331/415 1009/843 374/395 (EB)
MAIN ST: 196/350 873/1155 542/132 (NB); 313/534 623/569 543/570 (SB)

9 SR 1 NB RAMP / HARKINS SLOUGH

873/427 (EB)
HARKINS SLOUGH RD: 496/128 (NB); 213/43 262/449 (SB)
SR 1 NB OFF RAMP

10 SR 1 SB RAMP / HARKINS SLOUGH

891/111 195/359 (EB)
HARKINS SLOUGH RD: 496/128 51/22 (NB)
SR 1 SB ON RAMP

11 FREEDOM / AIRPORT

FREEDOM BLVD: 251/145 464/477 285/253 (WB); 171/144 500/422 41/96 (EB)
AIRPORT BLVD: 204/299 603/580 118/202 (NB); 248/274 375/380 25/135 (SB)

12 FREEDOM / GREEN VALLEY

FREEDOM BLVD: 110/134 438/611 72/133 (WB); 77/88 365/411 271/375 (EB)
GREEN VALLEY RD: 134/173 404/546 201/279 (NB); 256/335 425/543 236/331 (SB)

13 BREWINGTON / MARTINELLI

BREWINGTON AVE: 13/5 37/19 40/30 (WB); 32/28 246/269 11/6 (EB)
MARTINELLI ST: 5/14 191/277 11/30 (NB); 26/25 39/45 4/7 (SB)

14 HWY 1 NB RAMPS / RIVERSIDE

HWY 1 NB ON RAMP: 667/476 354/363 (EB)
RIVERSIDE DR: 88/141 437/517 (NB); 96/100 202/239 (SB)
HWY 1 NB OFF RAMP

15 HWY 1 SB RAMPS / RIVERSIDE

HWY 1 SB OFF RAMP: 260/138 393/405 (WB); 228/184 (EB)
RIVERSIDE DR: 132/153 149/150 (NB)
HWY 1 SB ON RAMP

16 AIRPORT / RANPORT

AIRPORT BLVD: 295/333 2/4 (WB); 3/0 5/2 (EB)
RANPORT RD: 766/669 2/2 (NB)

17 HWY 1 NB RAMPS / LARKIN

17/58 558/667 (EB)
LARKIN VALLEY RD: 57/55 28/11 (NB); 28/43 319/207 (SB)
HWY 1 NB RAMPS

18 AIRPORT / LARKIN

AIRPORT BLVD: 555/573 266/202 21/17 (WB); 10/33 6/115 9/47 (EB)
LARKIN VALLEY RD: 255/177 83/41 38/44 (NB); 14/37 566/556 119/29 (SB)

Source: RBF Consulting (2008)

0 1/2 1 Mile

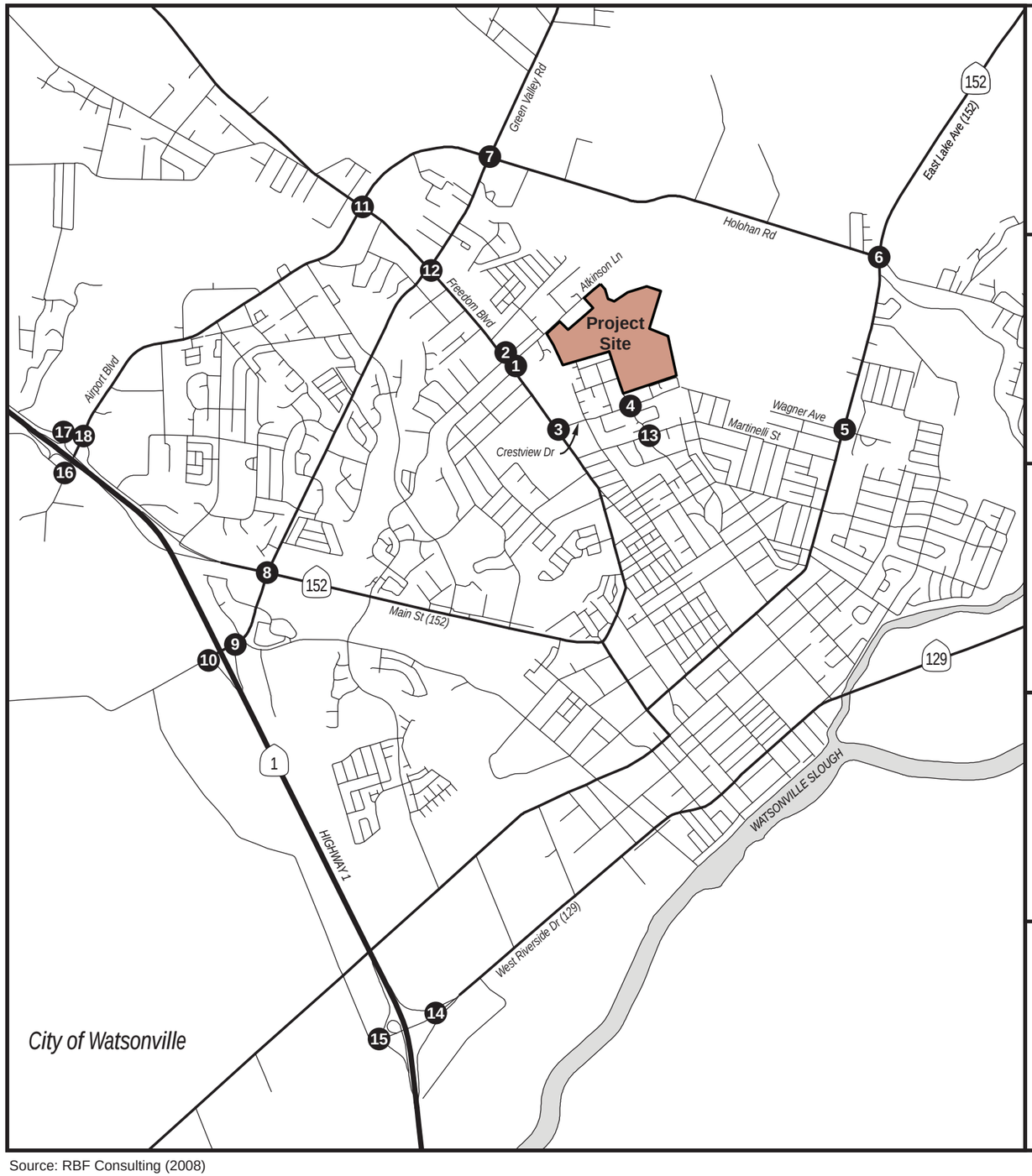
APPROXIMATE

10/28/08 JN 70-100160 • 0160-Exhibit 10-EX PHV.ai

ATKINSON LANE SPECIFIC PLAN TIA

Existing Peak Hour Volumes

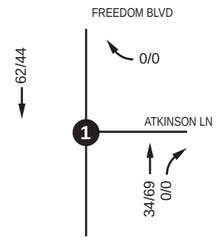
Exhibit 12



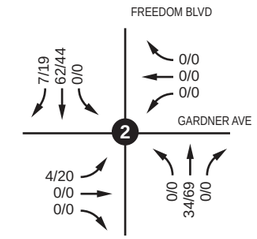
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Trips

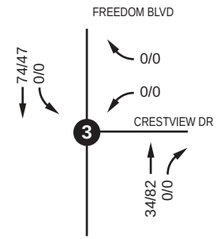
FREEDOM / ATKINSON



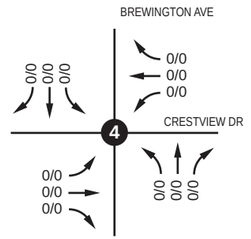
FREEDOM / GARDNER



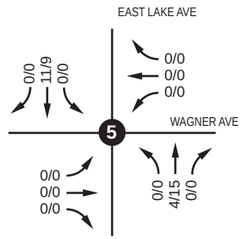
FREEDOM / CRESTVIEW



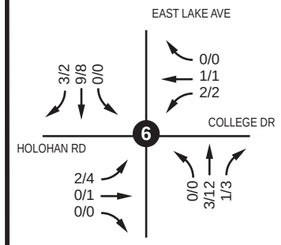
BREWINGTON / CRESTVIEW



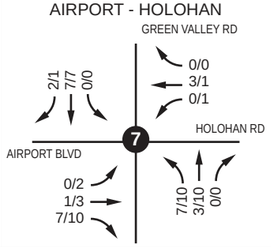
E. LAKE / WAGNER



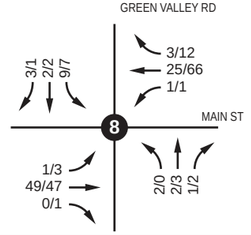
E. LAKE / HOLOHAN - COLLEGE



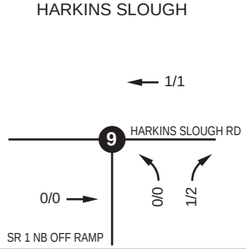
GREEN VALLEY / AIRPORT - HOLOHAN



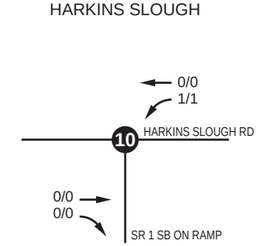
GREEN VALLEY / MAIN



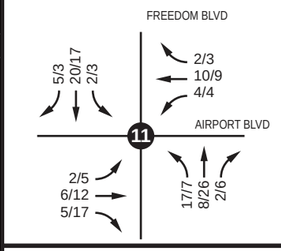
SR 1 NB RAMP / HARKINS SLOUGH



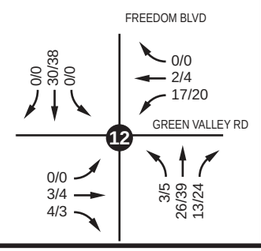
SR 1 SB RAMP / HARKINS SLOUGH



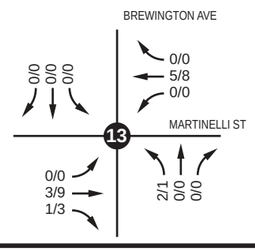
FREEDOM / AIRPORT



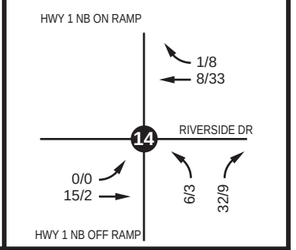
FREEDOM / GREEN VALLEY



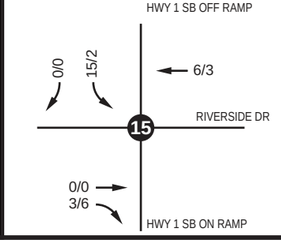
BREWINGTON / MARTINELLI



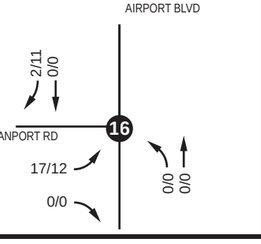
HWY 1 NB RAMPS / RIVERSIDE



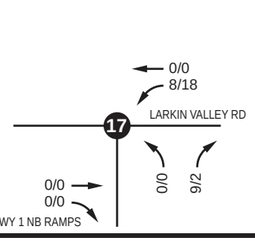
HWY 1 SB RAMPS / RIVERSIDE



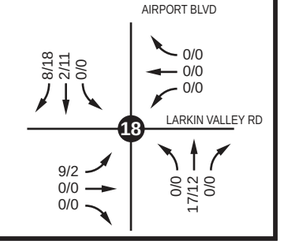
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

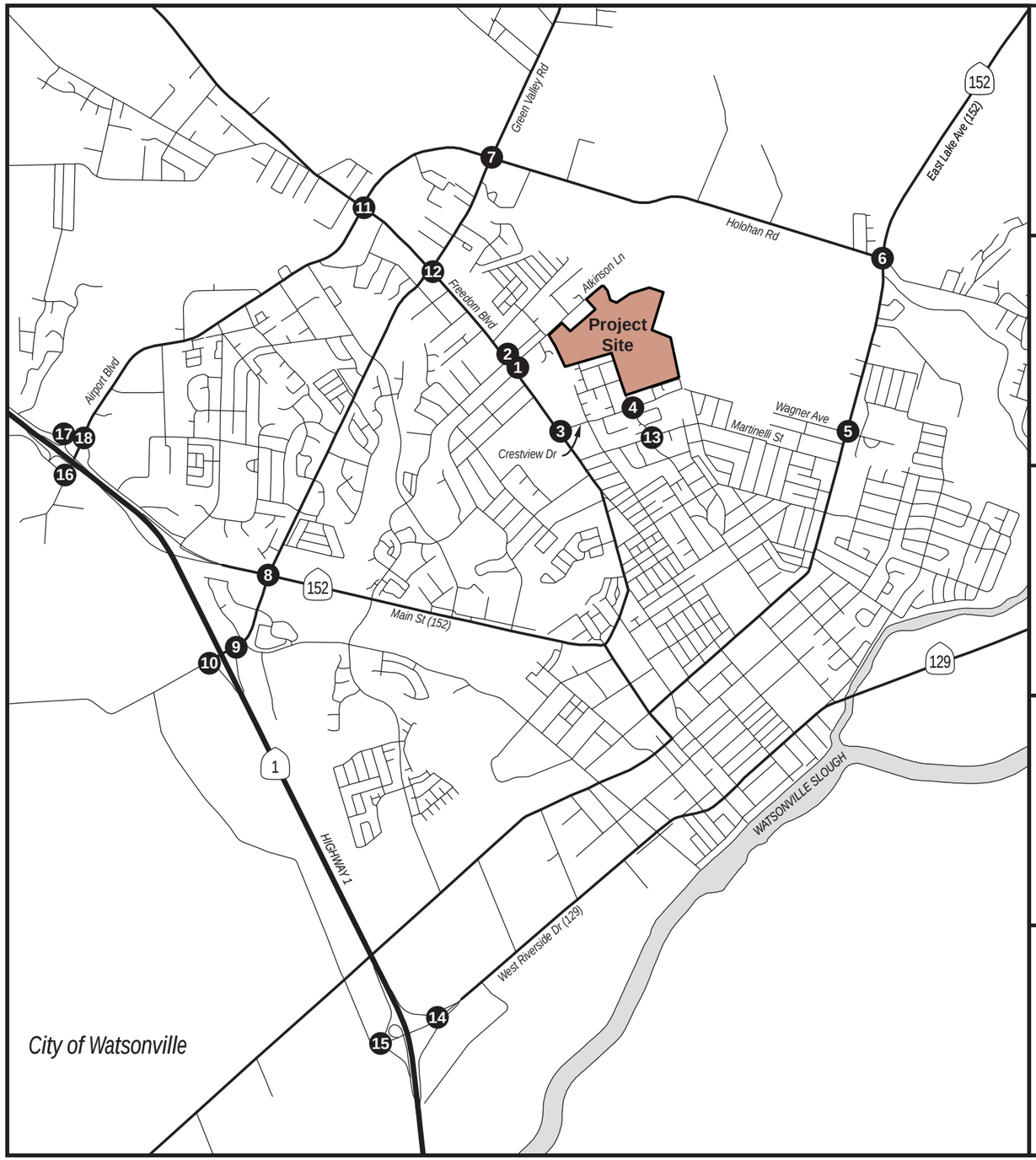
APPROXIMATE

11/04/08 JN 70-100160 • 0160-Exhibit 11-Back PHT.ai

ATKINSON LANE SPECIFIC PLAN TIA

Background Peak Hour Trips

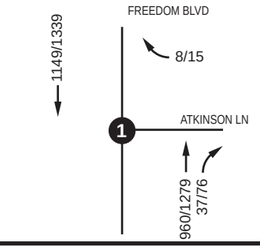
Exhibit 13



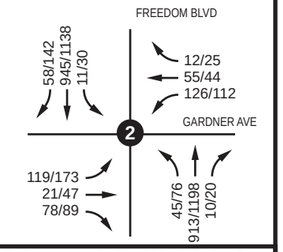
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Volumes

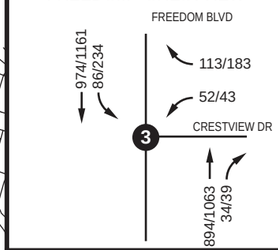
FREEDOM / ATKINSON



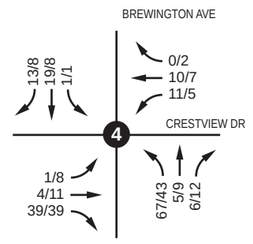
FREEDOM / GARDNER



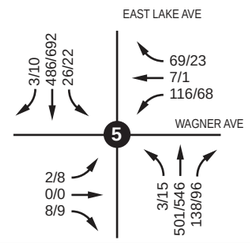
FREEDOM / CRESTVIEW



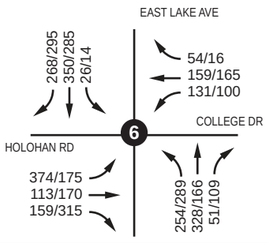
BREWINGTON / CRESTVIEW



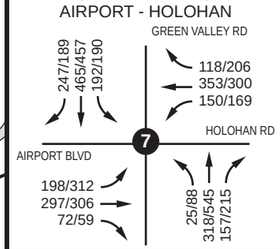
E. LAKE / WAGNER



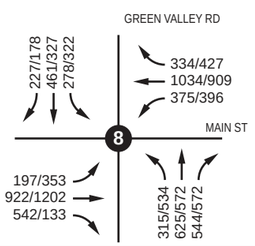
E. LAKE / HOLOHAN - COLLEGE



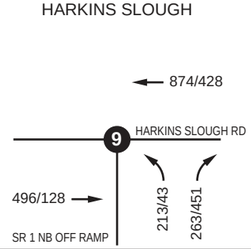
GREEN VALLEY / AIRPORT - HOLOHAN



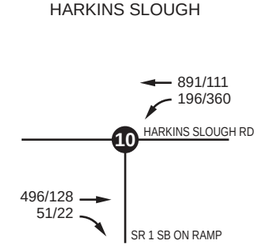
GREEN VALLEY / MAIN



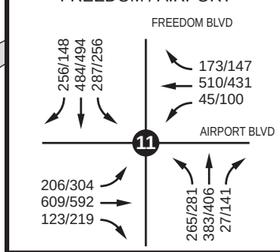
SR 1 NB RAMP / HARKINS SLOUGH



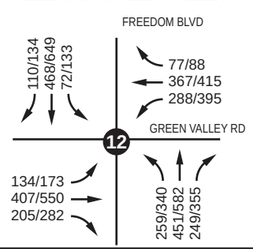
SR 1 SB RAMP / HARKINS SLOUGH



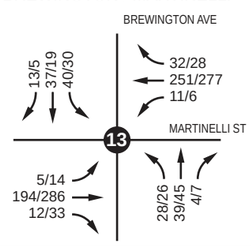
FREEDOM / AIRPORT



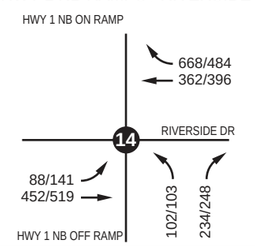
FREEDOM / GREEN VALLEY



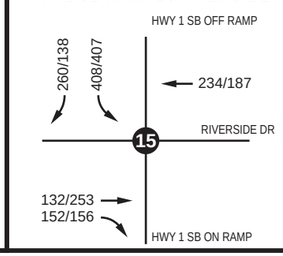
BREWINGTON / MARTINELLI



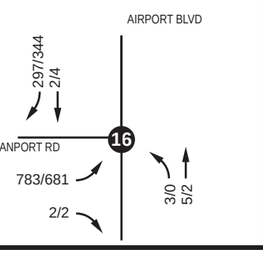
HWY 1 NB RAMPS / RIVERSIDE



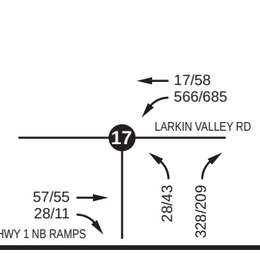
HWY 1 SB RAMPS / RIVERSIDE



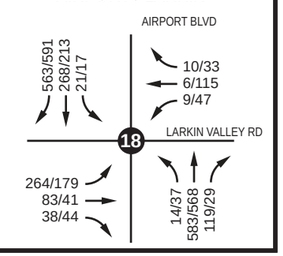
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

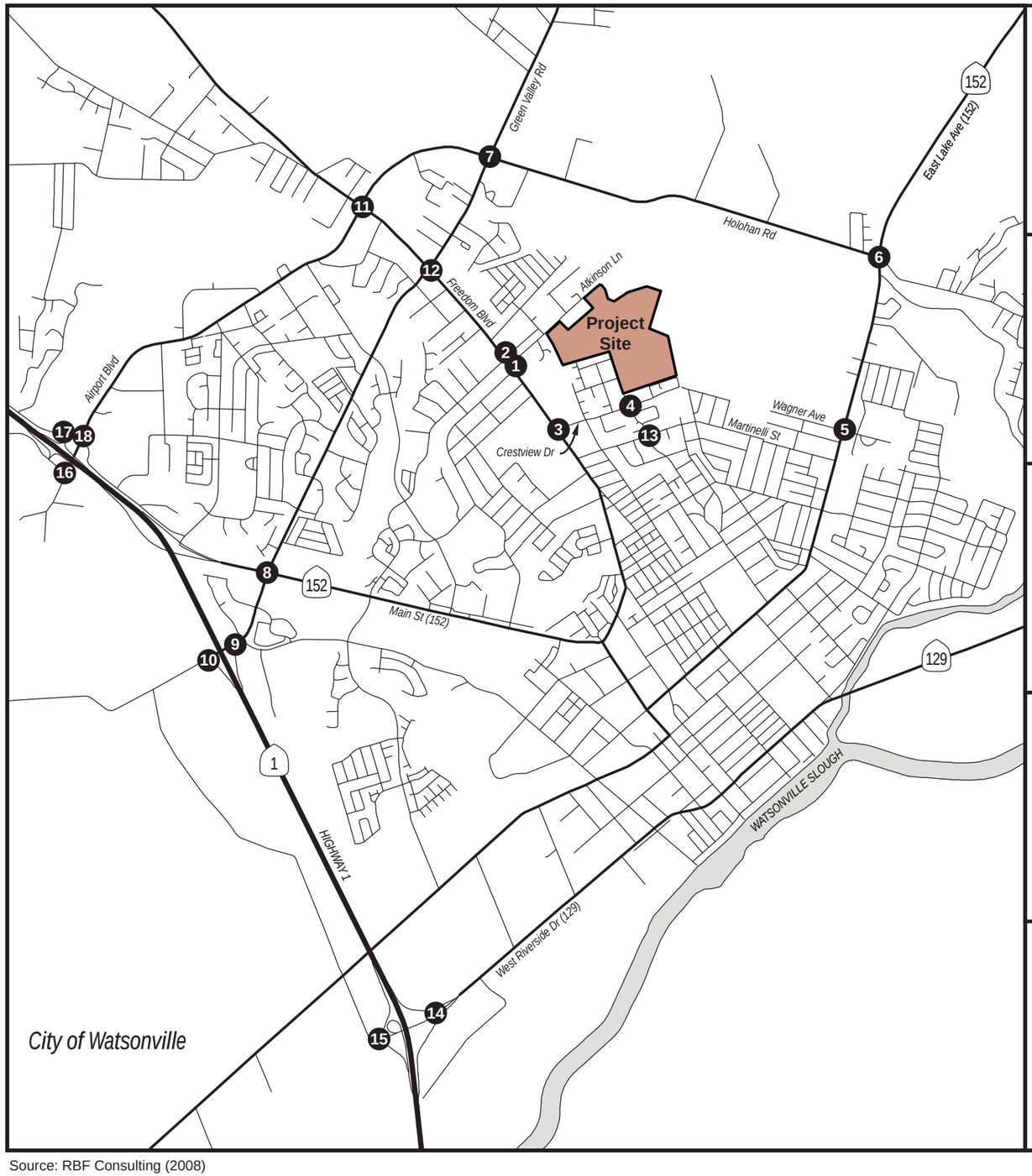
APPROXIMATE

11/04/08 JN 70-100160 • 0160-Exhibit 12-EX + Back PHV.ai

ATKINSON LANE SPECIFIC PLAN TIA

Existing + Background Peak Hour Volumes

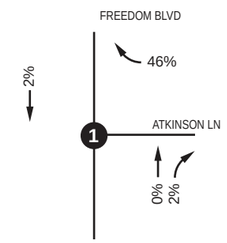
Exhibit 14



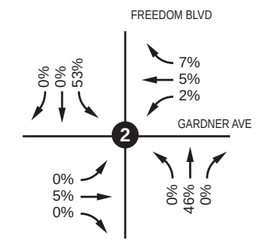
LEGEND

- (x) Intersection Analyzed
- XX = Distribution Percentage

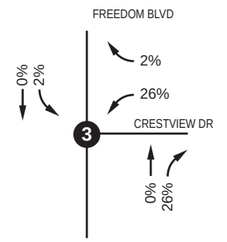
FREEDOM / ATKINSON



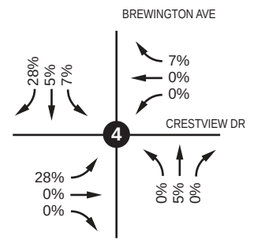
FREEDOM / GARDNER



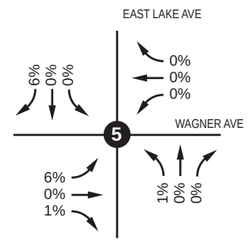
FREEDOM / CRESTVIEW



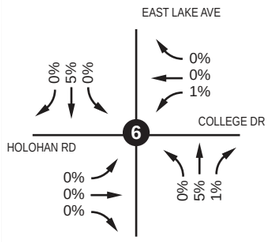
BREWINGTON / CRESTVIEW



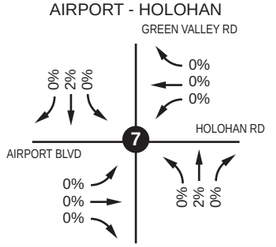
E. LAKE / WAGNER



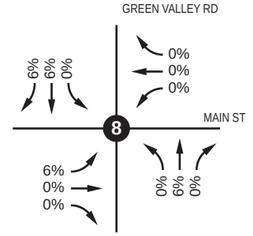
E. LAKE / HOLOHAN - COLLEGE



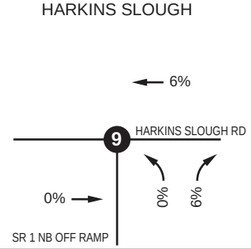
GREEN VALLEY / AIRPORT - HOLOHAN



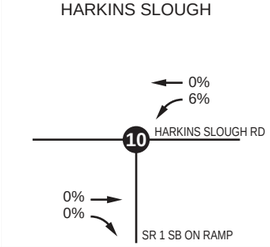
GREEN VALLEY / MAIN



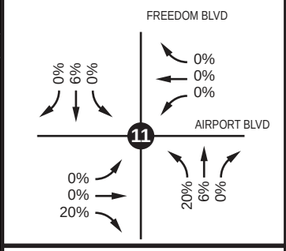
SR 1 NB RAMP / HARKINS SLOUGH



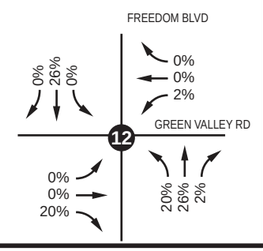
SR 1 SB RAMP / HARKINS SLOUGH



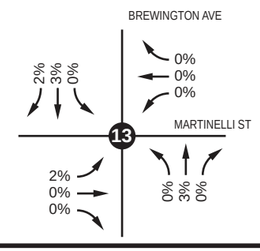
FREEDOM / AIRPORT



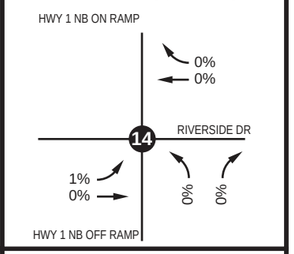
FREEDOM / GREEN VALLEY



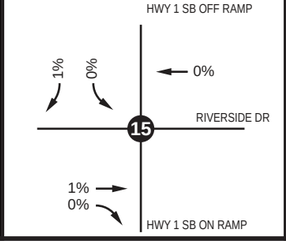
BREWINGTON / MARTINELLI



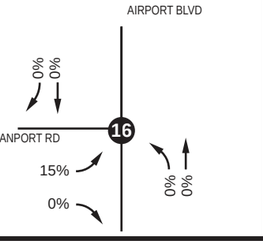
HWY 1 NB RAMPS / RIVERSIDE



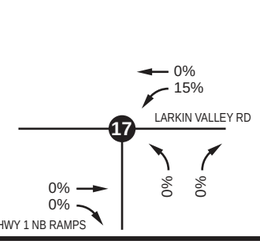
HWY 1 SB RAMPS / RIVERSIDE



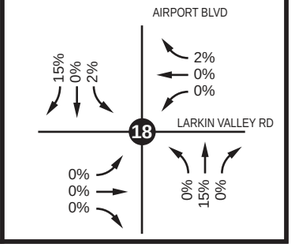
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

0 1/2 1 Mile

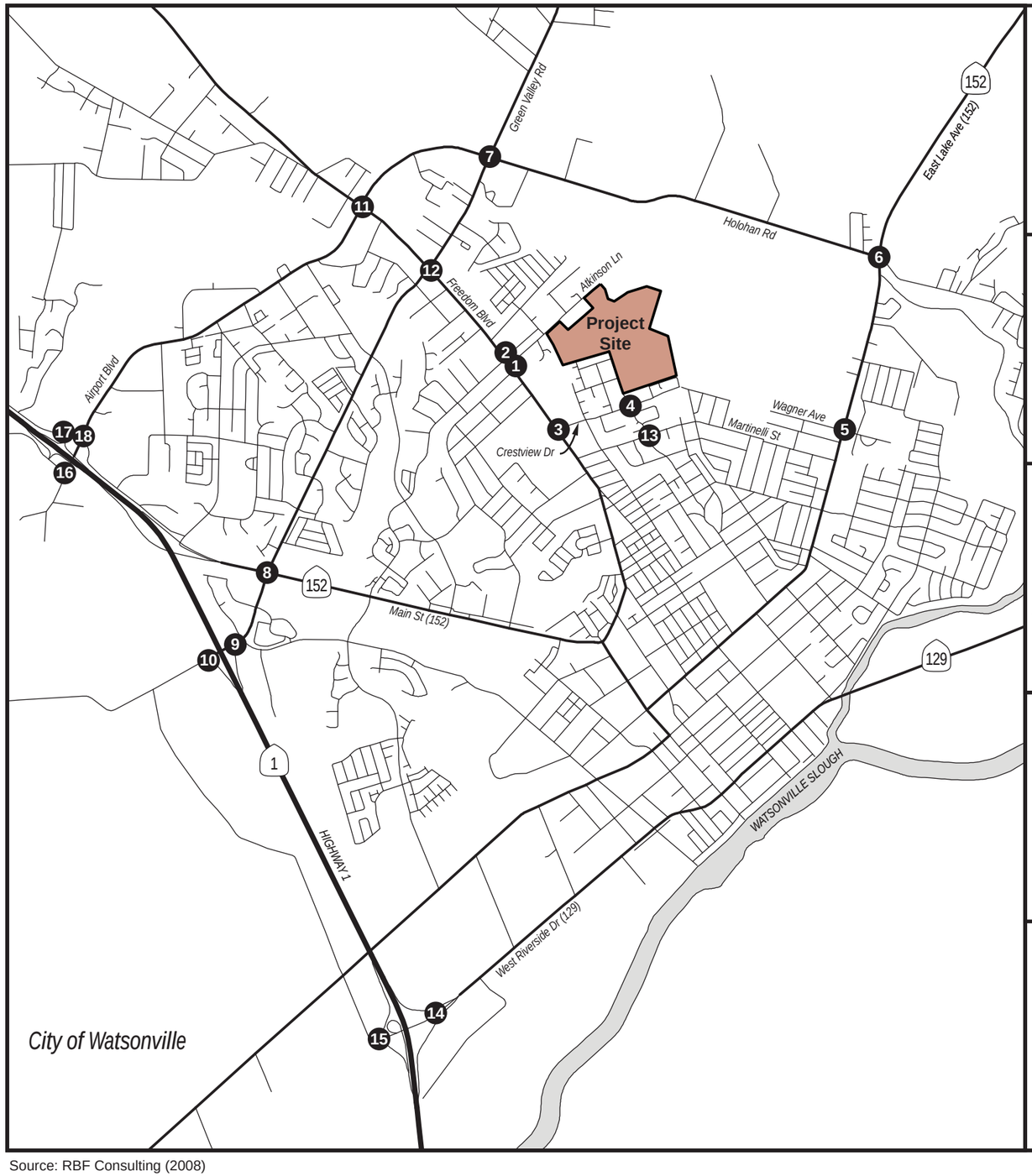
APPROXIMATE

11/04/08 JN 70-100160 • 0160-Exhibit 13 Trip Dist.ai

ATKINSON LANE SPECIFIC PLAN TIA

Project Trip Distribution

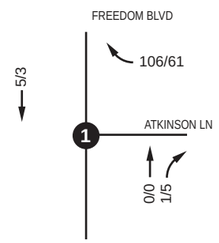
Exhibit 15



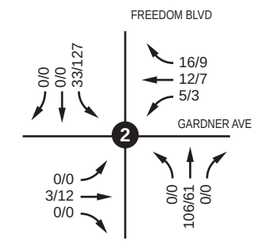
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Trips

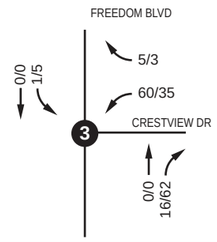
FREEDOM / ATKINSON



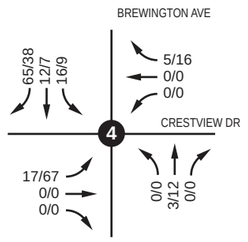
FREEDOM / GARDNER



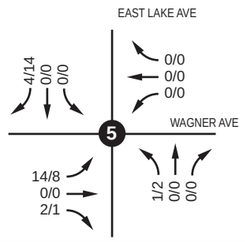
FREEDOM / CRESTVIEW



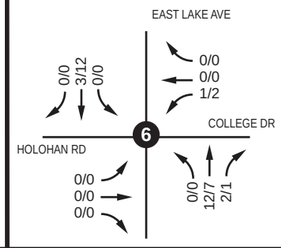
BREWINGTON / CRESTVIEW



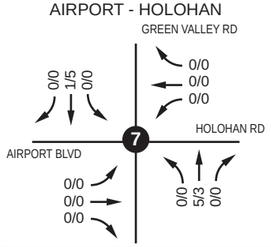
E. LAKE / WAGNER



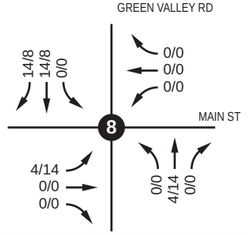
E. LAKE / HOLOHAN - COLLEGE



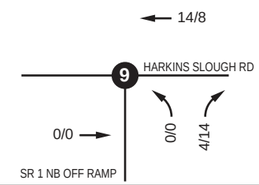
GREEN VALLEY / AIRPORT - HOLOHAN



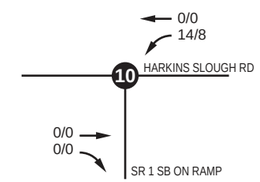
GREEN VALLEY / MAIN



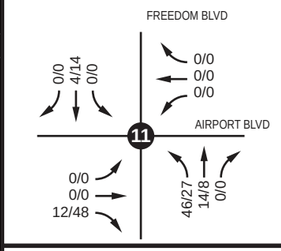
SR 1 NB RAMP / HARKINS SLOUGH



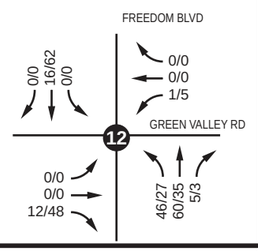
SR 1 SB RAMP / HARKINS SLOUGH



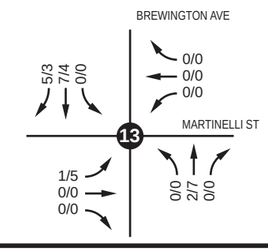
FREEDOM / AIRPORT



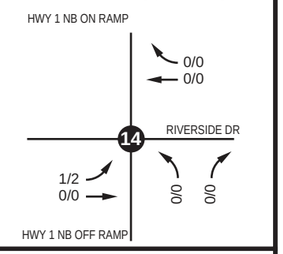
FREEDOM / GREEN VALLEY



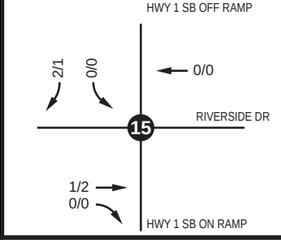
BREWINGTON / MARTINELLI



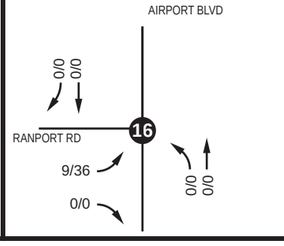
HWY 1 NB RAMPS / RIVERSIDE



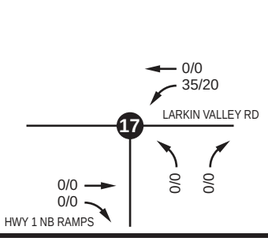
HWY 1 SB RAMPS / RIVERSIDE



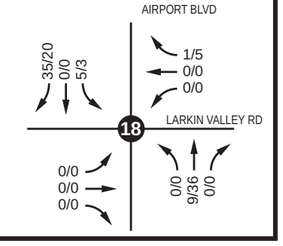
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

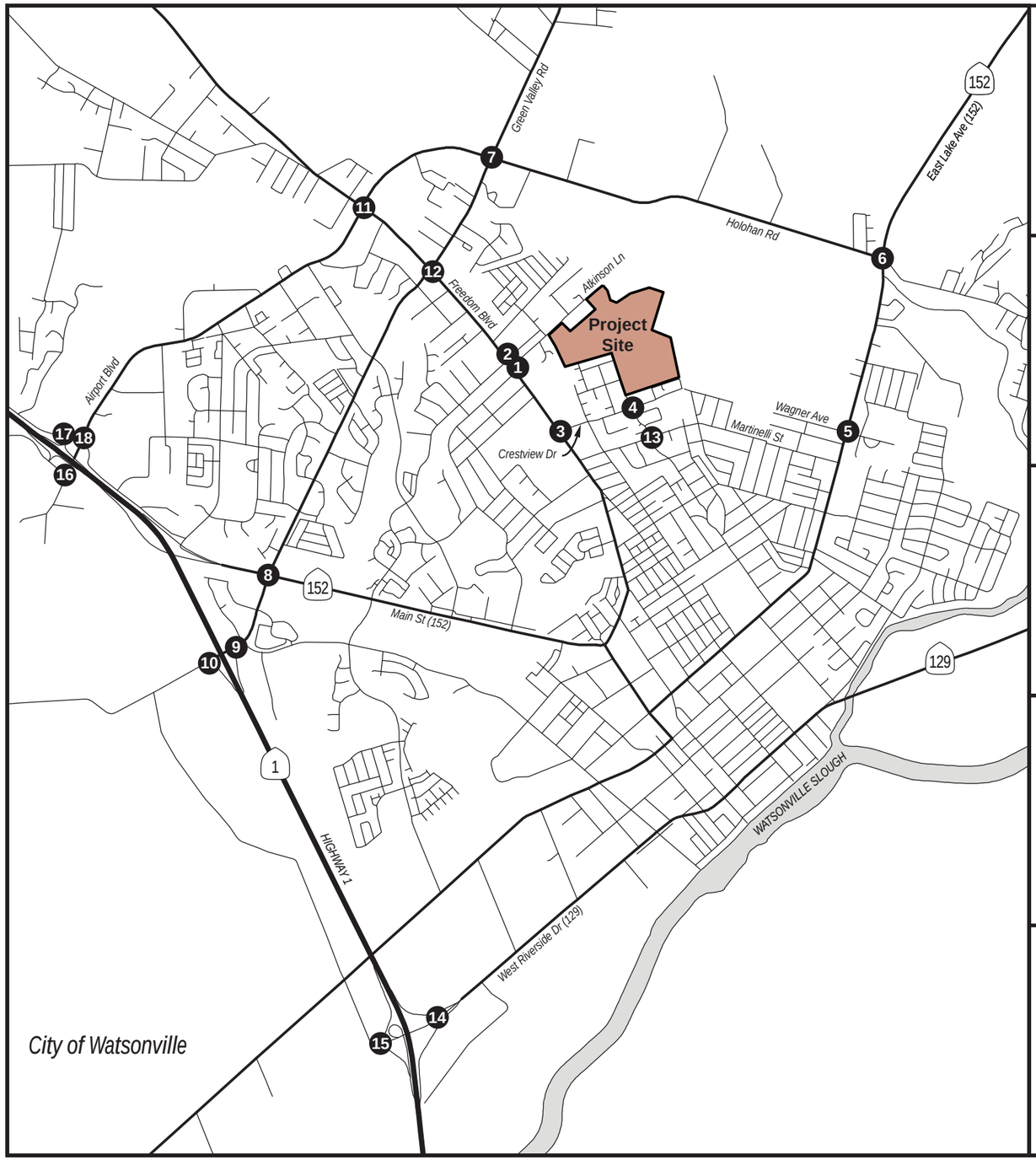
APPROXIMATE

11/04/08 JN 70-100160 • 0160-Exhibit 14 Trip Assign.ai

ATKINSON LANE SPECIFIC PLAN TIA

Project Peak Hour Trip Assignment

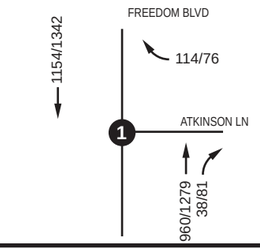
Exhibit 16



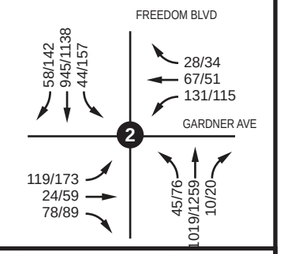
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Volumes

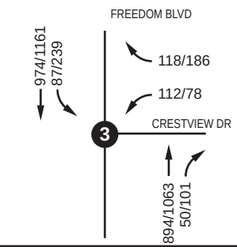
FREEDOM / ATKINSON



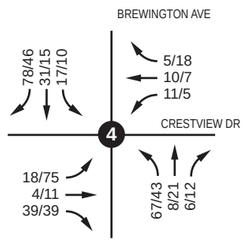
FREEDOM / GARDNER



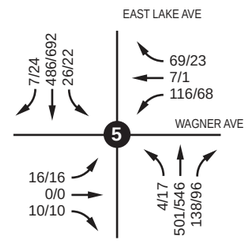
FREEDOM / CRESTVIEW



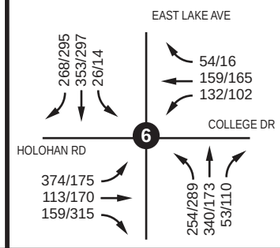
BREWINGTON / CRESTVIEW



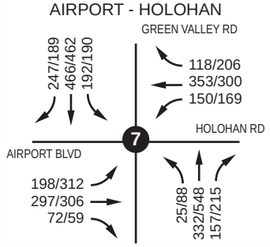
E. LAKE / WAGNER



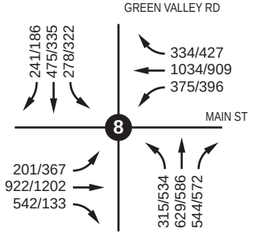
E. LAKE / HOLOHAN - COLLEGE



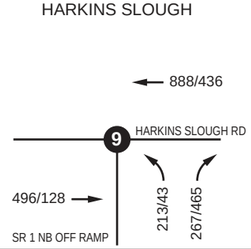
GREEN VALLEY / AIRPORT - HOLOHAN



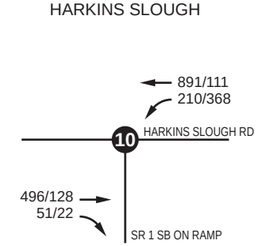
GREEN VALLEY / MAIN



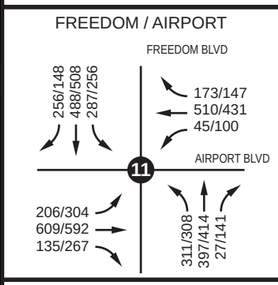
SR 1 NB RAMP / HARKINS SLOUGH



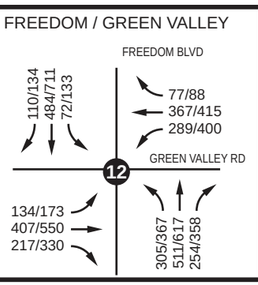
SR 1 SB RAMP / HARKINS SLOUGH



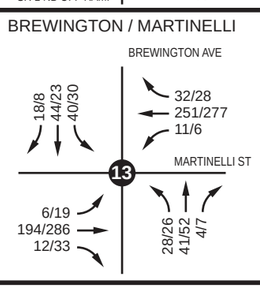
FREEDOM / AIRPORT



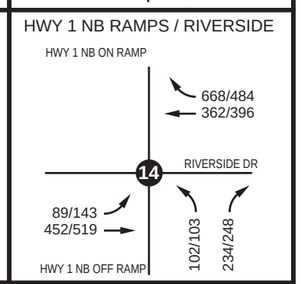
FREEDOM / GREEN VALLEY



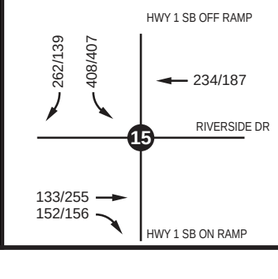
BREWINGTON / MARTINELLI



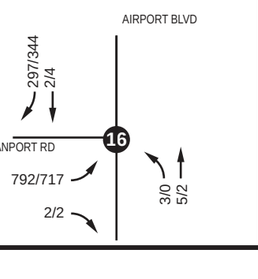
HWY 1 NB RAMPS / RIVERSIDE



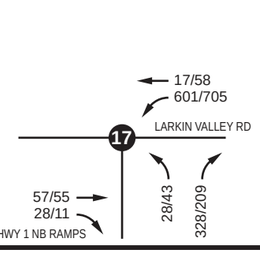
HWY 1 SB RAMPS / RIVERSIDE



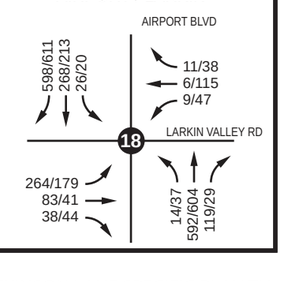
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

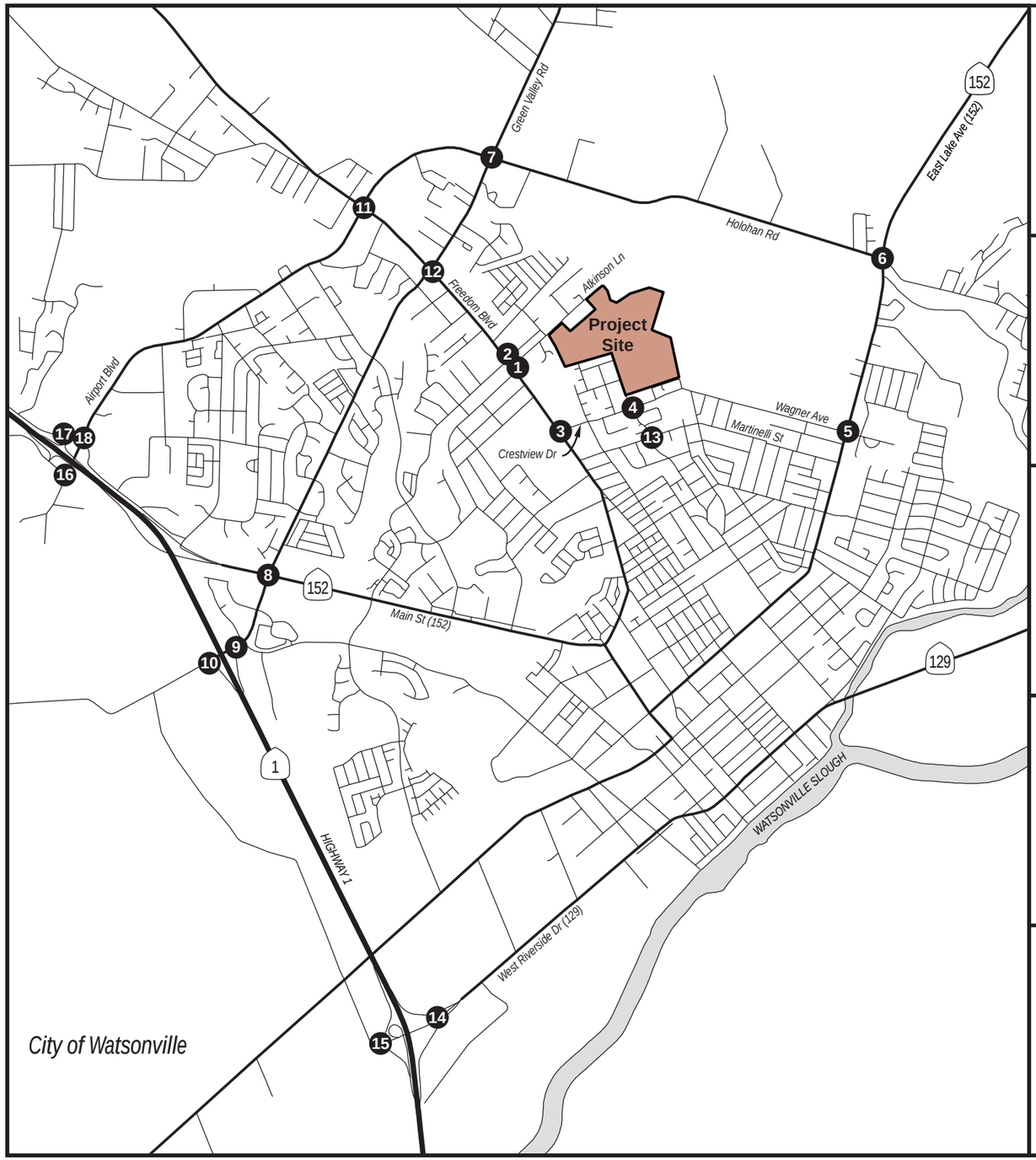
APPROXIMATE

11/04/08 JN 70-100160 • 0160-Exhibit 15-EX + Back + Proj PHV.ai

ATKINSON LANE SPECIFIC PLAN TIA

Existing + Background + Project Peak Hour Volumes

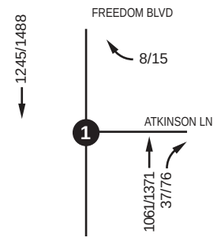
Exhibit 17



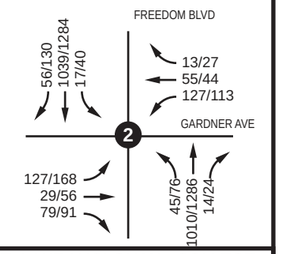
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Volumes

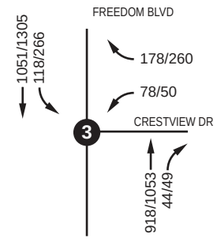
FREEDOM / ATKINSON



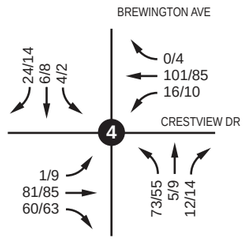
FREEDOM / GARDNER



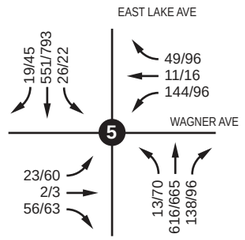
FREEDOM / CRESTVIEW



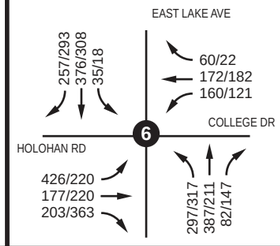
BREWINGTON / CRESTVIEW



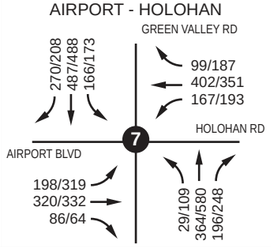
E. LAKE / WAGNER



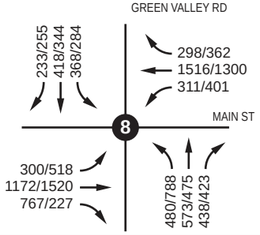
E. LAKE / HOLOHAN - COLLEGE



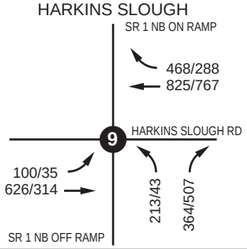
GREEN VALLEY / AIRPORT - HOLOHAN



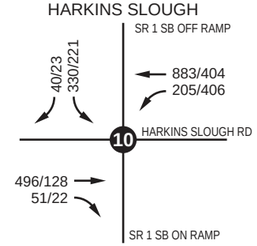
GREEN VALLEY / MAIN



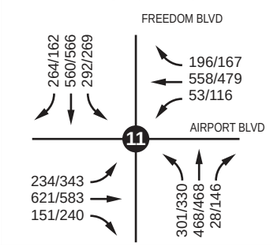
SR 1 NB RAMP / HARKINS SLOUGH



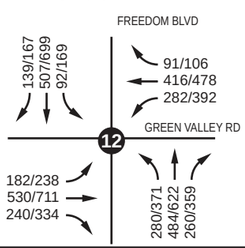
SR 1 SB RAMP / HARKINS SLOUGH



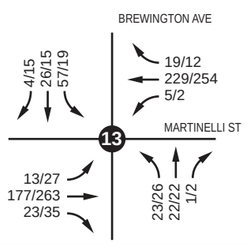
FREEDOM / AIRPORT



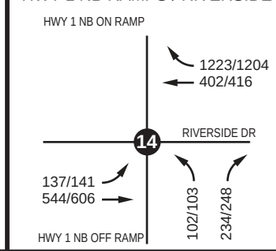
FREEDOM / GREEN VALLEY



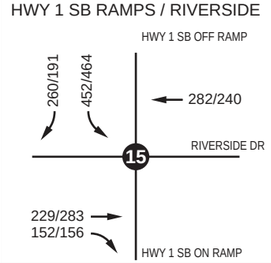
BREWINGTON / MARTINELLI



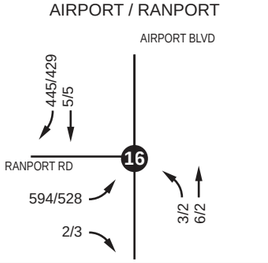
HWY 1 NB RAMPS / RIVERSIDE



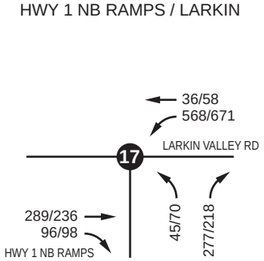
HWY 1 SB RAMPS / RIVERSIDE



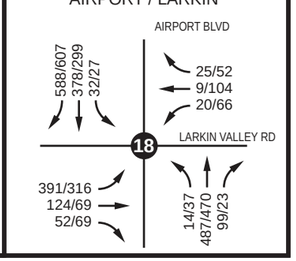
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

0 1/2 1 Mile

APPROXIMATE

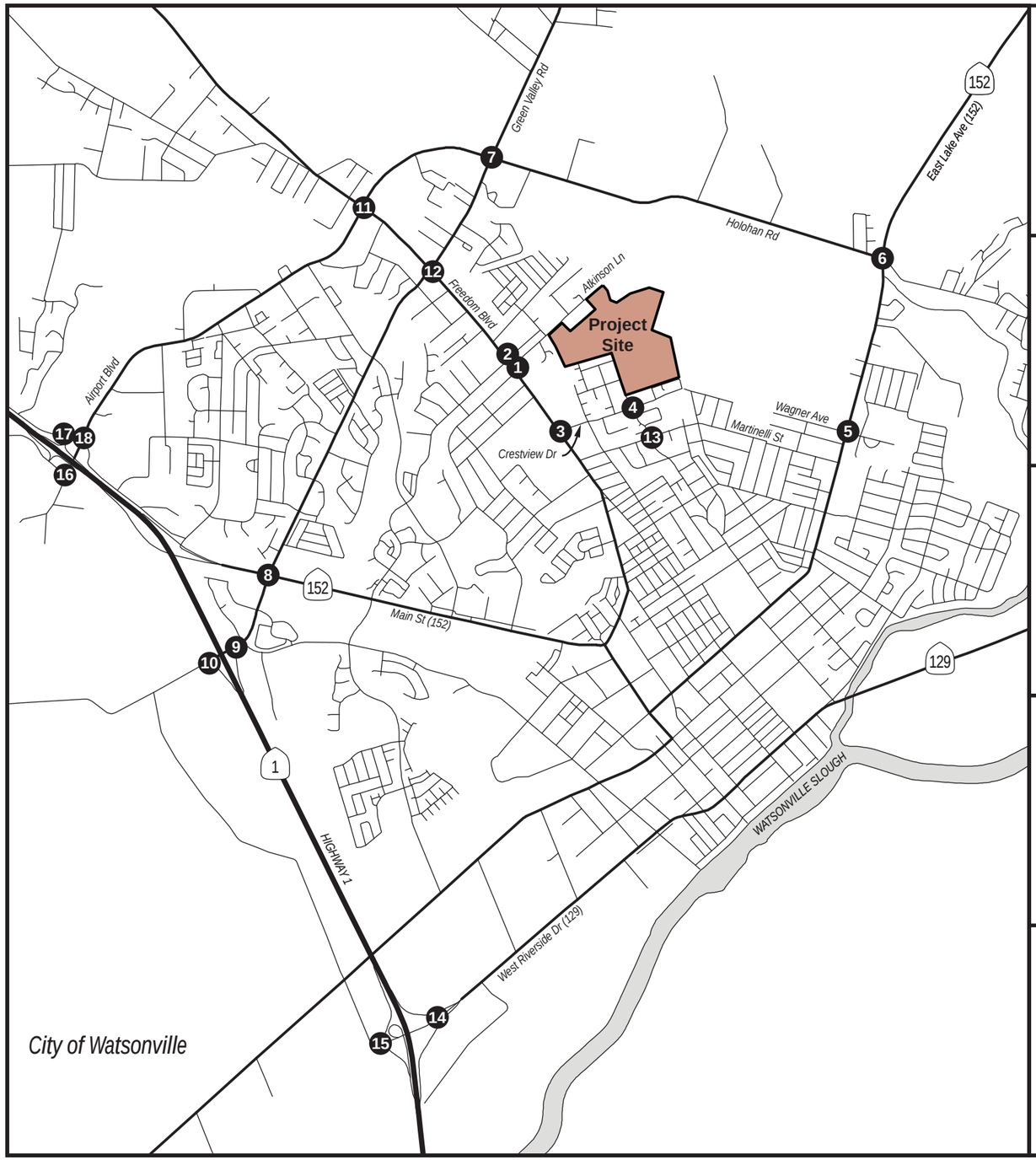
RBF CONSULTING

11/10/08 JN 70-100160 • 0160-Exhibit # CUM W WAG.ai

ATKINSON LANE SPECIFIC PLAN TIA

Cumulative With Wagner Volumes

Exhibit 18

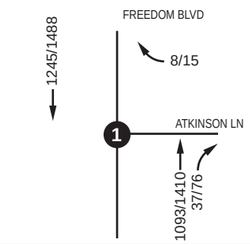


LEGEND

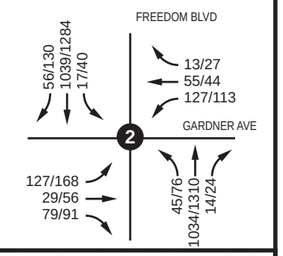
(x) Intersection Analyzed

XX/XX = AM/PM Peak Hour Volumes

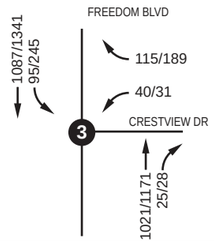
FREEDOM / ATKINSON



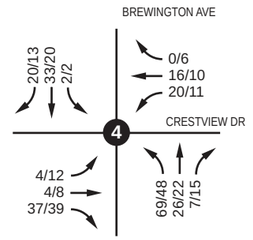
FREEDOM / GARDNER



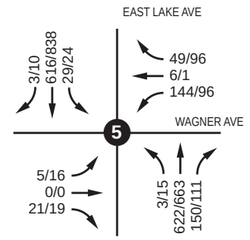
FREEDOM / CRESTVIEW



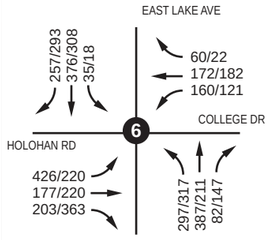
BREWINGTON / CRESTVIEW



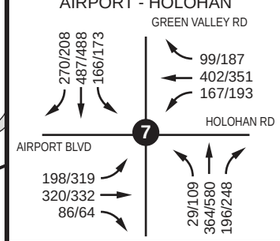
E. LAKE / WAGNER



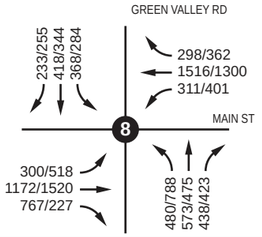
E. LAKE / HOLOHAN - COLLEGE



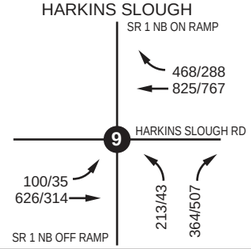
GREEN VALLEY / AIRPORT - HOLOHAN



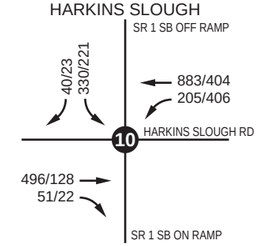
GREEN VALLEY / MAIN



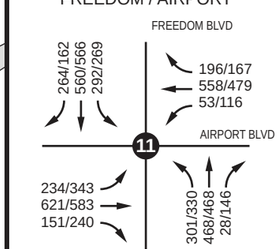
SR 1 NB RAMP / HARKINS SLOUGH



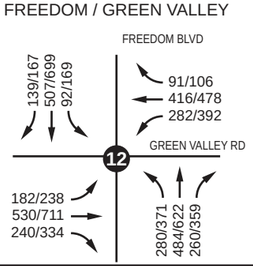
SR 1 SB RAMP / HARKINS SLOUGH



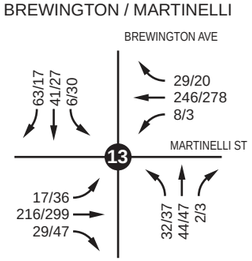
FREEDOM / AIRPORT



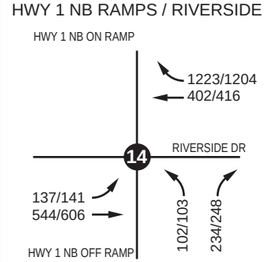
FREEDOM / GREEN VALLEY



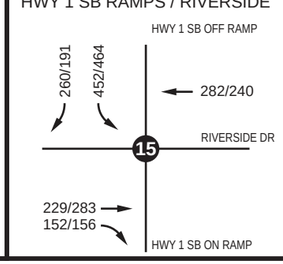
BREWINGTON / MARTINELLI



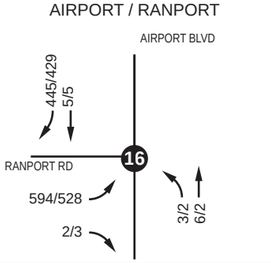
HWY 1 NB RAMPS / RIVERSIDE



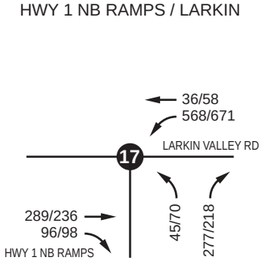
HWY 1 SB RAMPS / RIVERSIDE



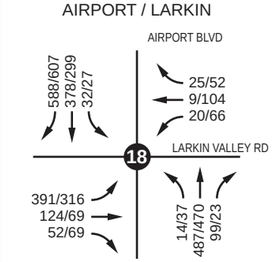
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

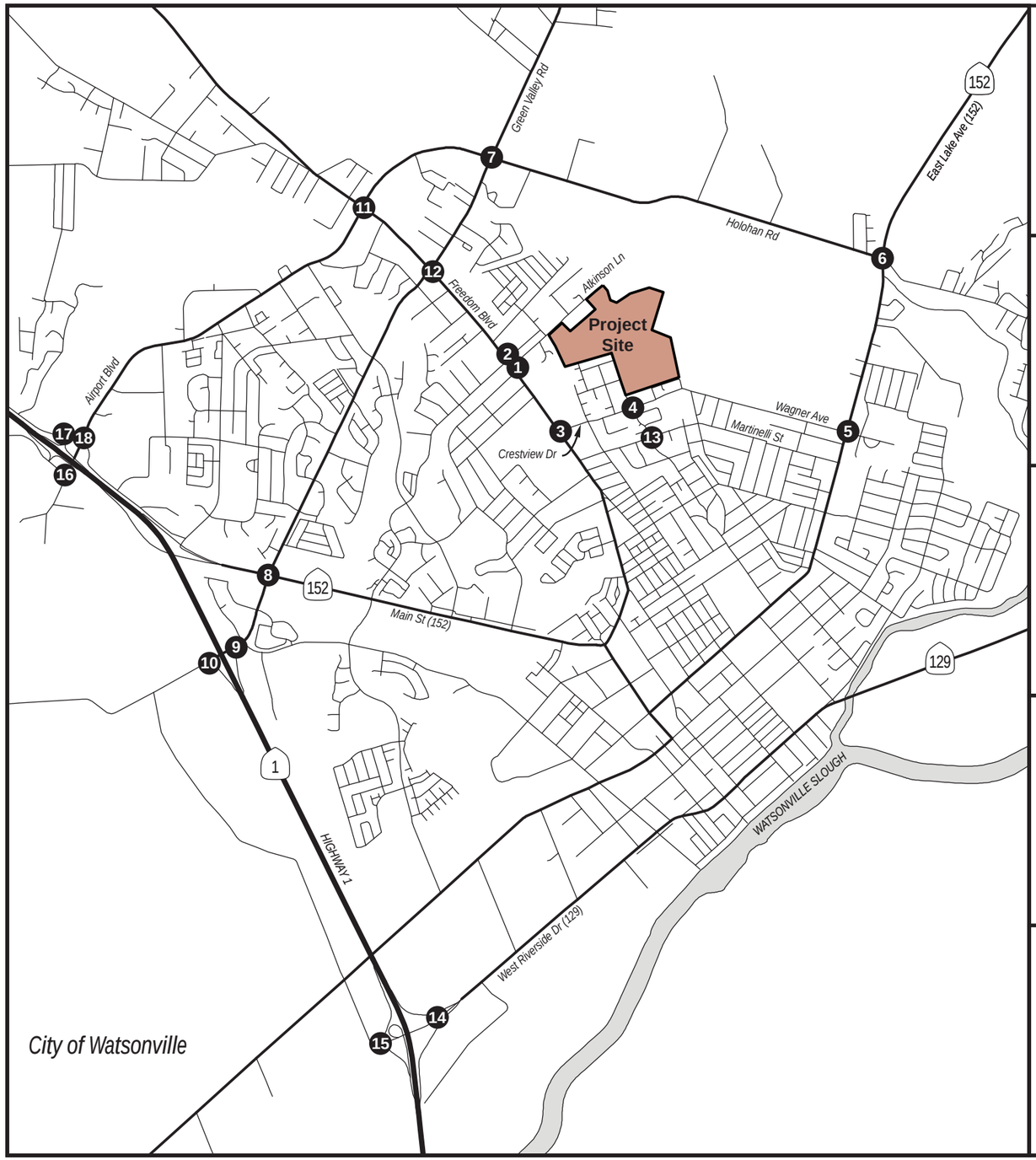
APPROXIMATE

11/10/08 JN 70-100160 • 0160-Exhibit # CUM W WAG.ai

ATKINSON LANE SPECIFIC PLAN TIA

Cumulative Without Wagner Volumes

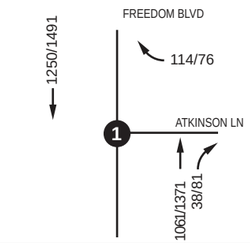
Exhibit 19



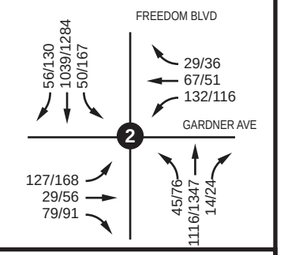
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Volumes

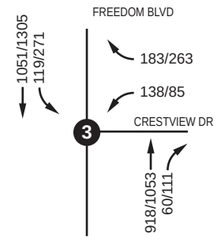
FREEDOM / ATKINSON



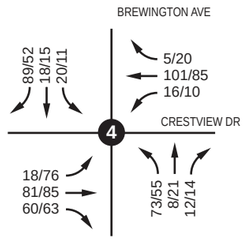
FREEDOM / GARDNER



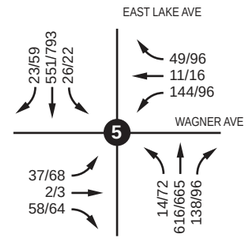
FREEDOM / CRESTVIEW



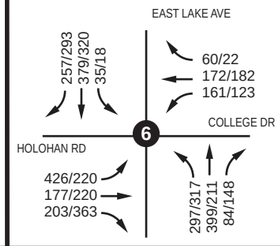
BREWINGTON / CRESTVIEW



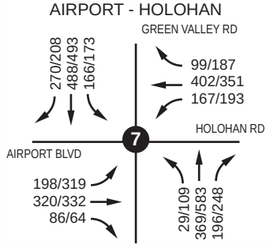
E. LAKE / WAGNER



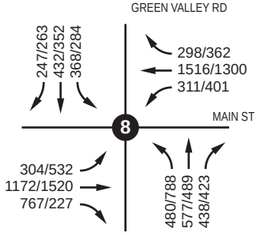
E. LAKE / HOLOHAN - COLLEGE



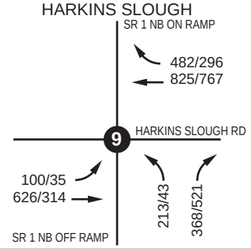
GREEN VALLEY / AIRPORT - HOLOHAN



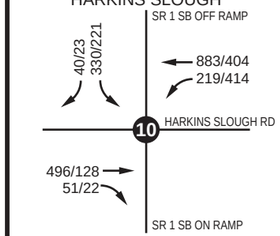
GREEN VALLEY / MAIN



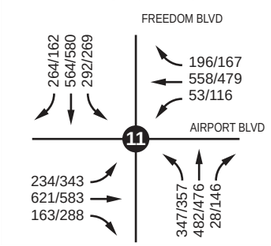
SR 1 NB RAMP / HARKINS SLOUGH



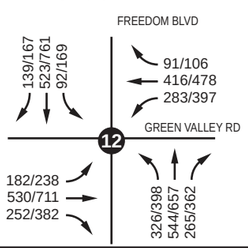
SR 1 SB RAMP / HARKINS SLOUGH



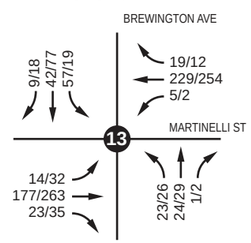
FREEDOM / AIRPORT



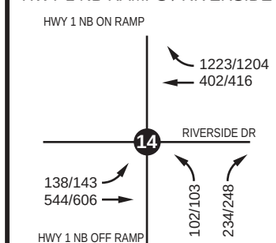
FREEDOM / GREEN VALLEY



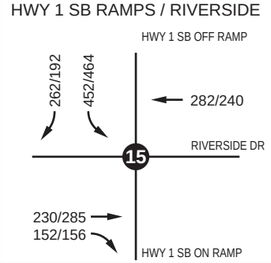
BREWINGTON / MARTINELLI



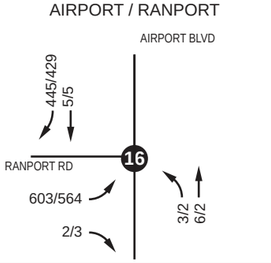
HWY 1 NB RAMPS / RIVERSIDE



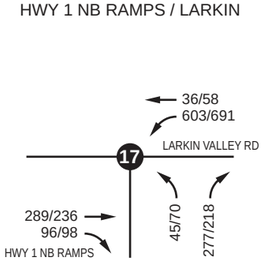
HWY 1 SB RAMPS / RIVERSIDE



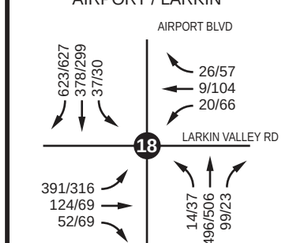
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

RBF CONSULTING

0 1/2 1 Mile

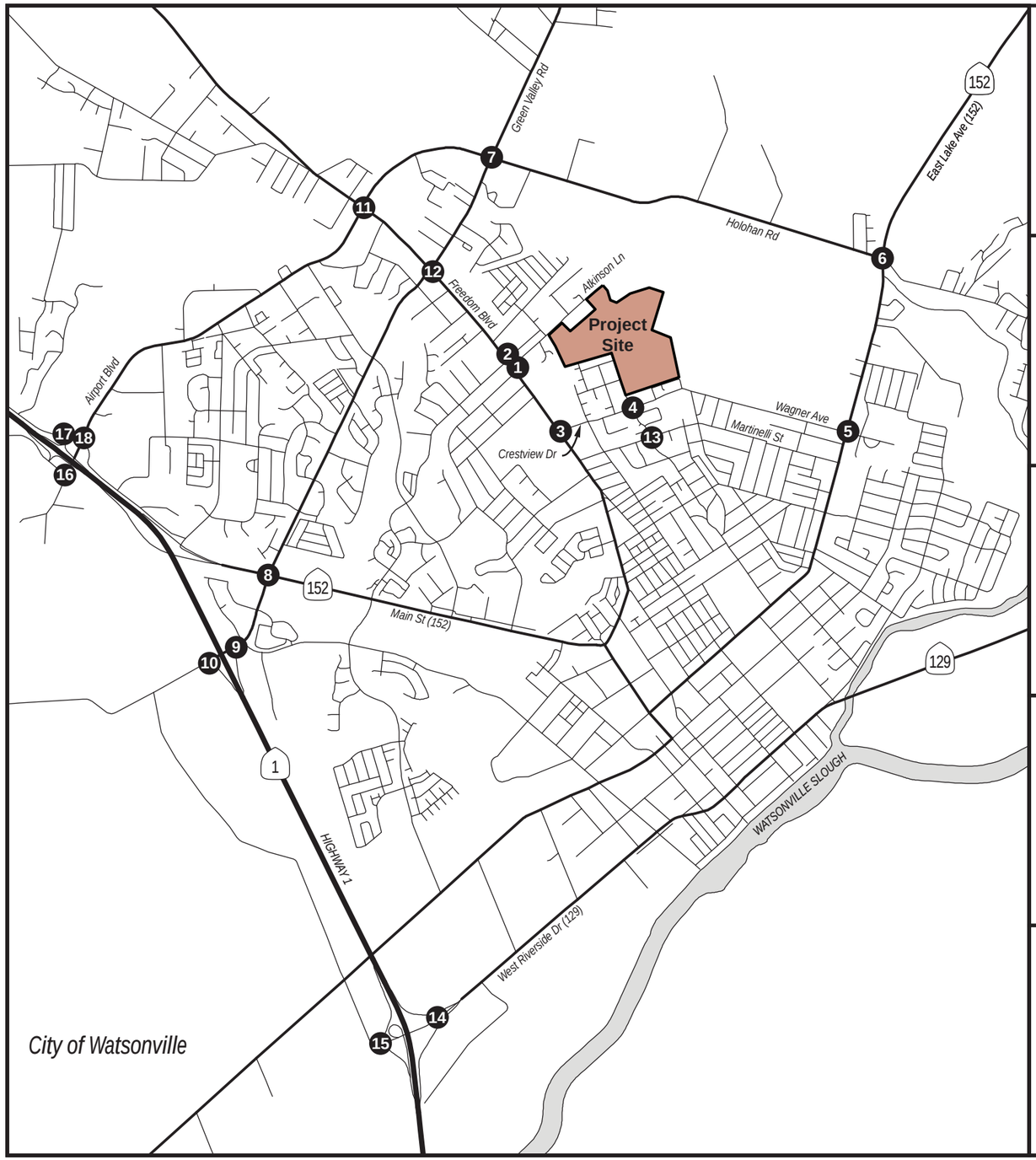
APPROXIMATE

11/14/08 JN 70-100160 • 0160-Exhibit 17 Cumulative+ProjectVol.ai

ATKINSON LANE SPECIFIC PLAN TIA

Cumulative With Wagner + Project Volumes

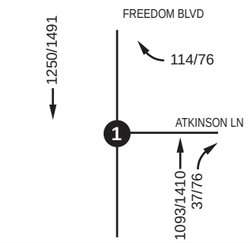
Exhibit 20



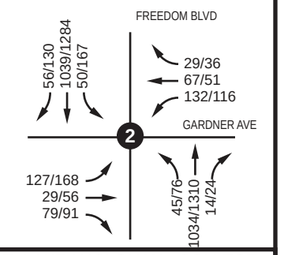
LEGEND

- (x) Intersection Analyzed
- XX/XX = AM/PM Peak Hour Volumes

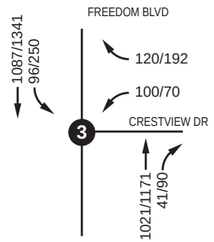
FREEDOM / ATKINSON



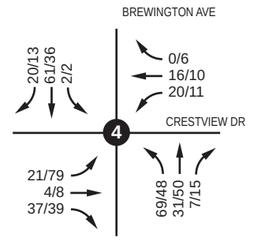
FREEDOM / GARDNER



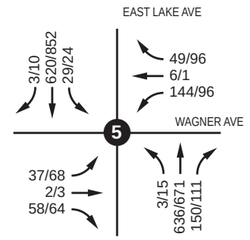
FREEDOM / CRESTVIEW



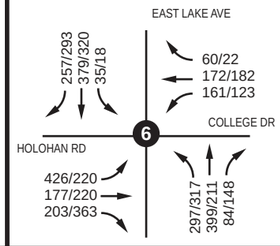
BREWINGTON / CRESTVIEW



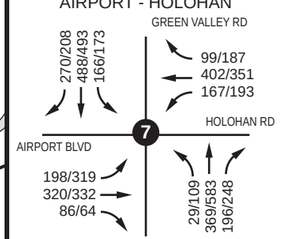
E. LAKE / WAGNER



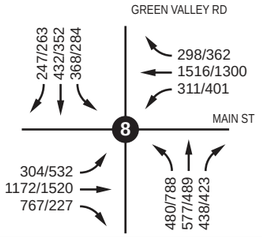
E. LAKE / HOLOHAN - COLLEGE



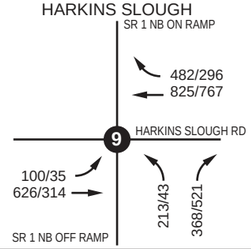
GREEN VALLEY / AIRPORT - HOLOHAN



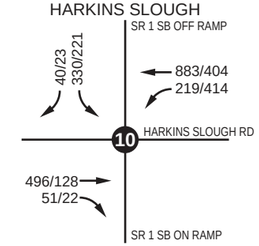
GREEN VALLEY / MAIN



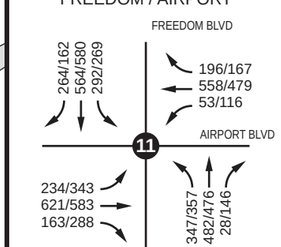
SR 1 NB RAMP / HARKINS SLOUGH



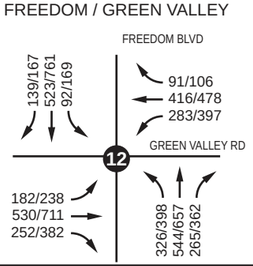
SR 1 SB RAMP / HARKINS SLOUGH



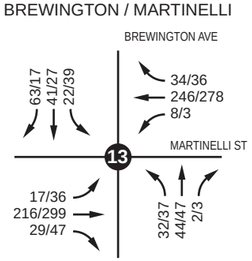
FREEDOM / AIRPORT



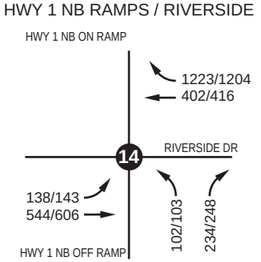
FREEDOM / GREEN VALLEY



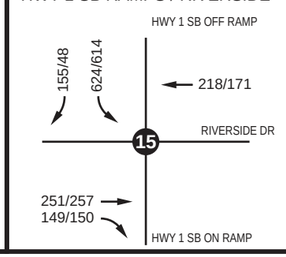
BREWINGTON / MARTINELLI



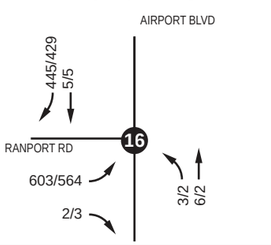
HWY 1 NB RAMPS / RIVERSIDE



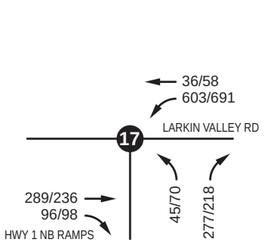
HWY 1 SB RAMPS / RIVERSIDE



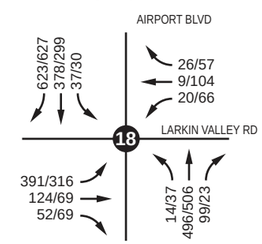
AIRPORT / RANPORT



HWY 1 NB RAMPS / LARKIN



AIRPORT / LARKIN



Source: RBF Consulting (2008)

0 1/2 1 Mile

APPROXIMATE

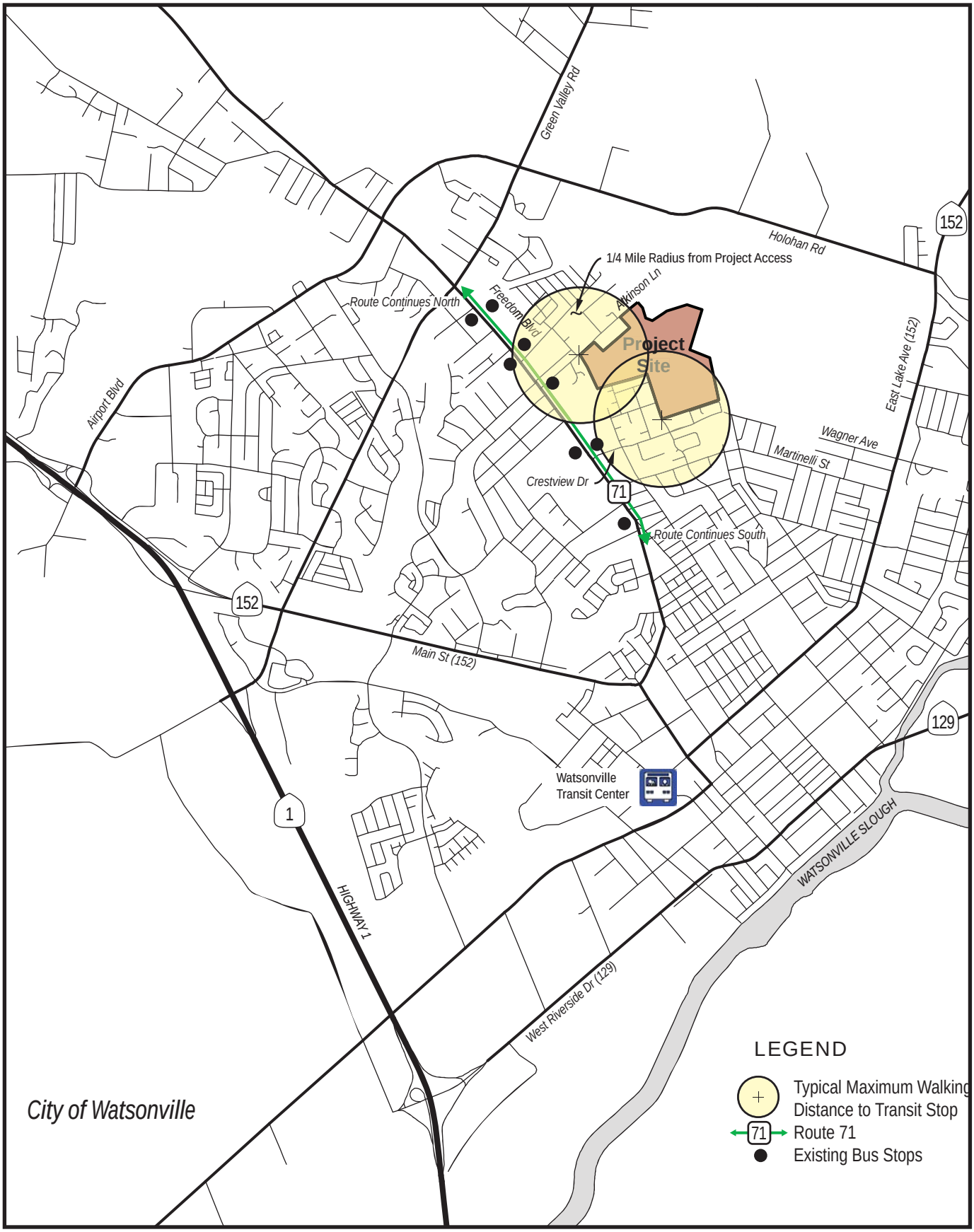
RBF CONSULTING

11/14/08 JN 70-100160 • 0160-Exhibit 17 Cumulative+ProjectVol.ai

ATKINSON LANE SPECIFIC PLAN TIA

Cumulative Without Wagner + Project Volumes

Exhibit 21



Source: RBF Consulting (2008)

0 1/2 1 Mile

APPROXIMATE

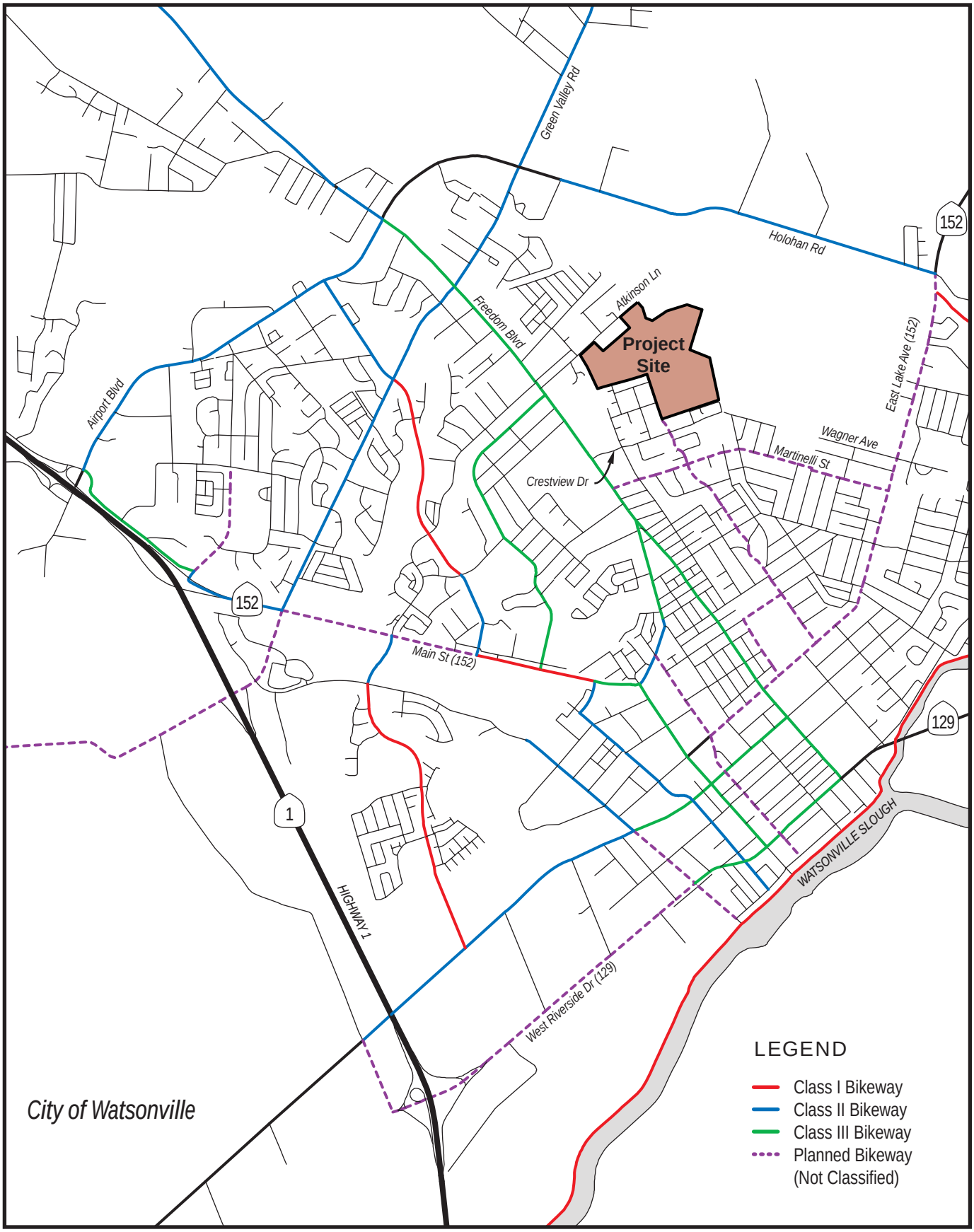
ATKINSON LANE SPECIFIC PLAN TIA

Transit Route Adjacent to Project Site

RBF CONSULTING

04/16/08 JN 70-100160 • 0160-Exhibit 18 EX Transit.ai

Exhibit 22



Source: RBF Consulting (2008)

0 1/2 1 Mile

APPROXIMATE

ATKINSON LANE SPECIFIC PLAN TIA

Existing and Planned Bikeway System

RBF CONSULTING

04/16/08 JN 70-100160 • 0160-Exhibit 19 EX Bikeway Sys.ai

Exhibit 23

Critical Movements V/C Ratio Increase

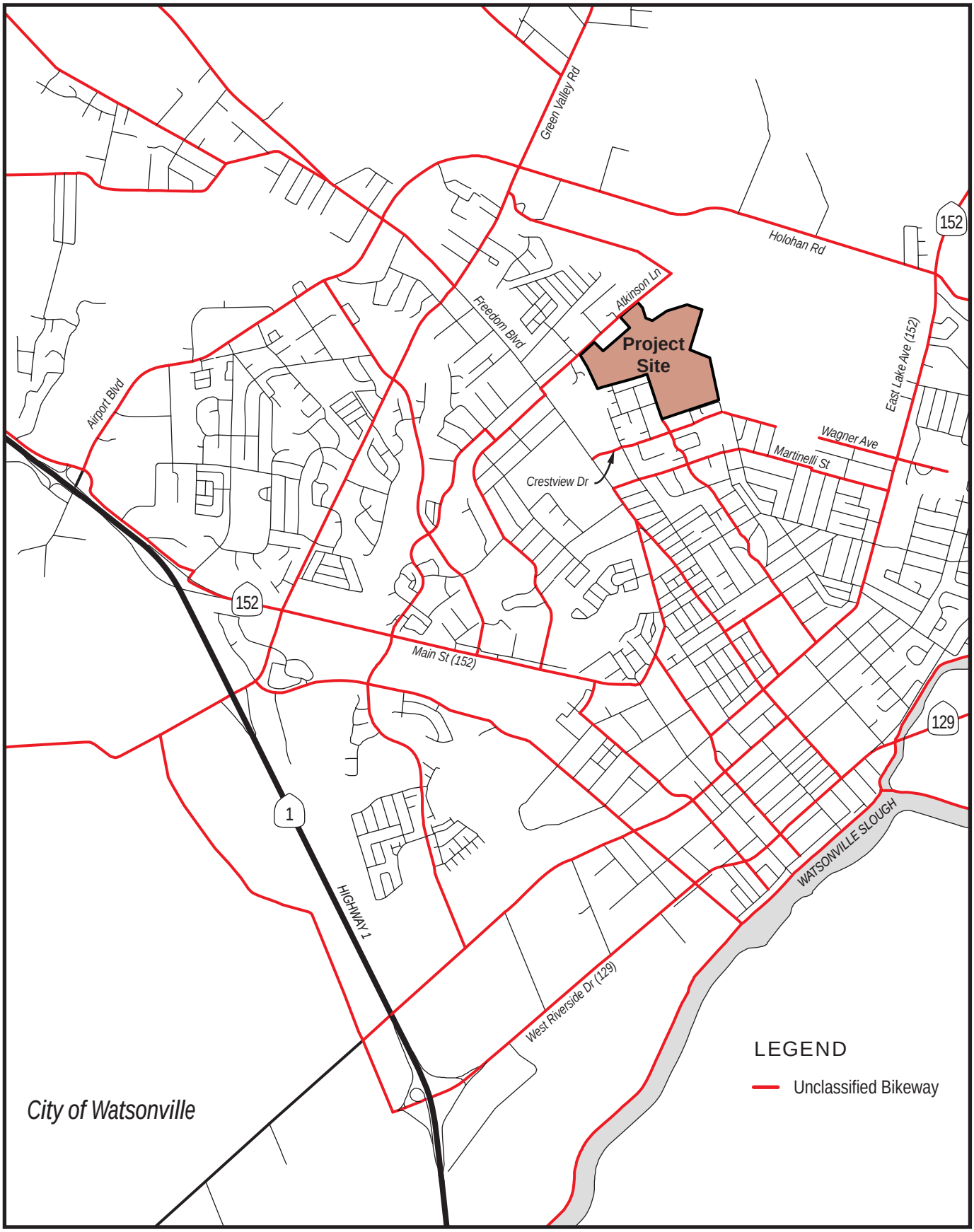
	N-S Street	E-W Street	Existing Conditions						Cumulative Conditions						Phase 1 Conditions					
			Existing + Bkgrd		Existing + Background + Project		% Increase		Cumulative		Cumulative + Project		% Increase		Existing + Bkgrd		Existing + Bkgrd+ Ph1		% Increase	
			AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C	AM V/C	PM V/C
5	East Lake Avenue	Wagner Avenue	0.80	NA	0.80	NA	0.0	NA	1.48	1.20	1.50	1.22	1.4	1.7	0.80	NA	0.80	NA	0.0	NA
6	East Lake Avenue	Holohan Road	1.69	1.64	1.70	1.72	0.6	4.9	1.9	1.78	1.91	1.80	0.5	1.1	1.69	1.64	1.70	1.65	0.6	0.6
7	Green Valley	Holohan Road	1.95	2.16	1.95	2.16	0.0	0.0	2.39	2.32	2.39	2.32	0.0	0.0						
8	Green Valley	Main Street	2.19	2.17	2.21	2.17	0.9	0.0	2.38	2.61	2.39	2.61	0.4	0.0						
9	Hwy 1 NB Off Ramp	Harkins Slough	2.80	NA	2.87	NA	2.5	NA	9.3	0.79	9.36	0.81	0.6	2.5	2.80	NA	2.83	NA	1.1	NA
11	Airport Boulevard	Freedom Boulevard	2.13	1.96	2.08	2.08	-2.3	6.1	2.41	2.27	2.61	2.36	8.3	4.0		1.96		1.99		1.5
14	Hwy 1 NB Ramps	Riverside Drive	0.55	0.85	0.55	0.85	0.0	0.0	0.31	0.38	0.31	0.38	0.0	0.0						
15	Hwy 1 SB Ramps	Riverside Drive	0.99	0.94	0.99	0.94	0.0	0.0	1.8	1.37	1.80	1.37	0.0	0.0						
17	NB Ramps	Larkin Valley	1.39	3.32	1.66	4.35	19.4	31.0	7.59	1.17	9.60	1.27	26.5	8.5		3.32		3.53		6.3
16	Airport	Ranport	0.52	0.46	0.53	0.48	1.9	4.3	0.5	0.51	0.5	0.48	0.0	-5.9		0.46		0.46		0.0

Notes:

1 Only LOS E or worse v/c ratios apply to the significance criteria

2 v/c ratios in the table is the sum of the v/c ratios for the critical movements i.e sum of highest left and thru for protected pahsing, shighest v/c for split phasing and the sum of the highest permitted phasing.

3 The highest v/c ratio is indicated for unsignalized intersections



Source: RBF Consulting (2008)

0 1/2 1 Mile

APPROXIMATE

ATKINSON LANE SPECIFIC PLAN TIA

Santa Cruz County Bikeway Master Plan

RBF CONSULTING

04/16/08 JN 70-100160 • 0160-Exhibit 19 EX Bikeway Sys.ai

Exhibit 25

APPENDIX A

Level of Service Descriptions

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH ALL-WAY STOP CONTROL (AWSC)

AWSC intersections require every vehicle to stop at the intersection before proceeding. Since each driver must stop, the judgement as to whether to proceed into the intersection is a function of traffic conditions on the other approaches. While giving priority to the driver on the right is a recognized rule in some areas, it is not a good descriptor of actual intersection operations. What happens is the development of a consensus of right-of-way that alternates between the drivers on the intersection approaches, a consensus that depends primarily on the intersection geometry and the arrival patterns at the stop line.

If no traffic is present on the other approaches, a driver can proceed immediately after the stop is made. If there is traffic on one or more of the other approaches, a driver proceeds only after determining that there are no vehicles currently in the intersection and that it is the driver's turn to proceed. Since no traffic signal controls the stream movement or allocates the right-of-way to each conflicting stream, the rate of departure is controlled by the interaction between the traffic streams themselves.

For AWSC intersections, the average control delay (in seconds per vehicle) is used as the primary measure of performance. Control delay is the increased time of travel for a vehicle approaching and passing through an AWSC intersection, compared with a free-flow vehicle if it were not required to slow down or stop at the intersection.

The criteria for AWSC intersections have different threshold values than do those for signalized intersections, primarily because drivers expect different levels of performance from different kinds of traffic control devices (i.e traffic signals, two way stop or all way stop, etc.). The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection and a higher level of control delay is acceptable at a signalized intersection for the same LOS.

For AWSC analysis using the HCM 2000 method, the LOS shown reflects the weighted average of the delay on each of the approaches.

LEVEL OF SERVICE (LOS) CRITERIA FOR AWSC INTERSECTIONS
(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH TWO-WAY STOP CONTROL (TWSC)

TWSC intersections are widely used and stop signs are used to control vehicle movements at such intersections. At TWSC intersections, the stop-controlled approaches are referred to as the minor street approaches; they can be either public streets or private driveways. The intersection approaches that are not controlled by stop signs are referred to as the major street approaches. A three-leg intersection is considered to be a standard type of TWSC intersection if the single minor street approach (i.e. the stem of the T configuration) is controlled by a stop sign. Three-leg intersections where two of the three approaches are controlled by stop signs are a special form of unsignalized intersection control.

At TWSC intersections, drivers on the controlled approaches are required to select gaps in the major street flow through which to execute crossing or turning maneuvers on the basis of judgement. In the presence of a queue, each driver on the controlled approach must use some time to move into the front-of-queue position and prepare to evaluate gaps in the major street flow. Capacity analysis at TWSC intersections depends on a clear description and understanding of the interaction of drivers on the minor or stop-controlled approach with drivers on the major street. Both gap acceptance and empirical models have been developed to describe this interaction.

Thus, the capacity of the controlled legs is based on three factors:

- the distribution of gaps in the major street traffic stream,;
- driver judgement in selecting gaps through which to execute the desired maneuvers; and
- the follow-up time required by each driver in a queue.

The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, in the absence of incident, control, traffic or geometric delay. Average control delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation and referred to as level of service.

LEVEL OF SERVICE (LOS) CRITERIA FOR TWSC INTERSECTIONS
(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

LEVEL OF SERVICE (LOS) DESCRIPTION
SIGNALIZED INTERSECTIONS

The capacity of an urban street is related primarily to the signal timing and the geometric characteristics of the facility as well as to the composition of traffic on the facility. Geometrics are a fixed characteristic of a facility. Thus, while traffic composition may vary somewhat over time, the capacity of a facility is generally a stable value that can be significantly improved only by initiating geometric improvements. A traffic signal essentially allocates time among conflicting traffic movements that seek to use the same space. The way in which time is allocated significantly affects the operation and the capacity of the intersection and its approaches.

The methodology for signalized intersection is designed to consider individual intersection approaches and individual lane groups within approaches. A lane group consists of one or more lanes on an intersection approach. The outputs from application of the method described in the HCM 2000 are reported on the basis of each lane. For a given lane group at a signalized intersection, three indications are displayed: green, yellow and red. The red indication may include a short period during which all indications are red, referred to as an all-red interval and the yellow indication forms the change and clearance interval between two green phases.

The methodology for analyzing the capacity and level of service must consider a wide variety of prevailing conditions, including the amount and distribution of traffic movements, traffic composition, geometric characteristics, and details of intersection signalization. The methodology addresses the capacity, LOS, and other performance measures for lane groups and the intersection approaches and the LOS for the intersection as a whole.

Capacity is evaluated in terms of the ratio of demand flow rate to capacity (v/c ratio), whereas LOS is evaluated on the basis of control delay per vehicle (in seconds per vehicle). The methodology does not take into account the potential impact of downstream congestion on intersection operation, nor does the methodology detect and adjust for the impacts of turn-pocket overflows on through traffic and intersection operation.

LEVEL OF SERVICE (LOS) CRITERIA FOR SIGNALIZED INTERSECTIONS
(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	<10
B	>10 - 20
C	>20 - 35
D	>35 - 55
E	>55 - 80
F	>80

LEVEL OF SERVICE THRESHOLD VOLUMES FOR VARIOUS ROADWAY TYPES
TOTAL PEAK HOUR VOLUME IN BOTH DIRECTIONS (PHV)

ROADWAY TYPE	CODE	LOS A	LOS B	LOS C	LOS D	LOS E
8-Lane Freeway	8F	5,100	7,900	11,200	13,600	14,600
6-Lane Freeway	6F	3,900	5,900	8,500	10,200	11,000
8-Lane Expressway	8E	3,500	5,400	7,500	9,000	9,800
6-Lane Expressway	6E	2,800	4,200	5,600	6,700	7,400
4-Lane Freeway	4F	2,600	4,000	5,700	6,900	7,400
8-Lane Divided Arterial (w/ left-turn lane)	9	4,000	4,700	5,400	6,100	6,800
6-Lane Divided Arterial (w/ left-turn lane)	7	3,200	3,800	4,300	4,900	5,400
4-Lane Expressway	4E	1,800	2,700	3,600	4,500	5,000
4-Lane Divided Arterial (w/ left-turn lane)	5	2,200	2,500	2,900	3,250	3,600
4-Lane Undivided Arterial (w/ no left-turn lane)	4	1,600	1,900	2,200	2,400	2,700
2-Lane Rural Highway	2R	400	800	1,200	1,700	2,500
2-Lane Arterial (w/ left turn lane)	3	1,100	1,250	1,450	1,600	1,800
2-Lane Collector	2	600	750	900	1,050	1,200
2-Lane Local	1	120	140	160	180	200
1-Lane Freeway Diamond Ramp	1D	1,320	1,540	1,760	1,980	2,200
2-Lane Freeway Diamond Ramp	2D	2,640	3,080	3,520	3,960	4,400
1-Lane Freeway Loop Ramp	1L	1,080	1,260	1,440	1,620	1,800
2-Lane Freeway Loop Ramp	2L	1,920	2,240	2,560	2,880	3,200

Notes:

1. The above threshold volumes for preliminary planning purposes only. If available, the results of detailed level of service analyses will typically have priority over the levels of service derived from this table. In that case this table can be used by the analyst for providing additional considerations for recommending the appropriate general roadway type for the specific condition being analyzed.
2. All above facilities assume a 60%/40% peak hour directional split, with the peak hour representing approximately 10% of the Average Daily Traffic (ADT).
3. Based on *Highway Capacity Manual* , Transportation Research Board, 2000.
4. Freeway thresholds are consistent with conditions utilizing a 0.95 peak hour factor, with 2% trucks and slightly over a one-mile average interchange spacing.
5. Expressways are consistent with the average of a multi-lane highway (with no signals) and Class 1 arterial (with an average signal spacing of 0.8 signals per miles and a 4.5 G/C ratio).
6. Arterial thresholds are consistent with the average of Class 1 and Class 2 arterials with an assumed signal density of two signals per mile. This assumes a divided arterial with left-turn lanes. Thresholds for four-lane undivided arterials assume approximately two-thirds the capacity of a four-lane divided arterial due to the impedance in traffic flow resulting from left-turning vehicles waiting in the inside through lane, thus significantly reducing the capacity of the roadway.
7. Rural highways are generally consistent with the 2000 Highway Capacity Manual rural highway, assuming 8% trucks, 4% RV's, 20% no-passing, and level terrain. The greatest difference is that it assumes a maximum capacity (upper end of LOS E) of 25,000 rater than the 28,000 calculated using the new Highway Capacity Manual.
8. Two-lane collectors assume approximately three-fourths of the capacity of a two-lane arterial with left-turn lanes. This is based on the assumption that left-turn channelization is not provided on a two-lane collector.
9. Local street level of service thresholds are based upon "Neighborhood Traffic Related Quality-of-Life Considerations" which assumes a standard suburban neighborhood, 40-foot roadway width, and 25 mile per hour speed limit with normal speed violation rates.
10. Capacities for Diamond Ramps and Loop Ramps may be slightly higher or lower than the planning level capacities indicated above. The *2000 Highway Capacity Manual* (2000 HCM) states that the capacity of a one-lane diamond to be 2,200 vehicles per hour (vph), and 1,800 vph for a small radius loop. Two-lane freeway ramp capacities are estimated in the 2000 HCM to be 4,400 vph for a two-lane diamond, and 3,200 vph for a two-lane small radius loop. Varying intermediate capacities are provided for incremental conditions between these extremes. Capacities given for each service level assume the same level of service for the adjoining merging roadway as well as level of service being determined by volume-to-capacity and not attainable speed. Level of service will be controlled by freeway level of service if worse than ramp. Mitigations of level of service deficiencies may include the addition of a lane on the freeway ramp, the addition of an auxiliary lane on the freeway mainline, the addition of approach lanes at the ramp junction with the local intersecting street, and/or geometric modifications to improve the efficiency of the ramp itself or its termini. The appropriate mitigation should be determined on a case-by-case basis, considering freeway mainline volumes and weaving, the extent that the freeway ramp volume exceeds the above planning thresholds, and the level of service of the ramp intersection with the local street.

APPENDIX B

Intersection Level of Service Calculations
Existing Conditions

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 11/8/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1087	926	37	0	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	1294	1102	44	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.76	
vC, conflicting volume	1146				1771	573
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1146				1700	573
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	605				63	462

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	647	647	735	412	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	44	10
cSH	1700	1700	1700	1700	462
Volume to Capacity	0.38	0.38	0.43	0.24	0.02
Queue Length 95th (ft)	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	12.9
Lane LOS					B
Approach Delay (s)	0.0		0.0		12.9
Approach LOS					B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner 11/10/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3498		1770	3532			1641	1543		1669	1415
Flt Permitted	0.95	1.00		0.95	1.00			0.55	1.00		0.65	1.00
Satd. Flow (perm)	1652	3498		1770	3532			943	1543		1131	1415
Volume (vph)	11	883	51	45	879	10	115	21	78	126	55	12
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	1.00	0.84	0.84	0.84
Adj. Flow (vph)	13	1051	61	54	1046	12	137	25	78	150	65	14
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	54	0	0	6
Lane Group Flow (vph)	13	1108	0	54	1057	0	0	162	24	0	215	8
Confl. Peds. (#/hr)	3		16	16		3	24		10	10		24
Confl. Bikes (#/hr)			3						3			4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	1.3	38.5		4.0	41.2			24.7	24.7		24.7	24.7
Effective Green, g (s)	1.3	38.5		4.0	41.2			24.7	24.7		24.7	24.7
Actuated g/C Ratio	0.02	0.49		0.05	0.52			0.31	0.31		0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	27	1700		89	1837			294	481		353	441
v/s Ratio Prot	0.01	c0.32		c0.03	c0.30							
v/s Ratio Perm								0.17	0.02		c0.19	0.01
v/c Ratio	0.48	0.65		0.61	0.58			0.55	0.05		0.61	0.02
Uniform Delay, d1	38.6	15.3		36.8	13.0			22.6	19.1		23.1	18.9
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.9	1.5		7.8	0.9			1.3	0.0		2.0	0.0
Delay (s)	43.5	16.8		44.6	13.9			23.9	19.1		25.2	18.9
Level of Service	D	B		D	B			C	B		C	B
Approach Delay (s)		17.1			15.4			22.3			24.8	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM Average Control Delay	17.5	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	79.2	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	58.7%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom

11/6/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1419	1770	3539	3510	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1419	1770	3539	3510	
Volume (vph)	52	113	86	900	860	34
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	60	130	99	1034	989	39
RTOR Reduction (vph)	0	113	0	0	3	0
Lane Group Flow (vph)	60	17	99	1034	1025	0
Confl. Peds. (#/hr)	39	22	21			21
Confl. Bikes (#/hr)						1
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	9.2	9.2	5.3	51.5	42.2	
Effective Green, g (s)	9.2	9.2	5.3	51.5	42.2	
Actuated g/C Ratio	0.13	0.13	0.08	0.75	0.61	
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)	221	190	137	2653	2156	
v/s Ratio Prot	c0.04		c0.06	0.29	c0.29	
v/s Ratio Perm		0.01				
v/c Ratio	0.27	0.09	0.72	0.39	0.48	
Uniform Delay, d1	26.7	26.1	31.0	3.0	7.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2	17.1	0.4	0.8	
Delay (s)	27.4	26.3	48.1	3.5	8.0	
Level of Service	C	C	D	A	A	
Approach Delay (s)	26.6			7.4	8.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington

11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	4	39	11	10	0	67	5	6	1	19	13
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	1	5	49	14	13	0	85	6	8	1	24	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	27	99	42
Volume Left (vph)	1	14	85	1
Volume Right (vph)	49	0	8	16
Hadj (s)	-0.49	0.14	0.16	-0.20
Departure Headway (s)	3.7	4.4	4.3	4.0
Degree Utilization, x	0.06	0.03	0.12	0.05
Capacity (veh/h)	921	786	817	879
Control Delay (s)	7.0	7.5	7.8	7.2
Approach Delay (s)	7.0	7.5	7.8	7.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.5		
HCM Level of Service	A		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	0	8	116	7	69	3	497	138	26	475	3
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	3	0	10	147	9	87	4	629	175	33	601	4
Pedestrians		2			9			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1399	1491	611	1329	1319	638	607			813		
vC1, stage 1 conf vol	671	671		646	646							
vC2, stage 2 conf vol	728	820		683	673							
vCu, unblocked vol	1399	1491	611	1329	1319	638	607			813		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	98	22	96	82	100			96		
cM capacity (veh/h)	148	171	490	187	202	473	970			808		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	13	147	96	4	629	175	33	605
Volume Left	3	147	0	4	0	0	33	0
Volume Right	10	0	87	0	0	175	0	4
cSH	335	187	421	970	1700	1700	808	1700
Volume to Capacity	0.04	0.78	0.23	0.00	0.37	0.10	0.04	0.36
Queue Length 95th (ft)	3	133	22	0	0	0	3	0
Control Delay (s)	16.2	71.1	16.1	8.7	0.0	0.0	9.6	0.0
Lane LOS	C	F	C	A			A	
Approach Delay (s)	16.2	49.3		0.0			0.5	
Approach LOS	C	E						

Intersection Summary				
Average Delay	7.4			
Intersection Capacity Utilization	45.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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
Frt	1.00	0.91		1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1678		1770	1771		1770	1820		1770	1863	1563
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1678		1770	1771		1770	1820		1770	1863	1563
Volume (vph)	372	113	159	129	158	54	254	325	50	26	341	265
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	404	123	173	140	172	59	276	353	54	28	371	288
RTOR Reduction (vph)	0	56	0	0	14	0	0	5	0	0	0	140
Lane Group Flow (vph)	404	240	0	140	217	0	276	402	0	28	371	148
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.1	19.1		14.8	14.8		15.3	34.9		3.0	22.6	41.7
Effective Green, g (s)	19.1	19.1		14.8	14.8		15.3	34.9		3.0	22.6	41.7
Actuated g/C Ratio	0.22	0.22		0.17	0.17		0.17	0.40		0.03	0.26	0.47
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	385	365		298	299		308	723		60	480	814
v/s Ratio Prot	c0.23	0.14		0.08	c0.12		c0.16	0.22		0.02	c0.20	0.04
v/s Ratio Perm												0.06
v/c Ratio	1.05	0.66		0.47	0.73		0.90	0.56		0.47	0.77	0.18
Uniform Delay, d1	34.3	31.4		33.0	34.6		35.5	20.5		41.6	30.2	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	59.4	4.3		1.2	8.5		26.5	3.1		5.6	11.5	0.1
Delay (s)	93.7	35.6		34.1	43.0		62.0	23.5		47.3	41.7	13.4
Level of Service	F	D		C	D		E	C		D	D	B
Approach Delay (s)		69.2			39.7			39.1			30.0	
Approach LOS		E			D			D			C	

Intersection Summary					
HCM Average Control Delay	45.2	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.86				
Actuated Cycle Length (s)	87.8	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	78.1%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

12/8/2008

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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	1863	1559	1770	3278		1770	3382	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	1863	1559	1770	3278		1770	3382	
Volume (vph)	276	375	102	249	402	185	140	248	183	209	656	238
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	297	403	110	268	432	199	151	267	197	225	705	256
RTOR Reduction (vph)	0	11	0	0	0	146	0	146	0	0	41	0
Lane Group Flow (vph)	297	502	0	268	432	53	151	318	0	225	920	0
Confl. Peds. (#/hr)			3			2			2			2
Confl. Bikes (#/hr)			1									3
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	16.0	26.0		14.0	24.0	24.0	8.0	19.9		14.1	26.0	
Effective Green, g (s)	16.0	26.0		14.0	24.0	24.0	8.0	19.9		14.1	26.0	
Actuated g/C Ratio	0.18	0.29		0.16	0.27	0.27	0.09	0.22		0.16	0.29	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	315	519		275	497	416	157	725		277	977	
v/s Ratio Prot	c0.17	c0.28		0.15	0.23		0.09	0.10		c0.13	c0.27	
v/s Ratio Perm						0.03						
v/c Ratio	0.94	0.97		0.97	0.87	0.13	0.96	0.44		0.81	0.94	
Uniform Delay, d1	36.5	31.6		37.8	31.5	25.1	40.8	30.2		36.7	31.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	35.7	31.1		46.9	14.9	0.1	60.1	1.9		16.4	17.7	
Delay (s)	72.2	62.7		84.7	46.4	25.2	100.9	32.1		53.1	49.0	
Level of Service	E	E		F	D	C	F	C		D	D	
Approach Delay (s)		66.2			53.1			49.0			49.7	
Approach LOS		E			D			D			D	

Intersection Summary				
HCM Average Control Delay	54.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	86.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley

11/6/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.84	1.00	1.00	0.96		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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1532	3433	3539	1328	1610	3387	1514		3475	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1532	3433	3539	1328	1610	3387	1514		3475	1545
Volume (vph)	196	873	542	374	1009	331	313	623	543	269	459	224
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	220	981	609	420	1134	372	352	700	610	302	516	252
RTOR Reduction (vph)	0	0	342	0	0	172	0	0	206	0	0	195
Lane Group Flow (vph)	220	981	267	420	1134	200	339	713	404	0	818	57
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	13.7	39.3	39.3	17.8	43.4	43.4	33.8	33.8	33.8		29.7	29.7
Effective Green, g (s)	13.9	41.0	41.0	18.0	45.1	45.1	34.0	34.0	34.0		31.0	31.0
Actuated g/C Ratio	0.10	0.29	0.29	0.13	0.32	0.32	0.24	0.24	0.24		0.22	0.22
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	341	1036	449	441	1140	428	391	823	368		769	342
v/s Ratio Prot	0.06	0.28		c0.12	c0.32		0.21	0.21			c0.24	
v/s Ratio Perm			0.17			0.15			c0.27			0.04
v/c Ratio	0.65	0.95	0.59	0.95	0.99	0.47	0.87	0.87	1.10		1.06	0.17
Uniform Delay, d1	60.7	48.4	42.4	60.6	47.3	37.9	50.8	50.8	53.0		54.5	44.0
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	4.2	17.0	3.2	30.8	25.3	1.7	17.9	9.5	75.9		50.8	0.3
Delay (s)	64.8	65.4	45.5	91.4	72.6	39.5	68.8	60.3	128.9		105.3	44.3
Level of Service	E	E	D	F	E	D	E	E	F		F	D
Approach Delay (s)		58.7			70.3			87.2			90.9	
Approach LOS		E			E			F			F	

Intersection Summary				
HCM Average Control Delay	74.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	91.3%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 11/6/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	213	262	496	0	0	873
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	270	332	628	0	0	1105
Pedestrians						1
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1733	629			628	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1733	629			628	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	31			100	
cM capacity (veh/h)	97	482			954	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	270	332	628	1105
Volume Left	270	0	0	0
Volume Right	0	332	0	0
cSH	97	482	1700	1700
Volume to Capacity	2.79	0.69	0.37	0.65
Queue Length 95th (ft)	640	130	0	0
Control Delay (s)	902.9	27.4	0.0	0.0
Lane LOS	F	D		
Approach Delay (s)	420.0		0.0	0.0
Approach LOS	F			

Intersection Summary				
Average Delay	108.2			
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough 11/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	0	0	496	51	195	891	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	0	0	0	0	0	0	605	62	238	1087	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	2198	2229	1087	2198	2198	636	1087			667		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2198	2229	1087	2198	2198	636	1087			667		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			74		
cM capacity (veh/h)	26	32	263	26	33	478	642			923		

Direction, Lane #	NE 1	SW 1
Volume Total	667	1324
Volume Left	0	238
Volume Right	62	0
cSH	1700	923
Volume to Capacity	0.39	0.26
Queue Length 95th (ft)	0	26
Control Delay (s)	0.0	7.8
Lane LOS		A
Approach Delay (s)	0.0	7.8
Approach LOS		

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	93.5%	ICU Level of Service	F	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom 11/6/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1554	1770	3539	1583	1770	3325		1770	3496	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1554	1770	3539	1583	1770	3325		1770	3496	
Volume (vph)	204	603	118	41	500	171	285	464	251	248	375	25
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	227	670	131	46	556	190	317	516	279	276	417	28
RTOR Reduction (vph)	0	0	27	0	0	56	0	60	0	0	4	0
Lane Group Flow (vph)	227	670	104	46	556	134	317	735	0	276	441	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	12.9	43.0	43.0	16.0	46.1	46.1	26.0	27.0		18.0	19.0	
Effective Green, g (s)	12.9	43.0	43.0	16.0	46.1	46.1	26.0	27.0		18.0	19.0	
Actuated g/C Ratio	0.11	0.36	0.36	0.13	0.38	0.38	0.22	0.22		0.15	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	668	557	236	1360	608	384	748		266	554	
v/s Ratio Prot	0.07	c0.36		0.03	c0.16		0.18	c0.22		c0.16	0.13	
v/s Ratio Perm			0.07			0.08						
v/c Ratio	0.62	1.00	0.19	0.19	0.41	0.22	0.83	0.98		1.04	0.80	
Uniform Delay, d1	51.2	38.5	26.5	46.3	27.0	24.9	44.8	46.3		51.0	48.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	35.6	0.2	1.8	0.2	0.2	18.0	28.3		65.3	7.8	
Delay (s)	54.2	74.1	26.6	48.1	27.2	25.0	62.9	74.6		116.3	56.4	
Level of Service	D	E	C	D	C	C	E	E		F	E	
Approach Delay (s)		63.6			27.9			71.2			79.3	
Approach LOS		E			C			E			E	

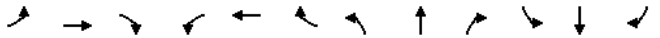
Intersection Summary				
HCM Average Control Delay	61.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	83.2%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley 11/6/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Volume (vph)	72	438	110	256	425	236	134	404	201	271	365	77
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	87	528	133	308	512	284	161	487	242	327	440	93
RTOR Reduction (vph)	0	0	84	0	0	191	0	0	130	0	0	71
Lane Group Flow (vph)	87	528	49	308	512	93	161	487	112	327	440	22
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	6.9	17.9	17.9	15.0	26.0	26.0	11.6	14.7	14.7	15.9	19.0	19.0
Effective Green, g (s)	6.9	17.9	17.9	15.0	26.0	26.0	11.6	14.7	14.7	15.9	19.0	19.0
Actuated g/C Ratio	0.09	0.23	0.23	0.19	0.33	0.33	0.15	0.18	0.18	0.20	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	154	797	351	334	1157	508	258	654	287	354	846	367
v/s Ratio Prot	0.05	c0.15		c0.17	0.14		0.09	c0.14		c0.18	0.12	
v/s Ratio Perm			0.03			0.06			0.07			0.01
v/c Ratio	0.56	0.66	0.14	0.92	0.44	0.18	0.62	0.74	0.39	0.92	0.52	0.06
Uniform Delay, d1	34.9	28.0	24.6	31.7	21.0	19.1	31.9	30.6	28.5	31.2	26.3	23.4
Progression Factor	1.00	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	4.7	4.3	0.8	30.0	1.2	0.8	4.6	4.6	0.9	29.1	0.6	0.1
Delay (s)	39.5	32.4	25.5	61.7	22.3	19.9	36.5	35.2	29.3	60.3	26.9	23.4
Level of Service	D	C	C	E	C	B	D	D	C	E	C	C
Approach Delay (s)		32.0			32.7			33.9			39.2	
Approach LOS		C			C			C			D	

Intersection Summary				
HCM Average Control Delay	34.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	67.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington 11/6/2008

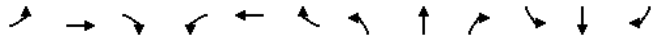


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	191	11	11	246	32	26	39	4	40	37	13
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	7	273	16	16	351	46	37	56	6	57	53	19
Pedestrians		1			2			7			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	401			296			754	735	290	740	720	379
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	401			296			754	735	290	740	720	379
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			86	83	99	80	85	97
cM capacity (veh/h)	1154			1258			272	338	744	281	344	665

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	296	413	99	129
Volume Left	7	16	37	57
Volume Right	16	46	6	19
cSH	1154	1258	319	334
Volume to Capacity	0.01	0.01	0.31	0.38
Queue Length 95th (ft)	0	1	32	44
Control Delay (s)	0.3	0.4	21.3	22.4
Lane LOS	A	A	C	C
Approach Delay (s)	0.3	0.4	21.3	22.4
Approach LOS			C	C

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	34.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	88	437	0	0	354	0	96	0	0	0	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)	93	460	0	0	373	0	101	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	373			460			1018	1018	460	1018	1018	373
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	373			460			1018	1018	460	1018	1018	373
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			50	100	100	100	100	100
cM capacity (veh/h)	1186			1101			203	219	601	203	219	673

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	93	460	373	101
Volume Left	93	0	0	101
Volume Right	0	0	0	0
cSH	1186	1700	1700	203
Volume to Capacity	0.08	0.27	0.22	0.50
Queue Length 95th (ft)	6	0	0	62
Control Delay (s)	8.3	0.0	0.0	39.2
Lane LOS	A			E
Approach Delay (s)	1.4		0.0	39.2
Approach LOS				E

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	38.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	132	149	0	228	0	0	0	393	0	260
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	152	171	0	262	0	0	0	452	0	299
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							None			None	
Median storage veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	262			323			798	499	499	585	262
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	262			323			798	499	499	585	262
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	6	100	62
cM capacity (veh/h)	1302			1237			187	473	482	423	777

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	323	262	452	299
Volume Left	0	0	452	0
Volume Right	171	0	0	299
cSH	1700	1700	482	777
Volume to Capacity	0.19	0.15	0.94	0.38
Queue Length 95th (ft)	0	0	282	46
Control Delay (s)	0.0	0.0	56.4	12.5
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	38.9	
Approach LOS			E	

Intersection Summary				
Average Delay	21.9			
Intersection Capacity Utilization	34.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 11/6/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	766	2	3	5	2	295
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	833	2	3	5	2	321
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	0		1666	1665	1665	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1666	1665	1665	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	49		90	88	95	70
cM capacity (veh/h)	1623		31	47	47	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	833	2	9	323
Volume Left	833	0	3	0
Volume Right	0	2	0	321
cSH	1623	1700	40	945
Volume to Capacity	0.51	0.00	0.22	0.34
Queue Length 95th (ft)	77	0	18	38
Control Delay (s)	9.5	0.0	120.1	10.8
Lane LOS	A		F	B
Approach Delay (s)	9.5		120.1	10.8
Approach LOS			F	B

Intersection Summary				
Average Delay	10.7			
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps

11/6/2008

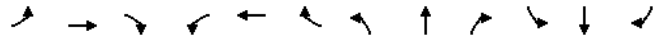
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	558	17	28	319	57	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	607	18	30	347	62	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1232	0	1237	1222
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1232	0	1237	1222
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	63		73	68	0	73
cM capacity (veh/h)	1623		111	1085	59	112

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	625	30	347	92
Volume Left	607	0	0	62
Volume Right	18	0	347	0
cSH	1623	111	1085	70
Volume to Capacity	0.37	0.27	0.32	1.32
Queue Length 95th (ft)	44	26	35	186
Control Delay (s)	8.4	49.3	9.9	317.8
Lane LOS	A	E	A	F
Approach Delay (s)	8.4	13.0		317.8
Approach LOS		B		F

Intersection Summary			
Average Delay	36.1		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport

11/10/2008



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	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	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1692		1770	1863	1583	1770	1863	1583
Flt Permitted	0.75	1.00	1.00	0.70	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1389	1863	1583	1301	1692		1770	1863	1583	1770	1863	1583
Volume (vph)	255	83	38	9	6	10	14	566	119	21	266	555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	90	41	10	7	11	15	615	129	23	289	603
RTOR Reduction (vph)	0	0	30	0	8	0	0	0	34	0	0	325
Lane Group Flow (vph)	277	90	11	10	10	0	15	615	95	23	289	278
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	13.3	13.3	13.3	13.3	13.3		1.2	22.7	22.7	1.2	22.7	22.7
Effective Green, g (s)	13.3	13.3	13.3	13.3	13.3		1.2	22.7	22.7	1.2	22.7	22.7
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27		0.02	0.46	0.46	0.02	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	375	504	428	352	457		43	860	730	43	860	730
v/s Ratio Prot		0.05			0.01		0.01	c0.33		c0.01	0.16	
v/s Ratio Perm	c0.20		0.01	0.01					0.06			0.18
v/c Ratio	0.74	0.18	0.03	0.03	0.02		0.35	0.72	0.13	0.53	0.34	0.38
Uniform Delay, d1	16.4	13.8	13.2	13.2	13.2		23.6	10.7	7.6	23.7	8.4	8.7
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	7.4	0.2	0.0	0.0	0.0		4.9	2.8	0.1	12.2	0.2	0.3
Delay (s)	23.8	13.9	13.2	13.2	13.2		28.5	13.5	7.7	35.9	8.7	9.0
Level of Service	C	B	B	B	B		C	B	A	D	A	A
Approach Delay (s)		20.6			13.2			12.8			9.6	
Approach LOS		C			B			B			A	

Intersection Summary					
HCM Average Control Delay	12.9	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.72				
Actuated Cycle Length (s)	49.2	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	57.3%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 11/6/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1295	1210	76	0	15
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1349	1260	79	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.72	
vC, conflicting volume	1340				1974	670
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1340				1965	670
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	511				40	400

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	674	674	840	499	16
Volume Left	0	0	0	0	0
Volume Right	0	0	0	79	16
cSH	1700	1700	1700	1700	400
Volume to Capacity	0.40	0.40	0.49	0.29	0.04
Queue Length 95th (ft)	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	14.4
Lane LOS					B
Approach Delay (s)	0.0		0.0		14.4
Approach LOS					B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner 11/10/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.96		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3470		1770	3527			1640	1519		1658	1401
Flt Permitted	0.95	1.00		0.95	1.00			0.62	1.00		0.59	1.00
Satd. Flow (perm)	1652	3470		1770	3527			1053	1519		1007	1401
Volume (vph)	30	1094	123	76	1129	20	153	47	89	112	44	25
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	1128	127	78	1164	21	158	48	92	115	45	26
RTOR Reduction (vph)	0	7	0	0	1	0	0	0	66	0	0	14
Lane Group Flow (vph)	31	1248	0	78	1184	0	0	206	26	0	160	12
Confl. Peds. (#/hr)	11		9	9		11	27		19	19		27
Confl. Bikes (#/hr)			2						6			8
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	2.9	43.7		6.2	47.0			24.4	24.4		24.4	24.4
Effective Green, g (s)	2.9	43.7		6.2	47.0			24.4	24.4		24.4	24.4
Actuated g/C Ratio	0.03	0.51		0.07	0.54			0.28	0.28		0.28	0.28
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	56	1757		127	1921			298	429		285	396
v/s Ratio Prot	0.02	c0.36		c0.04	c0.34							
v/s Ratio Perm								c0.20	0.02		0.16	0.01
v/c Ratio	0.55	0.71		0.61	0.62			0.69	0.06		0.56	0.03
Uniform Delay, d1	41.1	16.4		38.9	13.5			27.6	22.6		26.4	22.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	2.0		6.1	1.0			5.5	0.0		1.5	0.0
Delay (s)	47.6	18.4		44.9	14.5			33.1	22.6		27.9	22.4
Level of Service	D	B		D	B			C	C		C	C
Approach Delay (s)		19.1			16.4			29.8			27.1	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM Average Control Delay	19.5	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	86.3	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	69.3%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom

11/8/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1454	1770	3539	3514	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1454	1770	3539	3514	
Volume (vph)	43	183	234	1114	981	39
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	193	246	1173	1033	41
RTOR Reduction (vph)	0	170	0	0	4	0
Lane Group Flow (vph)	45	23	246	1173	1070	0
Confl. Peds. (#/hr)		4	10			10
Confl. Bikes (#/hr)						2
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	6.4	6.4	10.3	38.7	24.4	
Effective Green, g (s)	6.4	6.4	10.3	38.7	24.4	
Actuated g/C Ratio	0.12	0.12	0.19	0.73	0.46	
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)	199	175	343	2579	1615	
v/s Ratio Prot	c0.03		c0.14	0.33	c0.30	
v/s Ratio Perm		0.02				
v/c Ratio	0.23	0.13	0.72	0.45	0.66	
Uniform Delay, d1	21.1	20.9	20.0	2.9	11.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.3	7.0	0.6	2.2	
Delay (s)	21.7	21.2	27.0	3.5	13.3	
Level of Service	C	C	C	A	B	
Approach Delay (s)	21.3			7.6	13.3	
Approach LOS	C			A	B	

Intersection Summary				
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington

11/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	8	11	39	5	7	2	43	9	12	1	8	8
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	9	13	46	6	8	2	51	11	14	1	9	9

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	68	16	75	20
Volume Left (vph)	9	6	51	1
Volume Right (vph)	46	2	14	9
Hadj (s)	-0.34	0.02	0.06	-0.24
Departure Headway (s)	3.8	4.2	4.1	3.9
Degree Utilization, x	0.07	0.02	0.09	0.02
Capacity (veh/h)	924	833	841	893
Control Delay (s)	7.1	7.3	7.5	7.0
Approach Delay (s)	7.1	7.3	7.5	7.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.3		
HCM Level of Service	A		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

11/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	8	0	9	68	1	23	15	531	96	22	683	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	9	0	10	72	1	24	16	565	102	23	727	11
Pedestrians		8			12			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1410	1498	741	1393	1401	578	745			679		
vC1, stage 1 conf vol	787	787		609	609							
vC2, stage 2 conf vol	623	711		784	792							
vCu, unblocked vol	1410	1498	741	1393	1401	578	745			679		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	98	58	99	95	98			97		
cM capacity (veh/h)	169	173	413	173	185	510	857			904		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	18	72	26	16	565	102	23	737
Volume Left	9	72	0	16	0	0	23	0
Volume Right	10	0	24	0	0	102	0	11
cSH	246	173	475	857	1700	1700	904	1700
Volume to Capacity	0.07	0.42	0.05	0.02	0.33	0.06	0.03	0.43
Queue Length 95th (ft)	6	47	4	1	0	0	2	0
Control Delay (s)	20.8	40.0	13.0	9.3	0.0	0.0	9.1	0.0
Lane LOS	C	E	B	A			A	
Approach Delay (s)	20.8	33.0		0.2			0.3	
Approach LOS	C	D						

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	51.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	0.99		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
Frt	1.00	0.90		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1655		1770	1831		1770	1728		1770	1863	1561
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1655		1770	1831		1770	1728		1770	1863	1561
Volume (vph)	171	169	315	98	164	16	289	154	106	14	277	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	186	184	342	107	178	17	314	167	115	15	301	318
RTOR Reduction (vph)	0	74	0	0	4	0	0	23	0	0	0	127
Lane Group Flow (vph)	186	452	0	107	191	0	314	259	0	15	301	191
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		13.7	13.7		16.0	37.9		1.5	23.4	42.4
Effective Green, g (s)	19.0	19.0		13.7	13.7		16.0	37.9		1.5	23.4	42.4
Actuated g/C Ratio	0.22	0.22		0.16	0.16		0.18	0.43		0.02	0.27	0.48
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	382	357		275	285		321	743		30	495	822
v/s Ratio Prot	0.11	c0.27		0.06	c0.10		c0.18	0.15		0.01	c0.16	0.05
v/s Ratio Perm												0.07
v/c Ratio	0.49	1.27		0.39	0.67		0.98	0.35		0.50	0.61	0.23
Uniform Delay, d1	30.3	34.6		33.4	35.1		35.9	16.8		42.9	28.3	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	140.5		0.9	5.9		43.8	1.3		12.5	5.5	0.1
Delay (s)	31.3	175.1		34.4	40.9		79.7	18.1		55.4	33.8	13.5
Level of Service	C	F		C	D		E	B		E	C	B
Approach Delay (s)		137.5			38.6			50.6			24.1	
Approach LOS		F			D			D			C	

Intersection Summary					
HCM Average Control Delay	69.1	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.88				
Actuated Cycle Length (s)	88.1	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	77.6%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

12/8/2008

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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1811		1770	1863	1583	1770	3404		1770	3395	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1811		1770	1863	1583	1770	3404		1770	3395	
Volume (vph)	343	389	77	278	298	220	134	750	208	253	465	155
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	354	401	79	287	307	227	138	773	214	261	479	160
RTOR Reduction (vph)	0	8	0	0	0	184	0	28	0	0	35	0
Lane Group Flow (vph)	354	472	0	287	307	43	138	959	0	261	604	0
Confl. Peds. (#/hr)			5						2			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	19.0	22.0		14.0	17.0	17.0	11.3	26.0		12.0	26.7	
Effective Green, g (s)	19.0	22.0		14.0	17.0	17.0	11.3	26.0		12.0	26.7	
Actuated g/C Ratio	0.21	0.24		0.16	0.19	0.19	0.13	0.29		0.13	0.30	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	374	443		275	352	299	222	983		236	1007	
v/s Ratio Prot	c0.20	c0.26		0.16	0.16		0.08	c0.28		c0.15	0.18	
v/s Ratio Perm						0.03						
v/c Ratio	0.95	1.07		1.04	0.87	0.14	0.62	0.98		1.11	0.60	
Uniform Delay, d1	35.0	34.0		38.0	35.4	30.4	37.3	31.7		39.0	27.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.7	61.6		66.1	20.4	0.2	5.3	23.4		89.9	2.6	
Delay (s)	67.7	95.6		104.1	55.8	30.7	42.6	55.1		128.9	29.7	
Level of Service	E	F		F	E	C	D	E		F	C	
Approach Delay (s)		83.7			65.8			53.6			58.5	
Approach LOS		F			E			D			E	

Intersection Summary				
HCM Average Control Delay	64.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	95.4%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & Harkins Slough

11/8/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97		1.00	0.95
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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1545	3433	3539	1551	1610	3350	1539		3454	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1545	3433	3539	1551	1610	3350	1539		3454	1507
Volume (vph)	350	1155	132	395	843	415	534	569	570	315	325	177
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	372	1229	140	420	897	441	568	605	606	335	346	188
RTOR Reduction (vph)	0	0	68	0	0	250	0	0	189	0	0	150
Lane Group Flow (vph)	372	1229	72	420	897	191	378	795	417	0	681	38
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	20.0	48.0	48.0	16.8	44.8	44.8	36.8	36.8	36.8		29.0	29.0
Effective Green, g (s)	20.2	49.7	49.7	17.0	46.5	46.5	37.0	37.0	37.0		30.3	30.3
Actuated g/C Ratio	0.13	0.33	0.33	0.11	0.31	0.31	0.25	0.25	0.25		0.20	0.20
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	462	1173	512	389	1097	481	397	826	380		698	304
v/s Ratio Prot	0.11	c0.35		c0.12	0.25		0.23	0.24			c0.20	
v/s Ratio Perm			0.05			0.12			c0.27			0.03
v/c Ratio	0.81	1.05	0.14	1.08	0.82	0.40	0.95	0.96	1.10		0.98	0.12
Uniform Delay, d1	63.0	50.1	35.2	66.5	47.8	40.7	55.6	55.8	56.5		59.5	49.0
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	9.8	39.7	0.3	68.6	5.5	1.1	32.9	22.5	74.9		27.9	0.2
Delay (s)	72.8	89.9	35.4	135.1	53.3	41.9	88.5	78.3	131.4		87.4	49.2
Level of Service	E	F	D	F	D	D	F	E	F		F	D
Approach Delay (s)		81.8			70.0			98.5			79.1	
Approach LOS		F			E			F			E	

Intersection Summary				
HCM Average Control Delay	82.9	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	100.0%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 11/8/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	43	449	128	0	0	427
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	488	139	0	0	464
Pedestrians			1			3
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			0			0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	604	142			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604	142			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	46			100	
cM capacity (veh/h)	461	903			1444	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	47	488	139	464
Volume Left	47	0	0	0
Volume Right	0	488	0	0
cSH	461	903	1700	1700
Volume to Capacity	0.10	0.54	0.08	0.27
Queue Length 95th (ft)	8	83	0	0
Control Delay (s)	13.7	13.6	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.6		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough 11/8/2008

Movement	SBL	SBR	NWL	NWR	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	128	22	359	111	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	0	0	144	25	403	125	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	1100	125	1088	1088	125			169		
vC1, stage 1 conf vol										
vC2, stage 2 conf vol										
vCu, unblocked vol	1100	125	1088	1088	125			169		
tC, single (s)	6.5	6.2	7.1	6.5	4.1			4.1		
tC, 2 stage (s)										
tF (s)	4.0	3.3	3.5	4.0	2.2			2.2		
p0 queue free %	100	100	100	100	100			71		
cM capacity (veh/h)	151	926	151	154	1462			1409		

Direction, Lane #	NE 1	SW 1
Volume Total	169	528
Volume Left	0	403
Volume Right	25	0
cSH	1700	1409
Volume to Capacity	0.10	0.29
Queue Length 95th (ft)	0	30
Control Delay (s)	0.0	7.2
Lane LOS		A
Approach Delay (s)	0.0	7.2
Approach LOS		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

11/8/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1533	1770	3539	1556	1770	3398		1770	3341	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1533	1770	3539	1556	1770	3398		1770	3341	
Volume (vph)	299	580	202	96	422	144	253	477	145	274	380	135
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	308	598	208	99	435	148	261	492	149	282	392	139
RTOR Reduction (vph)	0	0	64	0	0	74	0	32	0	0	39	0
Lane Group Flow (vph)	308	598	144	99	435	74	261	609	0	282	492	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	12.9	26.0	26.0	16.0	29.1	29.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	12.9	26.0	26.0	16.0	29.1	29.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.14	0.29	0.29	0.18	0.32	0.32	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	492	538	443	315	1144	503	315	604		315	594	
v/s Ratio Prot	0.09	c0.32		0.06	c0.12		0.15	c0.18		c0.16	0.15	
v/s Ratio Perm			0.09			0.05						
v/c Ratio	0.63	1.11	0.33	0.31	0.38	0.15	0.83	1.01		0.90	0.83	
Uniform Delay, d1	36.3	32.0	25.1	32.2	23.5	21.6	35.7	37.0		36.2	35.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	73.1	0.4	2.6	0.2	0.1	21.6	38.7		29.9	9.2	
Delay (s)	38.8	105.1	25.5	34.8	23.7	21.8	57.3	75.7		66.1	44.9	
Level of Service	D	F	C	C	C	C	E	E		E	D	
Approach Delay (s)		71.9			24.9			70.3			52.3	
Approach LOS		E			C			E			D	

Intersection Summary				
HCM Average Control Delay	57.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	82.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

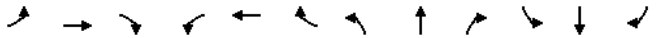
HCM Signalized Intersection Capacity Analysis
12: Freedom & Harkins Slough

11/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.96	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Volume (vph)	133	611	134	335	543	331	173	546	279	375	411	88
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)	140	643	141	353	572	348	182	575	294	395	433	93
RTOR Reduction (vph)	0	0	67	0	0	250	0	0	117	0	0	62
Lane Group Flow (vph)	140	643	74	353	572	98	182	575	177	395	433	31
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	11.6	19.0	19.0	18.0	25.4	25.4	13.6	16.0	16.0	21.0	23.4	23.4
Effective Green, g (s)	11.6	19.0	19.0	18.0	25.4	25.4	13.6	16.0	16.0	21.0	23.4	23.4
Actuated g/C Ratio	0.13	0.21	0.21	0.20	0.28	0.28	0.15	0.18	0.18	0.23	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	228	747	327	354	999	430	267	629	270	413	920	402
v/s Ratio Prot	0.08	c0.18		c0.20	0.16		0.10	c0.16		c0.22	0.12	
v/s Ratio Perm			0.05			0.06			0.12			0.02
v/c Ratio	0.61	0.86	0.23	1.00	0.57	0.23	0.68	0.91	0.66	0.96	0.47	0.08
Uniform Delay, d1	37.1	34.2	29.4	36.0	27.7	24.8	36.2	36.3	34.4	34.0	28.1	25.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	12.4	1.6	46.8	2.4	1.2	7.0	17.8	5.7	32.9	0.4	0.1
Delay (s)	41.9	46.7	31.0	82.7	30.0	26.0	43.1	54.2	40.1	66.9	28.5	25.2
Level of Service	D	D	C	F	C	C	D	D	D	E	C	C
Approach Delay (s)		43.6			43.5			48.3			44.6	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	45.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	84.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington 11/8/2008

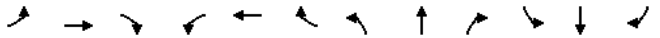


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	277	30	6	269	28	25	45	7	30	19	5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	15	298	32	6	289	30	27	48	8	32	20	5
Pedestrians		1			2			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	319			336			684	682	322	695	683	305
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	319			336			684	682	322	695	683	305
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			92	87	99	90	94	99
cM capacity (veh/h)	1241			1217			337	364	714	311	363	734

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	345	326	83	58
Volume Left	15	6	27	32
Volume Right	32	30	8	5
cSH	1241	1217	371	347
Volume to Capacity	0.01	0.01	0.22	0.17
Queue Length 95th (ft)	1	0	21	15
Control Delay (s)	0.5	0.2	17.5	17.4
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.2	17.5	17.4
Approach LOS			C	C

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	35.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	141	517	0	0	363	0	100	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	150	550	0	0	386	0	106	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	386			550			1236	1236	550	1236	1236	386
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	386			550			1236	1236	550	1236	1236	386
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			23	100	100	100	100	100
cM capacity (veh/h)	1172			1020			138	154	535	138	154	662

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	150	550	386	106
Volume Left	150	0	0	106
Volume Right	0	0	0	0
cSH	1172	1700	1700	138
Volume to Capacity	0.13	0.32	0.23	0.77
Queue Length 95th (ft)	11	0	0	116
Control Delay (s)	8.5	0.0	0.0	87.9
Lane LOS	A			F
Approach Delay (s)	1.8		0.0	87.9
Approach LOS				F

Intersection Summary				
Average Delay	8.9			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	253	150	0	184	0	0	0	405	0	138
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	264	156	0	192	0	0	0	422	0	144
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							None			None	
Median storage veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	192			420			677	533	533	611	192
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	192			420			677	533	533	611	192
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	8	100	83
cM capacity (veh/h)	1382			1139			305	453	457	408	850

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	420	192	422	144
Volume Left	0	0	422	0
Volume Right	156	0	0	144
cSH	1700	1700	457	850
Volume to Capacity	0.25	0.11	0.92	0.17
Queue Length 95th (ft)	0	0	264	15
Control Delay (s)	0.0	0.0	55.2	10.1
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	43.8	
Approach LOS			E	

Intersection Summary				
Average Delay	21.0			
Intersection Capacity Utilization	38.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 11/6/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	669	2	0	2	4	333
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	727	2	0	2	4	362
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	0		1457	1454	1454	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1457	1454	1454	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	55		100	97	94	67
cM capacity (veh/h)	1623		45	72	72	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	727	2	2	366
Volume Left	727	0	0	0
Volume Right	0	2	0	362
cSH	1623	1700	72	929
Volume to Capacity	0.45	0.00	0.03	0.39
Queue Length 95th (ft)	60	0	2	48
Control Delay (s)	9.0	0.0	56.7	11.4
Lane LOS	A		F	B
Approach Delay (s)	9.0		56.7	11.4
Approach LOS			F	B

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	64.6%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps

11/6/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	667	58	43	207	55	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	725	63	47	225	60	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1513	0	1505	1482
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1513	0	1505	1482
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	55		29	79	0	83
cM capacity (veh/h)	1623		66	1085	23	69

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	788	47	225	72
Volume Left	725	0	0	60
Volume Right	63	0	225	0
cSH	1623	66	1085	26
Volume to Capacity	0.45	0.71	0.21	2.72
Queue Length 95th (ft)	59	78	19	219
Control Delay (s)	8.6	140.0	9.2	1093.2
Lane LOS	A	F	A	F
Approach Delay (s)	8.6	31.7		1093.2
Approach LOS		D		F

Intersection Summary				
Average Delay	82.9			
Intersection Capacity Utilization	57.4%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport

11/10/2008

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	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	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1800		1770	1863	1583	1770	1863	1583
Flt Permitted	0.66	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1220	1863	1583	1356	1800		1770	1863	1583	1770	1863	1583
Volume (vph)	177	41	44	47	115	33	37	556	29	17	202	573
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	45	48	51	125	36	40	604	32	18	220	623
RTOR Reduction (vph)	0	0	38	0	19	0	0	0	8	0	0	320
Lane Group Flow (vph)	192	45	10	51	142	0	40	604	24	18	220	303
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	10.5	10.5	10.5	10.5	10.5		2.7	25.3	25.3	1.2	23.8	23.8
Effective Green, g (s)	10.5	10.5	10.5	10.5	10.5		2.7	25.3	25.3	1.2	23.8	23.8
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.06	0.52	0.52	0.02	0.49	0.49
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	261	399	339	291	386		98	962	817	43	905	769
v/s Ratio Prot		0.02			0.08		c0.02	c0.32		0.01	0.12	
v/s Ratio Perm	c0.16		0.01	0.04					0.02			0.19
v/c Ratio	0.74	0.11	0.03	0.18	0.37		0.41	0.63	0.03	0.42	0.24	0.39
Uniform Delay, d1	18.0	15.5	15.2	15.7	16.4		22.4	8.5	5.8	23.6	7.3	8.0
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	10.3	0.1	0.0	0.3	0.6		2.8	1.3	0.0	6.5	0.1	0.3
Delay (s)	28.2	15.6	15.3	16.0	17.0		25.1	9.8	5.8	30.0	7.5	8.3
Level of Service	C	B	B	B	B		C	A	A	C	A	A
Approach Delay (s)		24.1			16.8			10.5			8.6	
Approach LOS		C			B			B			A	

Intersection Summary						
HCM Average Control Delay	12.2		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.60					
Actuated Cycle Length (s)	49.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	60.2%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

APPENDIX C

Intersection Level of Service Calculations
Existing + Background Conditions

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1149	960	37	0	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	1368	1143	44	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.74	
vC, conflicting volume	1187				1849	593
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1187				1795	593
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	584				53	448

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	684	684	762	425	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	44	10
cSH	1700	1700	1700	1700	448
Volume to Capacity	0.40	0.40	0.45	0.25	0.02
Queue Length 95th (ft)	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	13.2
Lane LOS					B
Approach Delay (s)	0.0		0.0		13.2
Approach LOS					B

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		37.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner 11/10/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3496		1770	3532			1639	1541		1669	1412
Flt Permitted	0.95	1.00		0.95	1.00			0.54	1.00		0.64	1.00
Satd. Flow (perm)	1652	3496		1770	3532			916	1541		1106	1412
Volume (vph)	11	945	58	45	913	10	119	21	78	126	55	12
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	1.00	0.84	0.84	0.84
Adj. Flow (vph)	13	1125	69	54	1087	12	142	25	78	150	65	14
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	54	0	0	6
Lane Group Flow (vph)	13	1190	0	54	1098	0	0	167	24	0	215	8
Confl. Peds. (#/hr)	3		16	16		3	24		10	10		24
Confl. Bikes (#/hr)			3						3			4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	1.3	41.8		4.1	44.6			26.3	26.3		26.3	26.3
Effective Green, g (s)	1.3	41.8		4.1	44.6			26.3	26.3		26.3	26.3
Actuated g/C Ratio	0.02	0.50		0.05	0.53			0.31	0.31		0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	26	1736		86	1871			286	481		345	441
v/s Ratio Prot	0.01	c0.34		c0.03	c0.31							
v/s Ratio Perm								0.18	0.02		c0.19	0.01
v/c Ratio	0.50	0.69		0.63	0.59			0.58	0.05		0.62	0.02
Uniform Delay, d1	41.1	16.2		39.3	13.5			24.3	20.2		24.7	20.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	5.4	1.7		9.9	0.9			2.0	0.0		2.5	0.0
Delay (s)	46.5	17.9		49.2	14.4			26.3	20.2		27.2	20.0
Level of Service	D	B		D	B			C	C		C	C
Approach Delay (s)		18.2			16.0			24.4			26.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	84.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

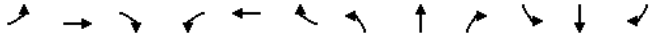
HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom 11/6/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1419	1770	3539	3511	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1419	1770	3539	3511	
Volume (vph)	52	113	86	974	894	34
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	60	130	99	1120	1028	39
RTOR Reduction (vph)	0	113	0	0	3	0
Lane Group Flow (vph)	60	17	99	1120	1064	0
Confl. Peds. (#/hr)	39	22	21			21
Confl. Bikes (#/hr)						1
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	9.2	9.2	5.3	51.5	42.2	
Effective Green, g (s)	9.2	9.2	5.3	51.5	42.2	
Actuated g/C Ratio	0.13	0.13	0.08	0.75	0.61	
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)	221	190	137	2653	2157	
v/s Ratio Prot	c0.04		c0.06	0.32	c0.30	
v/s Ratio Perm		0.01				
v/c Ratio	0.27	0.09	0.72	0.42	0.49	
Uniform Delay, d1	26.7	26.1	31.0	3.2	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2	17.1	0.5	0.8	
Delay (s)	27.4	26.3	48.1	3.6	8.1	
Level of Service	C	C	D	A	A	
Approach Delay (s)	26.6			7.3	8.1	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	4	39	11	10	0	67	5	6	1	19	13
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	1	5	49	14	13	0	85	6	8	1	24	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	27	99	42
Volume Left (vph)	1	14	85	1
Volume Right (vph)	49	0	8	16
Hadj (s)	-0.49	0.14	0.16	-0.20
Departure Headway (s)	3.7	4.4	4.3	4.0
Degree Utilization, x	0.06	0.03	0.12	0.05
Capacity (veh/h)	921	786	817	879
Control Delay (s)	7.0	7.5	7.8	7.2
Approach Delay (s)	7.0	7.5	7.8	7.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.5	
HCM Level of Service			A	
Intersection Capacity Utilization		25.8%	ICU Level of Service	A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	0	8	116	7	69	3	501	138	26	486	3
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	3	0	10	147	9	87	4	634	175	33	615	4
Pedestrians		2			9			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1418	1510	625	1348	1338	643	621			818		
vC1, stage 1 conf vol	685	685		651	651							
vC2, stage 2 conf vol	734	825		697	687							
vCu, unblocked vol	1418	1510	625	1348	1338	643	621			818		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	98	20	96	81	100			96		
cM capacity (veh/h)	146	169	481	184	199	470	958			804		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	13	147	96	4	634	175	33	619
Volume Left	3	147	0	4	0	0	33	0
Volume Right	10	0	87	0	0	175	0	4
cSH	330	184	418	958	1700	1700	804	1700
Volume to Capacity	0.04	0.80	0.23	0.00	0.37	0.10	0.04	0.36
Queue Length 95th (ft)	3	136	22	0	0	0	3	0
Control Delay (s)	16.4	74.1	16.2	8.8	0.0	0.0	9.7	0.0
Lane LOS	C	F	C	A			A	
Approach Delay (s)	16.4	51.2		0.0			0.5	
Approach LOS	C	F						

Intersection Summary						
Average Delay		7.6				
Intersection Capacity Utilization		46.1%	ICU Level of Service			A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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
Frt	1.00	0.91		1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1678		1770	1772		1770	1819		1770	1863	1563
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1678		1770	1772		1770	1819		1770	1863	1563
Volume (vph)	374	113	159	131	159	54	254	328	51	26	350	268
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	123	173	142	173	59	276	357	55	28	380	291
RTOR Reduction (vph)	0	56	0	0	14	0	0	5	0	0	0	139
Lane Group Flow (vph)	407	240	0	142	218	0	276	407	0	28	380	152
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.1	19.1		14.9	14.9		15.3	34.9		3.0	22.6	41.7
Effective Green, g (s)	19.1	19.1		14.9	14.9		15.3	34.9		3.0	22.6	41.7
Actuated g/C Ratio	0.22	0.22		0.17	0.17		0.17	0.40		0.03	0.26	0.47
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	385	365		300	300		308	722		60	479	813
v/s Ratio Prot	c0.23	0.14		0.08	c0.12		c0.16	0.22		0.02	c0.20	0.04
v/s Ratio Perm												0.06
v/c Ratio	1.06	0.66		0.47	0.73		0.90	0.56		0.47	0.79	0.19
Uniform Delay, d1	34.4	31.4		33.0	34.6		35.5	20.6		41.7	30.5	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	61.7	4.3		1.2	8.5		26.5	3.2		5.6	12.7	0.1
Delay (s)	96.1	35.7		34.1	43.0		62.0	23.7		47.3	43.2	13.4
Level of Service	F	D		C	D		E	C		D	D	B
Approach Delay (s)		70.7			39.7			39.1			31.0	
Approach LOS		E			D			D			C	

Intersection Summary				
HCM Average Control Delay	45.9	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	87.9	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	78.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

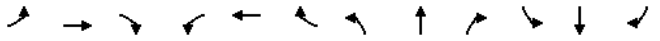
HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1793		1770	1863	1559	1770	3280		1770	3382	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1793		1770	1863	1559	1770	3280		1770	3382	
Volume (vph)	276	376	109	249	405	185	147	251	183	209	663	240
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	297	404	117	268	435	199	158	270	197	225	713	258
RTOR Reduction (vph)	0	11	0	0	0	138	0	144	0	0	40	0
Lane Group Flow (vph)	297	510	0	268	435	61	158	323	0	225	931	0
Confl. Peds. (#/hr)			3			2			2			2
Confl. Bikes (#/hr)			1									3
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	12.6	26.0		14.0	27.4	27.4	9.0	19.9		14.1	25.0	
Effective Green, g (s)	12.6	26.0		14.0	27.4	27.4	9.0	19.9		14.1	25.0	
Actuated g/C Ratio	0.14	0.29		0.16	0.30	0.30	0.10	0.22		0.16	0.28	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	481	518		275	567	475	177	725		277	939	
v/s Ratio Prot	0.09	c0.28		c0.15	0.23		0.09	0.10		c0.13	c0.28	
v/s Ratio Perm						0.04						
v/c Ratio	0.62	0.98		0.97	0.77	0.13	0.89	0.45		0.81	0.99	
Uniform Delay, d1	36.4	31.8		37.8	28.4	22.7	40.0	30.3		36.7	32.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	35.1		46.9	6.2	0.1	38.7	2.0		16.4	27.3	
Delay (s)	38.8	66.9		84.7	34.6	22.8	78.7	32.3		53.1	59.7	
Level of Service	D	E		F	C	C	E	C		D	E	
Approach Delay (s)		56.7			46.9			44.0			58.4	
Approach LOS		E			D			D			E	

Intersection Summary				
HCM Average Control Delay	52.5	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley 11/6/2008



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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.84	1.00	1.00	0.96		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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1532	3433	3539	1328	1610	3387	1514		3474	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1532	3433	3539	1328	1610	3387	1514		3474	1545
Volume (vph)	197	922	542	375	1034	334	315	625	544	278	461	227
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	221	1036	609	421	1162	375	354	702	611	312	518	255
RTOR Reduction (vph)	0	0	342	0	0	169	0	0	202	0	0	195
Lane Group Flow (vph)	221	1036	267	421	1162	206	340	716	409	0	830	60
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	13.7	39.3	39.3	17.8	43.4	43.4	33.8	33.8	33.8		29.7	29.7
Effective Green, g (s)	13.9	41.0	41.0	18.0	45.1	45.1	34.0	34.0	34.0		31.0	31.0
Actuated g/C Ratio	0.10	0.29	0.29	0.13	0.32	0.32	0.24	0.24	0.24		0.22	0.22
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	341	1036	449	441	1140	428	391	823	368		769	342
v/s Ratio Prot	0.06	0.29		c0.12	c0.33		0.21	0.21			c0.24	
v/s Ratio Perm			0.17			0.15			c0.27			0.04
v/c Ratio	0.65	1.00	0.60	0.95	1.02	0.48	0.87	0.87	1.11		1.08	0.17
Uniform Delay, d1	60.7	49.5	42.4	60.6	47.5	38.1	50.9	50.9	53.0		54.5	44.1
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	4.2	28.0	3.2	31.2	31.6	1.8	18.2	9.7	80.4		56.0	0.3
Delay (s)	64.9	77.5	45.6	91.8	79.1	39.8	69.1	60.6	133.4		110.5	44.4
Level of Service	E	E	D	F	E	D	E	E	F		F	D
Approach Delay (s)		65.6			74.3			89.0			95.0	
Approach LOS		E			E			F			F	

Intersection Summary				
HCM Average Control Delay	79.0	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	92.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 11/6/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	213	263	496	0	0	874
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	270	333	628	0	0	1106
Pedestrians						1
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1734	629			628	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1734	629			628	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	31			100	
cM capacity (veh/h)	96	482			954	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	270	333	628	1106
Volume Left	270	0	0	0
Volume Right	0	333	0	0
cSH	96	482	1700	1700
Volume to Capacity	2.80	0.69	0.37	0.65
Queue Length 95th (ft)	640	131	0	0
Control Delay (s)	905.3	27.5	0.0	0.0
Lane LOS	F	D		
Approach Delay (s)	420.3		0.0	0.0
Approach LOS	F			

Intersection Summary				
Average Delay	108.4			
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

11/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	0	0	496	51	196	891	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	0	0	0	0	0	0	605	62	239	1087	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	2201	2232	1087	2201	2201	636	1087			667		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2201	2232	1087	2201	2201	636	1087			667		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			74		
cM capacity (veh/h)	26	32	263	26	33	478	642			923		

Direction, Lane #	NE 1	SW 1
Volume Total	667	1326
Volume Left	0	239
Volume Right	62	0
cSH	1700	923
Volume to Capacity	0.39	0.26
Queue Length 95th (ft)	0	26
Control Delay (s)	0.0	7.9
Lane LOS		A
Approach Delay (s)	0.0	7.9
Approach LOS		

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	93.6%	ICU Level of Service	F	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

11/6/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1554	1770	3539	1583	1770	3328		1770	3494	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1554	1770	3539	1583	1770	3328		1770	3494	
Volume (vph)	206	609	123	45	510	173	287	484	256	265	383	27
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	229	677	137	50	567	192	319	538	284	294	426	30
RTOR Reduction (vph)	0	0	28	0	0	55	0	57	0	0	4	0
Lane Group Flow (vph)	229	677	109	50	567	137	319	765	0	294	452	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	12.9	43.0	43.0	16.0	46.1	46.1	26.0	27.0		18.0	19.0	
Effective Green, g (s)	12.9	43.0	43.0	16.0	46.1	46.1	26.0	27.0		18.0	19.0	
Actuated g/C Ratio	0.11	0.36	0.36	0.13	0.38	0.38	0.22	0.22		0.15	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	668	557	236	1360	608	384	749		266	553	
v/s Ratio Prot	0.07	c0.36		0.03	c0.16		0.18	c0.23		c0.17	0.13	
v/s Ratio Perm			0.07			0.09						
v/c Ratio	0.62	1.01	0.20	0.21	0.42	0.22	0.83	1.02		1.11	0.82	
Uniform Delay, d1	51.2	38.5	26.6	46.4	27.1	24.9	44.9	46.5		51.0	48.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	38.2	0.2	2.0	0.2	0.2	18.5	38.3		86.3	9.1	
Delay (s)	54.4	76.7	26.7	48.4	27.3	25.1	63.4	84.8		137.3	57.9	
Level of Service	D	E	C	D	C	C	E	F		F	E	
Approach Delay (s)		65.3			28.1			78.8			89.1	
Approach LOS		E			C			E			F	

Intersection Summary					
HCM Average Control Delay	66.1	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley

11/6/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Volume (vph)	72	468	110	259	451	249	134	407	205	288	367	77
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	87	564	133	312	543	300	161	490	247	347	442	93
RTOR Reduction (vph)	0	0	79	0	0	202	0	0	132	0	0	71
Lane Group Flow (vph)	87	564	54	312	543	98	161	490	115	347	442	22
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	6.9	17.9	17.9	15.0	26.0	26.0	11.6	14.7	14.7	16.0	19.1	19.1
Effective Green, g (s)	6.9	17.9	17.9	15.0	26.0	26.0	11.6	14.7	14.7	16.0	19.1	19.1
Actuated g/C Ratio	0.09	0.22	0.22	0.19	0.33	0.33	0.15	0.18	0.18	0.20	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	796	350	334	1156	507	258	654	286	356	849	368
v/s Ratio Prot	0.05	c0.16		c0.18	0.15		0.09	c0.14		c0.20	0.12	
v/s Ratio Perm			0.03			0.06			0.07			0.01
v/c Ratio	0.57	0.71	0.15	0.93	0.47	0.19	0.62	0.75	0.40	0.97	0.52	0.06
Uniform Delay, d1	34.9	28.4	24.8	31.8	21.3	19.3	32.0	30.7	28.6	31.6	26.3	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	5.3	0.9	32.4	1.4	0.8	4.6	4.7	0.9	40.6	0.6	0.1
Delay (s)	39.7	33.7	25.7	64.2	22.7	20.1	36.6	35.4	29.5	72.2	26.9	23.4
Level of Service	D	C	C	E	C	C	D	D	C	E	C	C
Approach Delay (s)		33.0			33.2			34.0			44.3	
Approach LOS		C			C			C			D	

Intersection Summary				
HCM Average Control Delay	36.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	68.6%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington

11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	194	12	11	251	32	28	39	4	40	37	13
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	7	277	17	16	359	46	40	56	6	57	53	19
Pedestrians		1			2			7			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	408			301			766	747	295	752	732	386
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	408			301			766	747	295	752	732	386
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			85	83	99	79	84	97
cM capacity (veh/h)	1147			1252			266	332	739	275	338	659

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	301	420	101	129
Volume Left	7	16	40	57
Volume Right	17	46	6	19
cSH	1147	1252	311	328
Volume to Capacity	0.01	0.01	0.33	0.39
Queue Length 95th (ft)	0	1	34	45
Control Delay (s)	0.3	0.4	22.1	22.9
Lane LOS	A	A	C	C
Approach Delay (s)	0.3	0.4	22.1	22.9
Approach LOS			C	C

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	34.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	88	452	0	0	362	0	102	0	0	0	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)	93	476	0	0	381	0	107	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	381			476			1042	1042	476	1042	1042	381
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	381			476			1042	1042	476	1042	1042	381
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			45	100	100	100	100	100
cM capacity (veh/h)	1177			1086			195	212	589	195	212	666

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	93	476	381	107
Volume Left	93	0	0	107
Volume Right	0	0	0	0
cSH	1177	1700	1700	195
Volume to Capacity	0.08	0.28	0.22	0.55
Queue Length 95th (ft)	6	0	0	73
Control Delay (s)	8.3	0.0	0.0	43.9
Lane LOS	A			E
Approach Delay (s)	1.4		0.0	43.9
Approach LOS				E

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	39.6%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	132	152	0	234	0	0	0	408	0	260
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	152	175	0	269	0	0	0	469	0	299
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	269			326			807	508	508	595	269
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	269			326			807	508	508	595	269
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	1	100	61
cM capacity (veh/h)	1295			1233			183	468	475	417	770

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	326	269	469	299
Volume Left	0	0	469	0
Volume Right	175	0	0	299
cSH	1700	1700	475	770
Volume to Capacity	0.19	0.16	0.99	0.39
Queue Length 95th (ft)	0	0	322	46
Control Delay (s)	0.0	0.0	67.6	12.6
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	46.2	
Approach LOS			E	

Intersection Summary				
Average Delay	26.0			
Intersection Capacity Utilization	35.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 11/6/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	783	2	3	5	2	297
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	851	2	3	5	2	323
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	0		1703	1702	1702	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1703	1702	1702	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	48		89	88	95	70
cM capacity (veh/h)	1623		29	44	44	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	851	2	9	325
Volume Left	851	0	3	0
Volume Right	0	2	0	323
cSH	1623	1700	37	936
Volume to Capacity	0.52	0.00	0.24	0.35
Queue Length 95th (ft)	80	0	19	39
Control Delay (s)	9.6	0.0	131.9	10.9
Lane LOS	A		F	B
Approach Delay (s)	9.6		131.9	10.9
Approach LOS			F	B

Intersection Summary			
Average Delay	10.9		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 11/6/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	566	17	28	328	57	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	615	18	30	357	62	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1249	0	1255	1240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1249	0	1255	1240
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	62		72	67	0	72
cM capacity (veh/h)	1623		107	1085	56	109

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	634	30	357	92
Volume Left	615	0	0	62
Volume Right	18	0	357	0
cSH	1623	107	1085	67
Volume to Capacity	0.38	0.28	0.33	1.39
Queue Length 95th (ft)	45	27	36	193
Control Delay (s)	8.4	51.3	9.9	350.4
Lane LOS	A	F	A	F
Approach Delay (s)	8.4	13.2		350.4
Approach LOS		B		F

Intersection Summary			
Average Delay	38.5		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport 11/10/2008

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	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	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1692		1770	1863	1583	1770	1863	1583
Flt Permitted	0.75	1.00	1.00	0.70	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1389	1863	1583	1301	1692		1770	1863	1583	1770	1863	1583
Volume (vph)	264	83	38	9	6	10	14	583	119	21	268	563
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	90	41	10	7	11	15	634	129	23	291	612
RTOR Reduction (vph)	0	0	30	0	8	0	0	0	33	0	0	329
Lane Group Flow (vph)	287	90	11	10	10	0	15	634	96	23	291	283
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	13.7	13.7	13.7	13.7	13.7		1.3	23.2	23.2	1.3	23.2	23.2
Effective Green, g (s)	13.7	13.7	13.7	13.7	13.7		1.3	23.2	23.2	1.3	23.2	23.2
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27		0.03	0.46	0.46	0.03	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	379	508	432	355	462		46	861	732	46	861	732
v/s Ratio Prot		0.05			0.01		0.01	c0.34		c0.01	0.16	
v/s Ratio Perm	c0.21		0.01	0.01					0.06			0.18
v/c Ratio	0.76	0.18	0.03	0.03	0.02		0.33	0.74	0.13	0.50	0.34	0.39
Uniform Delay, d1	16.7	13.9	13.4	13.4	13.3		24.0	11.0	7.7	24.1	8.6	8.8
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	8.4	0.2	0.0	0.0	0.0		4.1	3.3	0.1	8.3	0.2	0.3
Delay (s)	25.1	14.1	13.4	13.4	13.4		28.1	14.3	7.8	32.4	8.8	9.2
Level of Service	C	B	B	B	B		C	B	A	C	A	A
Approach Delay (s)		21.6			13.4			13.5			9.7	
Approach LOS		C			B			B			A	

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	58.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 11/6/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1339	1279	76	0	15
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1395	1332	79	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.70	
vC, conflicting volume	1411				2069	706
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1411				2099	706
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	479				31	378

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	697	697	888	523	16
Volume Left	0	0	0	0	0
Volume Right	0	0	0	79	16
cSH	1700	1700	1700	1700	378
Volume to Capacity	0.41	0.41	0.52	0.31	0.04
Queue Length 95th (ft)	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	14.9
Lane LOS					B
Approach Delay (s)	0.0		0.0		14.9
Approach LOS					B

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	47.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner 11/10/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.96		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3463		1770	3527			1636	1518		1659	1399
Flt Permitted	0.95	1.00		0.95	1.00			0.61	1.00		0.56	1.00
Satd. Flow (perm)	1652	3463		1770	3527			1044	1518		969	1399
Volume (vph)	30	1138	142	76	1198	20	173	47	89	112	44	25
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	1173	146	78	1235	21	178	48	92	115	45	26
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	65	0	0	14
Lane Group Flow (vph)	31	1311	0	78	1255	0	0	226	27	0	160	12
Confl. Peds. (#/hr)	11		9	9		11	27		19	19		27
Confl. Bikes (#/hr)			2						6			8
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	4.6	44.9		6.4	46.7			26.5	26.5		26.5	26.5
Effective Green, g (s)	4.6	44.9		6.4	46.7			26.5	26.5		26.5	26.5
Actuated g/C Ratio	0.05	0.50		0.07	0.52			0.30	0.30		0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	85	1732		126	1834			308	448		286	413
v/s Ratio Prot	0.02	c0.38		c0.04	0.36							
v/s Ratio Perm								c0.22	0.02		0.17	0.01
v/c Ratio	0.36	0.76		0.62	0.68			0.73	0.06		0.56	0.03
Uniform Delay, d1	41.2	18.1		40.5	16.1			28.5	22.7		26.7	22.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	2.6		6.2	1.6			7.6	0.0		1.3	0.0
Delay (s)	42.2	20.6		46.7	17.7			36.1	22.7		28.1	22.5
Level of Service	D	C		D	B			D	C		C	C
Approach Delay (s)		21.1			19.4			32.2			27.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom 11/6/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1454	1770	3539	3516	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1454	1770	3539	3516	
Volume (vph)	43	183	234	1161	1063	39
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	193	246	1222	1119	41
RTOR Reduction (vph)	0	170	0	0	4	0
Lane Group Flow (vph)	45	23	246	1222	1156	0
Confl. Peds. (#/hr)		4	10			10
Confl. Bikes (#/hr)						2
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	6.4	6.4	10.3	38.7	24.4	
Effective Green, g (s)	6.4	6.4	10.3	38.7	24.4	
Actuated g/C Ratio	0.12	0.12	0.19	0.73	0.46	
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)	199	175	343	2579	1616	
v/s Ratio Prot	c0.03		c0.14	0.35	c0.33	
v/s Ratio Perm		0.02				
v/c Ratio	0.23	0.13	0.72	0.47	0.72	
Uniform Delay, d1	21.1	20.9	20.0	3.0	11.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.3	7.0	0.6	2.7	
Delay (s)	21.7	21.2	27.0	3.6	14.3	
Level of Service	C	C	C	A	B	
Approach Delay (s)	21.3			7.5	14.3	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	8	11	39	5	7	2	43	9	12	1	8	8
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	9	13	46	6	8	2	51	11	14	1	9	9

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	68	16	75	20
Volume Left (vph)	9	6	51	1
Volume Right (vph)	46	2	14	9
Hadj (s)	-0.34	0.02	0.06	-0.24
Departure Headway (s)	3.8	4.2	4.1	3.9
Degree Utilization, x	0.07	0.02	0.09	0.02
Capacity (veh/h)	924	833	841	893
Control Delay (s)	7.1	7.3	7.5	7.0
Approach Delay (s)	7.1	7.3	7.5	7.0
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.3	
HCM Level of Service			A	
Intersection Capacity Utilization			22.5%	ICU Level of Service
Analysis Period (min)			15	A

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	8	0	9	68	1	23	15	546	96	22	692	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	9	0	10	72	1	24	16	581	102	23	736	11
Pedestrians		8			12			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1435	1523	750	1418	1426	594	755			695		
vC1, stage 1 conf vol	796	796		625	625							
vC2, stage 2 conf vol	639	727		794	802							
vCu, unblocked vol	1435	1523	750	1418	1426	594	755			695		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	98	57	99	95	98			97		
cM capacity (veh/h)	165	170	408	169	182	500	850			892		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	18	72	26	16	581	102	23	747
Volume Left	9	72	0	16	0	0	23	0
Volume Right	10	0	24	0	0	102	0	11
cSH	241	169	466	850	1700	1700	892	1700
Volume to Capacity	0.07	0.43	0.05	0.02	0.34	0.06	0.03	0.44
Queue Length 95th (ft)	6	48	4	1	0	0	2	0
Control Delay (s)	21.1	41.3	13.2	9.3	0.0	0.0	9.1	0.0
Lane LOS	C	E	B	A			A	
Approach Delay (s)	21.1	34.0		0.2			0.3	
Approach LOS	C	D						

Intersection Summary								
Average Delay			2.6					
Intersection Capacity Utilization			51.6%	ICU Level of Service				A
Analysis Period (min)			15					

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	0.99		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
Frt	1.00	0.90		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1656		1770	1831		1770	1732		1770	1863	1561
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1656		1770	1831		1770	1732		1770	1863	1561
Volume (vph)	175	170	315	100	165	16	289	166	109	14	285	295
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	185	342	109	179	17	314	180	118	15	310	321
RTOR Reduction (vph)	0	74	0	0	4	0	0	22	0	0	0	123
Lane Group Flow (vph)	190	453	0	109	192	0	314	276	0	15	310	198
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		13.8	13.8		15.0	37.9		1.5	24.4	43.4
Effective Green, g (s)	19.0	19.0		13.8	13.8		15.0	37.9		1.5	24.4	43.4
Actuated g/C Ratio	0.22	0.22		0.16	0.16		0.17	0.43		0.02	0.28	0.49
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	357		277	286		301	744		30	515	839
v/s Ratio Prot	0.11	c0.27		0.06	c0.10		c0.18	0.16		0.01	c0.17	0.05
v/s Ratio Perm												0.08
v/c Ratio	0.50	1.27		0.39	0.67		1.04	0.37		0.50	0.60	0.24
Uniform Delay, d1	30.4	34.6		33.4	35.1		36.6	17.1		43.0	27.7	12.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	141.7		0.9	6.1		63.6	1.4		12.5	5.1	0.1
Delay (s)	31.4	176.3		34.4	41.1		100.2	18.5		55.5	32.8	13.0
Level of Service	C	F		C	D		F	B		E	C	B
Approach Delay (s)		137.9			38.7			60.4			23.5	
Approach LOS		F			D			E			C	

Intersection Summary				
HCM Average Control Delay	71.4	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	78.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

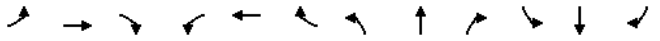
HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1805		1770	1863	1583	1770	3405		1770	3396	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1805		1770	1863	1583	1770	3405		1770	3396	
Volume (vph)	345	392	87	279	299	220	144	760	208	253	472	156
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	356	404	90	288	308	227	148	784	214	261	487	161
RTOR Reduction (vph)	0	8	0	0	0	165	0	25	0	0	31	0
Lane Group Flow (vph)	356	486	0	288	308	62	148	974	0	261	617	0
Confl. Peds. (#/hr)			5						2			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	12.7	25.0		15.0	27.3	27.3	12.6	30.0		14.0	31.4	
Effective Green, g (s)	12.7	25.0		15.0	27.3	27.3	12.6	30.0		14.0	31.4	
Actuated g/C Ratio	0.13	0.25		0.15	0.27	0.27	0.13	0.30		0.14	0.31	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	436	451		266	509	432	223	1022		248	1066	
v/s Ratio Prot	0.10	c0.27		c0.16	0.17		0.08	c0.29		c0.15	0.18	
v/s Ratio Perm						0.04						
v/c Ratio	0.82	1.08		1.08	0.61	0.14	0.66	0.95		1.05	0.58	
Uniform Delay, d1	42.5	37.5		42.5	31.7	27.5	41.7	34.3		43.0	28.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.3	64.6		79.0	2.0	0.2	7.2	18.8		71.6	2.3	
Delay (s)	53.8	102.1		121.5	33.7	27.7	48.9	53.1		114.6	31.1	
Level of Service	D	F		F	C	C	D	D		F	C	
Approach Delay (s)		81.9			62.7			52.6			55.0	
Approach LOS		F			E			D			E	

Intersection Summary				
HCM Average Control Delay	62.1	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	96.5%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley 11/6/2008



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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97		1.00	0.95
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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1545	3433	3539	1551	1610	3351	1539		3454	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1545	3433	3539	1551	1610	3351	1539		3454	1507
Volume (vph)	353	1202	133	396	909	427	534	572	572	322	327	178
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	376	1279	141	421	967	454	568	609	609	343	348	189
RTOR Reduction (vph)	0	0	66	0	0	236	0	0	187	0	0	151
Lane Group Flow (vph)	376	1279	75	421	967	218	379	798	422	0	691	38
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	18.9	48.0	48.0	16.8	45.9	45.9	36.8	36.8	36.8		29.0	29.0
Effective Green, g (s)	19.1	49.7	49.7	17.0	47.6	47.6	37.0	37.0	37.0		30.3	30.3
Actuated g/C Ratio	0.13	0.33	0.33	0.11	0.32	0.32	0.25	0.25	0.25		0.20	0.20
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	437	1173	512	389	1123	492	397	827	380		698	304
v/s Ratio Prot	0.11	c0.36		c0.12	0.27		0.24	0.24			c0.20	
v/s Ratio Perm			0.05			0.14			c0.27			0.03
v/c Ratio	0.86	1.09	0.15	1.08	0.86	0.44	0.95	0.96	1.11		0.99	0.13
Uniform Delay, d1	64.1	50.1	35.3	66.5	48.1	40.7	55.7	55.9	56.5		59.7	49.0
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	15.8	54.5	0.3	69.5	7.6	1.3	33.3	22.9	79.7		31.2	0.2
Delay (s)	79.9	104.6	35.5	136.0	55.6	42.0	89.0	78.7	136.2		90.9	49.2
Level of Service	E	F	D	F	E	D	F	E	F		F	D
Approach Delay (s)		94.0			70.6			100.5			82.0	
Approach LOS		F			E			F			F	

Intersection Summary				
HCM Average Control Delay	87.3	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.07			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	101.5%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 11/6/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	43	451	128	0	0	428
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	490	139	0	0	465
Pedestrians			1			3
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			0			0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	605	142			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	605	142			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	46			100	
cM capacity (veh/h)	460	903			1444	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	47	490	139	465
Volume Left	47	0	0	0
Volume Right	0	490	0	0
cSH	460	903	1700	1700
Volume to Capacity	0.10	0.54	0.08	0.27
Queue Length 95th (ft)	8	84	0	0
Control Delay (s)	13.7	13.6	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.6		0.0	0.0
Approach LOS	B			

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	41.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

11/8/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	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	0	0	128	22	360	111	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	0	0	0	0	144	25	404	125	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	1090	1090	156	1090	1102	125	125			169		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1090	1090	156	1090	1102	125	125			169		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			71		
cM capacity (veh/h)	150	153	889	150	151	926	1462			1409		

Direction, Lane #	NE 1	SW 1
Volume Total	169	529
Volume Left	0	404
Volume Right	25	0
cSH	1700	1409
Volume to Capacity	0.10	0.29
Queue Length 95th (ft)	0	30
Control Delay (s)	0.0	7.2
Lane LOS		A
Approach Delay (s)	0.0	7.2
Approach LOS		

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	40.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

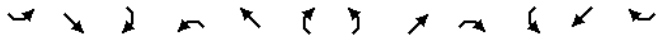
11/6/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1533	1770	3539	1556	1770	3399		1770	3344	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1533	1770	3539	1556	1770	3399		1770	3344	
Volume (vph)	304	592	219	100	431	147	256	494	148	281	406	141
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	313	610	226	103	444	152	264	509	153	290	419	145
RTOR Reduction (vph)	0	0	68	0	0	75	0	31	0	0	38	0
Lane Group Flow (vph)	313	610	158	103	444	77	264	631	0	290	526	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.0	26.0	26.0	16.0	29.0	29.0	16.0	16.0		16.0	16.0	
Effective Green, g (s)	13.0	26.0	26.0	16.0	29.0	29.0	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.14	0.29	0.29	0.18	0.32	0.32	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	496	538	443	315	1140	501	315	604		315	594	
v/s Ratio Prot	0.09	c0.33		0.06	c0.13		0.15	c0.19		c0.16	0.16	
v/s Ratio Perm			0.10			0.05						
v/c Ratio	0.63	1.13	0.36	0.33	0.39	0.15	0.84	1.04		0.92	0.89	
Uniform Delay, d1	36.2	32.0	25.4	32.3	23.6	21.8	35.7	37.0		36.4	36.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	81.2	0.5	2.8	0.2	0.1	22.6	48.7		34.0	14.8	
Delay (s)	38.9	113.2	25.9	35.1	23.9	21.9	58.3	85.7		70.3	50.9	
Level of Service	D	F	C	D	C	C	E	F		E	D	
Approach Delay (s)		75.8			25.1			77.9			57.5	
Approach LOS		E			C			E			E	

Intersection Summary					
HCM Average Control Delay	62.2	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	90.0	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					

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley

11/6/2008

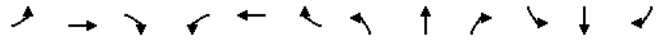


Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.96	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Volume (vph)	133	649	134	340	582	355	173	550	282	395	415	88
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)	140	683	141	358	613	374	182	579	297	416	437	93
RTOR Reduction (vph)	0	0	63	0	0	268	0	0	117	0	0	61
Lane Group Flow (vph)	140	683	78	358	613	106	182	579	180	416	437	32
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	11.6	19.0	19.0	18.0	25.4	25.4	13.6	16.0	16.0	21.0	23.4	23.4
Effective Green, g (s)	11.6	19.0	19.0	18.0	25.4	25.4	13.6	16.0	16.0	21.0	23.4	23.4
Actuated g/C Ratio	0.13	0.21	0.21	0.20	0.28	0.28	0.15	0.18	0.18	0.23	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	228	747	327	354	999	430	267	629	270	413	920	402
v/s Ratio Prot	0.08	c0.19		c0.20	0.17		0.10	c0.16		c0.24	0.12	
v/s Ratio Perm			0.05			0.07			0.12			0.02
v/c Ratio	0.61	0.91	0.24	1.01	0.61	0.25	0.68	0.92	0.67	1.01	0.47	0.08
Uniform Delay, d1	37.1	34.7	29.5	36.0	28.0	24.9	36.2	36.4	34.5	34.5	28.1	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	17.6	1.7	50.7	2.8	1.4	7.0	18.9	6.1	46.1	0.4	0.1
Delay (s)	41.9	52.3	31.2	86.7	30.9	26.3	43.1	55.3	40.6	80.6	28.5	25.2
Level of Service	D	D	C	F	C	C	D	E	D	F	C	C
Approach Delay (s)		47.7			44.4			49.1			51.1	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	47.8	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	87.2%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington

11/6/2008

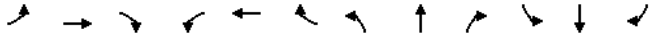


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	286	33	6	277	28	26	45	7	30	19	5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	15	308	35	6	298	30	28	48	8	32	20	5
Pedestrians		1			2			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	328			349			704	702	333	715	705	314
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			349			704	702	333	715	705	314
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			91	86	99	89	94	99
cM capacity (veh/h)	1232			1204			326	354	704	301	353	726

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	358	334	84	58
Volume Left	15	6	28	32
Volume Right	35	30	8	5
cSH	1232	1204	360	336
Volume to Capacity	0.01	0.01	0.23	0.17
Queue Length 95th (ft)	1	0	22	15
Control Delay (s)	0.5	0.2	18.0	17.9
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.2	18.0	17.9
Approach LOS			C	C

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	36.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	141	519	0	0	396	0	103	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	150	552	0	0	421	0	110	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	421			552			1273	1273	552	1273	1273	421
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	421			552			1273	1273	552	1273	1273	421
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			15	100	100	100	100	100
cM capacity (veh/h)	1138			1018			130	145	533	130	145	632

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	150	552	421	110
Volume Left	150	0	0	110
Volume Right	0	0	0	0
cSH	1138	1700	1700	130
Volume to Capacity	0.13	0.32	0.25	0.85
Queue Length 95th (ft)	11	0	0	132
Control Delay (s)	8.6	0.0	0.0	106.6
Lane LOS	A			F
Approach Delay (s)	1.8		0.0	106.6
Approach LOS				F

Intersection Summary				
Average Delay	10.5			
Intersection Capacity Utilization	44.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	253	156	0	187	0	0	0	407	0	138
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	264	162	0	195	0	0	0	424	0	144
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							None			None	
Median storage veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	195			426			683	540	540	621	195
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	195			426			683	540	540	621	195
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	6	100	83
cM capacity (veh/h)	1378			1133			301	449	453	403	847

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	426	195	424	144
Volume Left	0	0	424	0
Volume Right	162	0	0	144
cSH	1700	1700	453	847
Volume to Capacity	0.25	0.11	0.94	0.17
Queue Length 95th (ft)	0	0	273	15
Control Delay (s)	0.0	0.0	58.2	10.1
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	46.0	
Approach LOS			E	

Intersection Summary				
Average Delay	22.0			
Intersection Capacity Utilization	38.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 11/6/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	681	2	0	2	4	344
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	740	2	0	2	4	374
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	0		1483	1480	1480	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1483	1480	1480	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	54		100	97	94	66
cM capacity (veh/h)	1623		42	68	68	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	740	2	2	378
Volume Left	740	0	0	0
Volume Right	0	2	0	374
cSH	1623	1700	68	926
Volume to Capacity	0.46	0.00	0.03	0.41
Queue Length 95th (ft)	62	0	2	50
Control Delay (s)	9.1	0.0	59.5	11.5
Lane LOS	A		F	B
Approach Delay (s)	9.0		59.5	11.5
Approach LOS			F	B

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 11/6/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	685	58	43	209	55	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	745	63	47	227	60	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1552	0	1544	1521
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1552	0	1544	1521
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	54		24	79	0	81
cM capacity (veh/h)	1623		61	1085	19	64

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	808	47	227	72
Volume Left	745	0	0	60
Volume Right	63	0	227	0
cSH	1623	61	1085	22
Volume to Capacity	0.46	0.76	0.21	3.32
Queue Length 95th (ft)	62	84	20	Err
Control Delay (s)	8.7	161.6	9.2	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.7	35.2		Err
Approach LOS		E		F

Intersection Summary			
Average Delay	636.5		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport 11/10/2008

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	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	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1800		1770	1863	1583	1770	1863	1583
Flt Permitted	0.66	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1220	1863	1583	1356	1800		1770	1863	1583	1770	1863	1583
Volume (vph)	179	41	44	47	115	33	37	568	29	17	213	591
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	195	45	48	51	125	36	40	617	32	18	232	642
RTOR Reduction (vph)	0	0	38	0	19	0	0	0	8	0	0	327
Lane Group Flow (vph)	195	45	10	51	142	0	40	617	24	18	232	315
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	10.6	10.6	10.6	10.6	10.6		2.7	25.9	25.9	1.2	24.4	24.4
Effective Green, g (s)	10.6	10.6	10.6	10.6	10.6		2.7	25.9	25.9	1.2	24.4	24.4
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.05	0.52	0.52	0.02	0.49	0.49
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	260	397	338	289	384		96	971	825	43	915	777
v/s Ratio Prot		0.02			0.08		c0.02	c0.33		0.01	0.12	
v/s Ratio Perm	c0.16		0.01	0.04					0.02			0.20
v/c Ratio	0.75	0.11	0.03	0.18	0.37		0.42	0.64	0.03	0.42	0.25	0.41
Uniform Delay, d1	18.3	15.8	15.5	16.0	16.7		22.7	8.5	5.8	23.9	7.4	8.0
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	11.5	0.1	0.0	0.3	0.6		2.9	1.4	0.0	6.5	0.1	0.3
Delay (s)	29.8	15.9	15.5	16.3	17.3		25.7	9.9	5.8	30.4	7.5	8.4
Level of Service	C	B	B	B	B		C	A	A	C	A	A
Approach Delay (s)		25.2			17.1			10.6			8.6	
Approach LOS		C			B			B			A	

Intersection Summary					
HCM Average Control Delay	12.4	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	8.0		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

APPENDIX D

Intersection Level of Service Calculations
Existing + Background + Project Conditions

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 11/8/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1154	960	38	0	114
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	1374	1143	45	0	136
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.74	
vC, conflicting volume	1188				1852	594
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1188				1800	594
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	70
cM capacity (veh/h)	583				52	448

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	687	687	762	426	136
Volume Left	0	0	0	0	0
Volume Right	0	0	0	45	136
cSH	1700	1700	1700	1700	448
Volume to Capacity	0.40	0.40	0.45	0.25	0.30
Queue Length 95th (ft)	0	0	0	0	32
Control Delay (s)	0.0	0.0	0.0	0.0	16.5
Lane LOS					C
Approach Delay (s)	0.0		0.0		16.5
Approach LOS					C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner 11/10/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3496		1770	3533			1642	1541		1672	1412
Flt Permitted	0.95	1.00		0.95	1.00			0.51	1.00		0.64	1.00
Satd. Flow (perm)	1652	3496		1770	3533			872	1541		1113	1412
Volume (vph)	44	945	58	45	1019	10	119	24	78	131	67	28
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	1.00	0.84	0.84	0.84
Adj. Flow (vph)	52	1125	69	54	1213	12	142	29	78	156	80	33
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	54	0	0	12
Lane Group Flow (vph)	52	1190	0	54	1224	0	0	171	24	0	236	21
Confl. Peds. (#/hr)	3		16	16		3	24		10	10		24
Confl. Bikes (#/hr)			3						3			4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	4.9	42.1		4.2	41.4			26.5	26.5		26.5	26.5
Effective Green, g (s)	4.9	42.1		4.2	41.4			26.5	26.5		26.5	26.5
Actuated g/C Ratio	0.06	0.50		0.05	0.49			0.31	0.31		0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	95	1736		88	1725			273	482		348	441
v/s Ratio Prot	c0.03	0.34		0.03	c0.35							
v/s Ratio Perm								0.20	0.02		c0.21	0.02
v/c Ratio	0.55	0.69		0.61	0.71			0.63	0.05		0.68	0.05
Uniform Delay, d1	38.9	16.3		39.5	17.0			24.9	20.4		25.4	20.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	1.7		8.6	2.0			3.2	0.0		4.1	0.0
Delay (s)	42.3	18.0		48.1	19.0			28.1	20.4		29.5	20.4
Level of Service	D	B		D	B			C	C		C	C
Approach Delay (s)		19.0			20.2			25.7			28.4	
Approach LOS		B			C			C			C	

Intersection Summary					
HCM Average Control Delay	20.9	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.69				
Actuated Cycle Length (s)	84.8	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	61.5%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom

11/6/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1422	1770	3539	3500	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1422	1770	3539	3500	
Volume (vph)	112	118	87	974	894	50
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	129	136	100	1120	1028	57
RTOR Reduction (vph)	0	114	0	0	5	0
Lane Group Flow (vph)	129	22	100	1120	1080	0
Confl. Peds. (#/hr)	39	22	21			21
Confl. Bikes (#/hr)						1
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	10.2	10.2	6.6	46.3	35.7	
Effective Green, g (s)	10.2	10.2	6.6	46.3	35.7	
Actuated g/C Ratio	0.16	0.16	0.10	0.72	0.55	
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)	261	225	181	2540	1937	
v/s Ratio Prot	c0.08		c0.06	0.32	c0.31	
v/s Ratio Perm		0.02				
v/c Ratio	0.49	0.10	0.55	0.44	0.56	
Uniform Delay, d1	24.8	23.2	27.5	3.8	9.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.2	3.6	0.6	1.2	
Delay (s)	26.3	23.4	31.2	4.3	10.5	
Level of Service	C	C	C	A	B	
Approach Delay (s)	24.8			6.5	10.5	
Approach LOS	C			A	B	

Intersection Summary				
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington

11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	4	39	11	10	5	67	8	6	17	31	78
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	23	5	49	14	13	6	85	10	8	22	39	99

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	77	33	103	159
Volume Left (vph)	23	14	85	22
Volume Right (vph)	49	6	8	99
Hadj (s)	-0.29	0.00	0.15	-0.31
Departure Headway (s)	4.2	4.6	4.5	4.0
Degree Utilization, x	0.09	0.04	0.13	0.18
Capacity (veh/h)	791	731	775	881
Control Delay (s)	7.6	7.8	8.1	7.8
Approach Delay (s)	7.6	7.8	8.1	7.8
Approach LOS	A	A	A	A

Intersection Summary					
Delay		7.8			
HCM Level of Service		A			
Intersection Capacity Utilization	23.3%	ICU Level of Service		A	
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	16	0	10	116	7	69	4	501	138	26	486	7
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	20	0	13	147	9	87	5	634	175	33	615	9
Pedestrians		2			9			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1424	1515	628	1353	1345	643	626			818		
vC1, stage 1 conf vol	687	687		653	653							
vC2, stage 2 conf vol	736	828		700	692							
vCu, unblocked vol	1424	1515	628	1353	1345	643	626			818		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	100	97	20	96	81	99			96		
cM capacity (veh/h)	145	168	480	183	198	470	954			804		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	33	147	96	5	634	175	33	624
Volume Left	20	147	0	5	0	0	33	0
Volume Right	13	0	87	0	0	175	0	9
cSH	198	183	417	954	1700	1700	804	1700
Volume to Capacity	0.17	0.80	0.23	0.01	0.37	0.10	0.04	0.37
Queue Length 95th (ft)	15	138	22	0	0	0	3	0
Control Delay (s)	26.7	76.0	16.2	8.8	0.0	0.0	9.7	0.0
Lane LOS	D	F	C	A			A	
Approach Delay (s)	26.7	52.3		0.1			0.5	
Approach LOS	D	F						

Intersection Summary				
Average Delay	8.0			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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
Frt	1.00	0.91		1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1678		1770	1772		1770	1819		1770	1863	1563
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1678		1770	1772		1770	1819		1770	1863	1563
Volume (vph)	374	113	159	132	159	54	254	340	53	26	353	268
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	123	173	143	173	59	276	370	58	28	384	291
RTOR Reduction (vph)	0	56	0	0	14	0	0	5	0	0	0	139
Lane Group Flow (vph)	407	240	0	143	218	0	276	423	0	28	384	152
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.1	19.1		14.9	14.9		15.3	34.9		3.0	22.6	41.7
Effective Green, g (s)	19.1	19.1		14.9	14.9		15.3	34.9		3.0	22.6	41.7
Actuated g/C Ratio	0.22	0.22		0.17	0.17		0.17	0.40		0.03	0.26	0.47
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	385	365		300	300		308	722		60	479	813
v/s Ratio Prot	c0.23	0.14		0.08	c0.12		c0.16	0.23		0.02	c0.21	0.04
v/s Ratio Perm												0.06
v/c Ratio	1.06	0.66		0.48	0.73		0.90	0.59		0.47	0.80	0.19
Uniform Delay, d1	34.4	31.4		33.0	34.6		35.5	20.8		41.7	30.6	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	61.7	4.3		1.2	8.5		26.5	3.5		5.6	13.2	0.1
Delay (s)	96.1	35.7		34.2	43.0		62.0	24.3		47.3	43.8	13.4
Level of Service	F	D		C	D		E	C		D	D	B
Approach Delay (s)		70.7			39.7			39.1			31.4	
Approach LOS		E			D			D			C	

Intersection Summary					
HCM Average Control Delay	45.9	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	87.9	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	78.9%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1793		1770	1863	1559	1770	3282		1770	3382	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1793		1770	1863	1559	1770	3282		1770	3382	
Volume (vph)	276	376	109	249	405	185	147	256	183	209	664	240
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	297	404	117	268	435	199	158	275	197	225	714	258
RTOR Reduction (vph)	0	11	0	0	0	133	0	142	0	0	40	0
Lane Group Flow (vph)	297	510	0	268	435	66	158	330	0	225	932	0
Confl. Peds. (#/hr)			3			2			2			2
Confl. Bikes (#/hr)			1									3
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.0	26.0		14.0	30.0	30.0	9.0	19.9		14.1	25.0	
Effective Green, g (s)	10.0	26.0		14.0	30.0	30.0	9.0	19.9		14.1	25.0	
Actuated g/C Ratio	0.11	0.29		0.16	0.33	0.33	0.10	0.22		0.16	0.28	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	518		275	621	520	177	726		277	939	
v/s Ratio Prot	0.09	c0.28		c0.15	c0.23		0.09	0.10		c0.13	c0.28	
v/s Ratio Perm						0.04						
v/c Ratio	0.78	0.98		0.97	0.70	0.13	0.89	0.45		0.81	0.99	
Uniform Delay, d1	38.9	31.8		37.8	26.1	20.9	40.0	30.4		36.7	32.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	35.1		46.9	3.6	0.1	38.7	2.1		16.4	27.5	
Delay (s)	48.6	66.9		84.7	29.7	21.0	78.7	32.4		53.1	59.9	
Level of Service	D	E		F	C	C	E	C		D	E	
Approach Delay (s)		60.3			44.1			44.0			58.6	
Approach LOS		E			D			D			E	

Intersection Summary				
HCM Average Control Delay	52.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley

11/6/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.84	1.00	1.00	0.96		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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1532	3433	3539	1328	1610	3387	1514		3475	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1532	3433	3539	1328	1610	3387	1514		3475	1545
Volume (vph)	201	922	542	375	1034	334	315	629	544	278	475	241
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	226	1036	609	421	1162	375	354	707	611	312	534	271
RTOR Reduction (vph)	0	0	341	0	0	170	0	0	202	0	0	199
Lane Group Flow (vph)	226	1036	268	421	1162	205	342	719	409	0	846	72
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	13.8	39.3	39.3	17.8	43.3	43.3	33.8	33.8	33.8		29.7	29.7
Effective Green, g (s)	14.0	41.0	41.0	18.0	45.0	45.0	34.0	34.0	34.0		31.0	31.0
Actuated g/C Ratio	0.10	0.29	0.29	0.13	0.32	0.32	0.24	0.24	0.24		0.22	0.22
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	343	1036	449	441	1138	427	391	823	368		769	342
v/s Ratio Prot	0.07	0.29		c0.12	c0.33		0.21	0.21			c0.24	
v/s Ratio Perm			0.18			0.15			c0.27			0.05
v/c Ratio	0.66	1.00	0.60	0.95	1.02	0.48	0.87	0.87	1.11		1.10	0.21
Uniform Delay, d1	60.7	49.5	42.4	60.6	47.5	38.1	51.0	50.9	53.0		54.5	44.5
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	4.5	28.0	3.2	31.2	32.1	1.8	19.0	10.2	80.4		63.4	0.4
Delay (s)	65.2	77.5	45.6	91.8	79.6	39.9	70.0	61.1	133.4		117.9	44.9
Level of Service	E	E	D	F	E	D	E	E	F		F	D
Approach Delay (s)		65.6			74.6			89.3			100.1	
Approach LOS		E			E			F			F	

Intersection Summary				
HCM Average Control Delay	80.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.07			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 11/6/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	213	267	496	0	0	888
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	270	338	628	0	0	1124
Pedestrians						1
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1752	629			628	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1752	629			628	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	30			100	
cM capacity (veh/h)	94	482			954	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	270	338	628	1124
Volume Left	270	0	0	0
Volume Right	0	338	0	0
cSH	94	482	1700	1700
Volume to Capacity	2.87	0.70	0.37	0.66
Queue Length 95th (ft)	647	135	0	0
Control Delay (s)	939.2	28.2	0.0	0.0
Lane LOS	F	D		
Approach Delay (s)	432.4		0.0	0.0
Approach LOS	F			

Intersection Summary			
Average Delay	111.4		
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough 11/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	0	0	496	51	210	891	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	0	0	0	0	0	0	605	62	256	1087	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	2235	2266	1087	2235	2235	636	1087			667		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2235	2266	1087	2235	2235	636	1087			667		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			72		
cM capacity (veh/h)	24	29	263	24	31	478	642			923		

Direction, Lane #	NE 1	SW 1
Volume Total	667	1343
Volume Left	0	256
Volume Right	62	0
cSH	1700	923
Volume to Capacity	0.39	0.28
Queue Length 95th (ft)	0	28
Control Delay (s)	0.0	8.5
Lane LOS		A
Approach Delay (s)	0.0	8.5
Approach LOS		

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom 11/6/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1554	1770	3539	1583	1770	3329		1770	3496	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1554	1770	3539	1583	1770	3329		1770	3496	
Volume (vph)	206	609	135	45	510	173	287	488	256	311	397	27
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	229	677	150	50	567	192	319	542	284	346	441	30
RTOR Reduction (vph)	0	0	31	0	0	55	0	57	0	0	4	0
Lane Group Flow (vph)	229	677	119	50	567	137	319	769	0	346	467	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	12.9	43.0	43.0	16.0	46.1	46.1	26.0	27.0		18.0	19.0	
Effective Green, g (s)	12.9	43.0	43.0	16.0	46.1	46.1	26.0	27.0		18.0	19.0	
Actuated g/C Ratio	0.11	0.36	0.36	0.13	0.38	0.38	0.22	0.22		0.15	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	668	557	236	1360	608	384	749		266	554	
v/s Ratio Prot	0.07	c0.36		0.03	c0.16		0.18	c0.23		c0.20	0.13	
v/s Ratio Perm			0.08			0.09						
v/c Ratio	0.62	1.01	0.21	0.21	0.42	0.22	0.83	1.03		1.30	0.84	
Uniform Delay, d1	51.2	38.5	26.8	46.4	27.1	24.9	44.9	46.5		51.0	49.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	38.2	0.2	2.0	0.2	0.2	18.5	40.0		160.1	11.2	
Delay (s)	54.4	76.7	26.9	48.4	27.3	25.1	63.4	86.5		211.1	60.2	
Level of Service	D	E	C	D	C	C	E	F		F	E	
Approach Delay (s)		64.8			28.1			80.1			124.1	
Approach LOS		E			C			F			F	

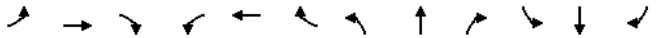
Intersection Summary				
HCM Average Control Delay	74.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley 11/6/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Volume (vph)	72	484	110	305	511	254	134	407	217	289	367	77
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	87	583	133	367	616	306	161	490	261	348	442	93
RTOR Reduction (vph)	0	0	77	0	0	206	0	0	139	0	0	71
Lane Group Flow (vph)	87	583	56	367	616	100	161	490	122	348	442	22
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	6.9	17.9	17.9	15.0	26.0	26.0	11.6	14.7	14.7	16.0	19.1	19.1
Effective Green, g (s)	6.9	17.9	17.9	15.0	26.0	26.0	11.6	14.7	14.7	16.0	19.1	19.1
Actuated g/C Ratio	0.09	0.22	0.22	0.19	0.33	0.33	0.15	0.18	0.18	0.20	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	796	350	334	1156	507	258	654	286	356	849	368
v/s Ratio Prot	0.05	c0.16		c0.21	0.17		0.09	c0.14		c0.20	0.12	
v/s Ratio Perm			0.04			0.06			0.08			0.01
v/c Ratio	0.57	0.73	0.16	1.10	0.53	0.20	0.62	0.75	0.43	0.98	0.52	0.06
Uniform Delay, d1	34.9	28.6	24.8	32.3	21.8	19.3	32.0	30.7	28.7	31.6	26.3	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	5.9	1.0	78.4	1.8	0.9	4.6	4.7	1.0	41.2	0.6	0.1
Delay (s)	39.7	34.5	25.8	110.7	23.6	20.2	36.6	35.4	29.7	72.9	26.9	23.4
Level of Service	D	C	C	F	C	C	D	D	C	E	C	C
Approach Delay (s)		33.6			47.6			34.0			44.6	
Approach LOS		C			D			C			D	

Intersection Summary				
HCM Average Control Delay	40.8	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	71.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington 11/6/2008

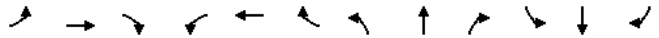


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	194	12	11	251	32	28	41	4	40	44	18
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	9	277	17	16	359	46	40	59	6	57	63	26
Pedestrians		1			2			7			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	408			301			781	750	295	757	735	386
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	408			301			781	750	295	757	735	386
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			84	82	99	79	81	96
cM capacity (veh/h)	1147			1252			250	330	739	271	337	659

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	303	420	104	146
Volume Left	9	16	40	57
Volume Right	17	46	6	26
cSH	1147	1252	302	334
Volume to Capacity	0.01	0.01	0.35	0.44
Queue Length 95th (ft)	1	1	37	53
Control Delay (s)	0.3	0.4	23.1	23.9
Lane LOS	A	A	C	C
Approach Delay (s)	0.3	0.4	23.1	23.9
Approach LOS			C	C

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	34.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	89	452	0	0	362	0	102	0	0	0	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)	94	476	0	0	381	0	107	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	381			476			1044	1044	476	1044	1044	381
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	381			476			1044	1044	476	1044	1044	381
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			45	100	100	100	100	100
cM capacity (veh/h)	1177			1086			194	211	589	194	211	666

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	94	476	381	107
Volume Left	94	0	0	107
Volume Right	0	0	0	0
cSH	1177	1700	1700	194
Volume to Capacity	0.08	0.28	0.22	0.55
Queue Length 95th (ft)	6	0	0	73
Control Delay (s)	8.3	0.0	0.0	44.2
Lane LOS	A			E
Approach Delay (s)	1.4		0.0	44.2
Approach LOS				E

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	39.6%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	133	152	0	234	0	0	0	408	0	262
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	153	175	0	269	0	0	0	469	0	301
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							None			None	
Median storage veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	269			328			810	509	509	597	269
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	269			328			810	509	509	597	269
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	1	100	61
cM capacity (veh/h)	1295			1232			182	467	474	417	770

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	328	269	469	301
Volume Left	0	0	469	0
Volume Right	175	0	0	301
cSH	1700	1700	474	770
Volume to Capacity	0.19	0.16	0.99	0.39
Queue Length 95th (ft)	0	0	323	47
Control Delay (s)	0.0	0.0	68.1	12.7
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	46.4	
Approach LOS			E	

Intersection Summary				
Average Delay	26.2			
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 11/6/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	792	2	3	5	2	297
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	861	2	3	5	2	323
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	0		1723	1722	1722	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1723	1722	1722	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	47		88	87	95	70
cM capacity (veh/h)	1623		28	42	42	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	861	2	9	325
Volume Left	861	0	3	0
Volume Right	0	2	0	323
cSH	1623	1700	35	930
Volume to Capacity	0.53	0.00	0.25	0.35
Queue Length 95th (ft)	82	0	20	39
Control Delay (s)	9.7	0.0	138.6	10.9
Lane LOS	A		F	B
Approach Delay (s)	9.7		138.6	10.9
Approach LOS			F	B

Intersection Summary				
Average Delay	11.0			
Intersection Capacity Utilization	69.0%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps

11/6/2008

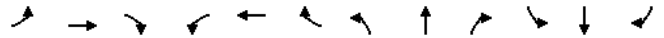
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	601	17	28	328	57	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	653	18	30	357	62	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1325	0	1331	1316
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1325	0	1331	1316
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	60		67	67	0	68
cM capacity (veh/h)	1623		93	1085	46	94

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	672	30	357	92
Volume Left	653	0	0	62
Volume Right	18	0	357	0
cSH	1623	93	1085	56
Volume to Capacity	0.40	0.33	0.33	1.66
Queue Length 95th (ft)	50	31	36	216
Control Delay (s)	8.6	61.5	9.9	484.8
Lane LOS	A	F	A	F
Approach Delay (s)	8.6	14.0		484.8
Approach LOS		B		F

Intersection Summary			
Average Delay	48.6		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport

11/10/2008



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	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	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1686		1770	1863	1583	1770	1863	1583
Flt Permitted	0.75	1.00	1.00	0.70	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1388	1863	1583	1301	1686		1770	1863	1583	1770	1863	1583
Volume (vph)	264	83	38	9	6	11	14	592	119	26	268	598
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	90	41	10	7	12	15	643	129	28	291	650
RTOR Reduction (vph)	0	0	30	0	9	0	0	0	32	0	0	334
Lane Group Flow (vph)	287	90	11	10	10	0	15	643	97	28	291	316
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	13.8	13.8	13.8	13.8	13.8		1.3	24.3	24.3	2.7	25.7	25.7
Effective Green, g (s)	13.8	13.8	13.8	13.8	13.8		1.3	24.3	24.3	2.7	25.7	25.7
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26		0.02	0.46	0.46	0.05	0.49	0.49
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	363	487	414	340	441		44	857	729	91	907	771
v/s Ratio Prot		0.05			0.01		0.01	c0.35		c0.02	0.16	
v/s Ratio Perm	c0.21		0.01	0.01					0.06			0.20
v/c Ratio	0.79	0.18	0.03	0.03	0.02		0.34	0.75	0.13	0.31	0.32	0.41
Uniform Delay, d1	18.2	15.1	14.5	14.5	14.5		25.3	11.7	8.2	24.1	8.2	8.7
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	11.2	0.2	0.0	0.0	0.0		4.6	3.7	0.1	1.9	0.2	0.4
Delay (s)	29.3	15.3	14.5	14.6	14.5		29.9	15.5	8.3	26.1	8.4	9.0
Level of Service	C	B	B	B	B		C	B	A	C	A	A
Approach Delay (s)		24.8			14.5			14.6			9.4	
Approach LOS		C			B			B			A	

Intersection Summary					
HCM Average Control Delay	14.2	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	52.8	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	59.1%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson

11/6/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1342	1279	81	0	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1398	1332	84	0	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.71	
vC, conflicting volume	1417				2073	708
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1417				2103	708
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	79
cM capacity (veh/h)	477				32	377

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	699	699	888	528	79
Volume Left	0	0	0	0	0
Volume Right	0	0	0	84	79
cSH	1700	1700	1700	1700	377
Volume to Capacity	0.41	0.41	0.52	0.31	0.21
Queue Length 95th (ft)	0	0	0	0	20
Control Delay (s)	0.0	0.0	0.0	0.0	17.1
Lane LOS					C
Approach Delay (s)	0.0		0.0		17.1
Approach LOS					C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner

11/10/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.96		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3462		1770	3528			1641	1515		1662	1395
Flt Permitted	0.95	1.00		0.95	1.00			0.59	1.00		0.51	1.00
Satd. Flow (perm)	1652	3462		1770	3528			1005	1515		877	1395
Volume (vph)	157	1138	142	76	1259	20	173	59	89	115	51	34
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	162	1173	146	78	1298	21	178	61	92	119	53	35
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	67	0	0	18
Lane Group Flow (vph)	162	1311	0	78	1318	0	0	239	25	0	172	17
Confl. Peds. (#/hr)	11		9	9		11	27		19	19		27
Confl. Bikes (#/hr)			2						6			8
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	11.8	50.1		6.6	44.9			26.3	26.3		26.3	26.3
Effective Green, g (s)	11.8	50.1		6.6	44.9			26.3	26.3		26.3	26.3
Actuated g/C Ratio	0.12	0.53		0.07	0.47			0.28	0.28		0.28	0.28
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	205	1826		123	1667			278	419		243	386
v/s Ratio Prot	c0.10	0.38		0.04	c0.37							
v/s Ratio Perm								c0.24	0.02		0.20	0.01
v/c Ratio	0.79	0.72		0.63	0.79			0.86	0.06		0.71	0.04
Uniform Delay, d1	40.4	17.1		43.0	21.1			32.6	25.3		30.9	25.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	17.3	2.0		7.6	3.2			21.6	0.0		7.5	0.0
Delay (s)	57.7	19.1		50.6	24.3			54.2	25.3		38.4	25.2
Level of Service	E	B		D	C			D	C		D	C
Approach Delay (s)		23.3			25.8			46.2			36.1	
Approach LOS		C			C			D			D	

Intersection Summary					
HCM Average Control Delay	27.3	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	73.5%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom

11/6/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1454	1770	3539	3482	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1454	1770	3539	3482	
Volume (vph)	78	186	239	1161	1063	101
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	82	196	252	1222	1119	106
RTOR Reduction (vph)	0	170	0	0	10	0
Lane Group Flow (vph)	82	26	252	1222	1215	0
Confl. Peds. (#/hr)		4	10			10
Confl. Bikes (#/hr)						2
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	6.9	6.9	10.4	38.1	23.7	
Effective Green, g (s)	6.9	6.9	10.4	38.1	23.7	
Actuated g/C Ratio	0.13	0.13	0.20	0.72	0.45	
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)	215	189	347	2544	1557	
v/s Ratio Prot	c0.05		c0.14	0.35	c0.35	
v/s Ratio Perm		0.02				
v/c Ratio	0.38	0.14	0.73	0.48	0.78	
Uniform Delay, d1	21.1	20.4	20.0	3.2	12.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.3	7.4	0.7	3.9	
Delay (s)	22.2	20.7	27.3	3.9	16.4	
Level of Service	C	C	C	A	B	
Approach Delay (s)	21.2			7.9	16.4	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

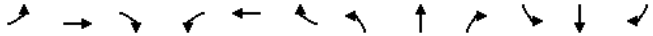
Queuing and Blocking Report
Baseline

PM cum + PROJ 60
12/17/2008

Intersection: 3: Crestview & Freedom

Movement	WB	WB	SE	SE	SE	NW	NW
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	92	74	175	119	141	141	129
Average Queue (ft)	40	39	117	90	98	118	97
95th Queue (ft)	84	68	195	129	166	151	135
Link Distance (ft)	1364			945	945	916	916
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		50	150				
Storage Blk Time (%)	8	3	9				
Queuing Penalty (veh)	15	2	54				

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	75	11	39	5	7	18	43	21	12	10	15	46
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	88	13	46	6	8	21	51	25	14	12	18	54

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	147	35	89	84
Volume Left (vph)	88	6	51	12
Volume Right (vph)	46	21	14	54
Hadj (s)	-0.03	-0.29	0.05	-0.33
Departure Headway (s)	4.3	4.2	4.5	4.1
Degree Utilization, x	0.18	0.04	0.11	0.09
Capacity (veh/h)	805	810	768	827
Control Delay (s)	8.2	7.3	8.0	7.5
Approach Delay (s)	8.2	7.3	8.0	7.5
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.9	
HCM Level of Service			A	
Intersection Capacity Utilization			31.8%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	16	0	10	68	1	23	17	546	96	22	692	24
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	17	0	11	72	1	24	18	581	102	23	736	26
Pedestrians		8			12			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1447	1535	758	1424	1446	594	770			695		
vC1, stage 1 conf vol	804	804		629	629							
vC2, stage 2 conf vol	643	731		795	817							
vCu, unblocked vol	1447	1535	758	1424	1446	594	770			695		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	97	57	99	95	98			97		
cM capacity (veh/h)	164	168	404	167	178	500	839			892		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	28	72	26	18	581	102	23	762
Volume Left	17	72	0	18	0	0	23	0
Volume Right	11	0	24	0	0	102	0	26
cSH	212	167	465	839	1700	1700	892	1700
Volume to Capacity	0.13	0.43	0.05	0.02	0.34	0.06	0.03	0.45
Queue Length 95th (ft)	11	49	4	2	0	0	2	0
Control Delay (s)	24.5	41.9	13.2	9.4	0.0	0.0	9.1	0.0
Lane LOS	C	E	B	A			A	
Approach Delay (s)	24.5	34.4		0.2			0.3	
Approach LOS	C	D						

Intersection Summary						
Average Delay		2.7				
Intersection Capacity Utilization		52.9%	ICU Level of Service		A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/3/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	0.99		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
Frt	1.00	0.90		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1656		1770	1831		1770	1734		1770	1863	1561
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1656		1770	1831		1770	1734		1770	1863	1561
Volume (vph)	175	170	315	102	165	16	289	173	110	14	297	295
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	185	342	111	179	17	314	188	120	15	323	321
RTOR Reduction (vph)	0	74	0	0	4	0	0	21	0	0	0	120
Lane Group Flow (vph)	190	453	0	111	192	0	314	287	0	15	323	201
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		13.8	13.8		14.0	37.9		1.5	25.4	44.4
Effective Green, g (s)	19.0	19.0		13.8	13.8		14.0	37.9		1.5	25.4	44.4
Actuated g/C Ratio	0.22	0.22		0.16	0.16		0.16	0.43		0.02	0.29	0.50
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	357		277	286		281	745		30	537	857
v/s Ratio Prot	0.11	c0.27		0.06	c0.10		c0.18	0.17		0.01	c0.17	0.05
v/s Ratio Perm												0.08
v/c Ratio	0.50	1.27		0.40	0.67		1.12	0.39		0.50	0.60	0.23
Uniform Delay, d1	30.4	34.6		33.5	35.1		37.1	17.2		43.0	27.0	12.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	141.7		1.0	6.1		89.0	1.5		12.5	4.9	0.1
Delay (s)	31.4	176.3		34.4	41.1		126.1	18.7		55.5	32.0	12.5
Level of Service	C	F		C	D		F	B		E	C	B
Approach Delay (s)		137.9			38.7			72.9			23.0	
Approach LOS		F			D			E			C	

Intersection Summary				
HCM Average Control Delay	74.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	78.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

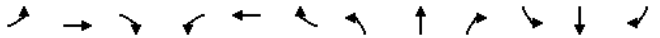
1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1805		1770	1863	1583	1770	3406		1770	3397	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1805		1770	1863	1583	1770	3406		1770	3397	
Volume (vph)	345	392	87	279	299	220	144	763	208	253	477	156
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	356	404	90	288	308	227	148	787	214	261	492	161
RTOR Reduction (vph)	0	8	0	0	0	165	0	25	0	0	31	0
Lane Group Flow (vph)	356	486	0	288	308	62	148	977	0	261	622	0
Confl. Peds. (#/hr)			5						2			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	12.7	25.0		15.0	27.3	27.3	12.6	30.0		14.0	31.4	
Effective Green, g (s)	12.7	25.0		15.0	27.3	27.3	12.6	30.0		14.0	31.4	
Actuated g/C Ratio	0.13	0.25		0.15	0.27	0.27	0.13	0.30		0.14	0.31	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	436	451		266	509	432	223	1022		248	1067	
v/s Ratio Prot	0.10	c0.27		c0.16	0.17		0.08	c0.29		c0.15	0.18	
v/s Ratio Perm						0.04						
v/c Ratio	0.82	1.08		1.08	0.61	0.14	0.66	0.96		1.05	0.58	
Uniform Delay, d1	42.5	37.5		42.5	31.7	27.5	41.7	34.3		43.0	28.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.3	64.6		79.0	2.0	0.2	7.2	19.3		71.6	2.3	
Delay (s)	53.8	102.1		121.5	33.7	27.7	48.9	53.6		114.6	31.1	
Level of Service	D	F		F	C	C	D	D		F	C	
Approach Delay (s)		81.9			62.7			53.0			55.0	
Approach LOS		F			E			D			D	

Intersection Summary				
HCM Average Control Delay	62.2	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	96.6%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley

11/6/2008



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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97		1.00	0.95
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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1545	3433	3539	1551	1610	3352	1539		3454	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1545	3433	3539	1551	1610	3352	1539		3454	1507
Volume (vph)	367	1202	133	396	909	427	534	586	572	322	335	186
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	390	1279	141	421	967	454	568	623	609	343	356	198
RTOR Reduction (vph)	0	0	66	0	0	236	0	0	187	0	0	158
Lane Group Flow (vph)	390	1279	75	421	967	218	383	808	422	0	699	40
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	18.9	48.0	48.0	16.8	45.9	45.9	36.8	36.8	36.8		29.0	29.0
Effective Green, g (s)	19.1	49.7	49.7	17.0	47.6	47.6	37.0	37.0	37.0		30.3	30.3
Actuated g/C Ratio	0.13	0.33	0.33	0.11	0.32	0.32	0.25	0.25	0.25		0.20	0.20
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	437	1173	512	389	1123	492	397	827	380		698	304
v/s Ratio Prot	0.11	c0.36		c0.12	0.27		0.24	0.24			c0.20	
v/s Ratio Perm			0.05			0.14			c0.27			0.03
v/c Ratio	0.89	1.09	0.15	1.08	0.86	0.44	0.96	0.98	1.11		1.00	0.13
Uniform Delay, d1	64.4	50.1	35.3	66.5	48.1	40.7	55.9	56.1	56.5		59.9	49.1
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	19.9	54.5	0.3	69.5	7.6	1.3	35.7	25.5	79.7		34.4	0.2
Delay (s)	84.4	104.6	35.5	136.0	55.6	42.0	91.6	81.5	136.2		94.3	49.3
Level of Service	F	F	D	F	E	D	F	F	F		F	D
Approach Delay (s)		94.9			70.6			102.2			84.3	
Approach LOS		F			E			F			F	

Intersection Summary				
HCM Average Control Delay	88.4	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.08			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	101.8%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough

11/6/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	43	465	128	0	0	436
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	505	139	0	0	474
Pedestrians			1			3
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			0			0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	614	142			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	614	142			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	44			100	
cM capacity (veh/h)	455	903			1444	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	47	505	139	474
Volume Left	47	0	0	0
Volume Right	0	505	0	0
cSH	455	903	1700	1700
Volume to Capacity	0.10	0.56	0.08	0.28
Queue Length 95th (ft)	9	89	0	0
Control Delay (s)	13.8	13.9	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.9		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

11/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	0	0	128	22	368	111	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	0	0	0	0	144	25	413	125	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	1108	1120	125	1108	1108	156	125			169		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1108	1120	125	1108	1108	156	125			169		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			71		
cM capacity (veh/h)	145	146	926	145	148	889	1462			1409		

Direction, Lane #	NE 1	SW 1
Volume Total	169	538
Volume Left	0	413
Volume Right	25	0
cSH	1700	1409
Volume to Capacity	0.10	0.29
Queue Length 95th (ft)	0	31
Control Delay (s)	0.0	7.2
Lane LOS		A
Approach Delay (s)	0.0	7.2
Approach LOS		

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	41.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

11/6/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1533	1770	3539	1556	1770	3402		1770	3347	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1533	1770	3539	1556	1770	3402		1770	3347	
Volume (vph)	304	592	267	100	431	147	256	508	148	308	414	141
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	313	610	275	103	444	152	264	524	153	318	427	145
RTOR Reduction (vph)	0	0	83	0	0	75	0	30	0	0	37	0
Lane Group Flow (vph)	313	610	192	103	444	77	264	647	0	318	535	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.0	26.0	26.0	16.0	29.0	29.0	16.0	16.0		16.0	16.0	
Effective Green, g (s)	13.0	26.0	26.0	16.0	29.0	29.0	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.14	0.29	0.29	0.18	0.32	0.32	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	496	538	443	315	1140	501	315	605		315	595	
v/s Ratio Prot	0.09	c0.33		0.06	c0.13		0.15	c0.19		c0.18	0.16	
v/s Ratio Perm			0.13			0.05						
v/c Ratio	0.63	1.13	0.43	0.33	0.39	0.15	0.84	1.07		1.01	0.90	
Uniform Delay, d1	36.2	32.0	26.0	32.3	23.6	21.8	35.7	37.0		37.0	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	81.2	0.7	2.8	0.2	0.1	22.6	56.3		53.1	16.3	
Delay (s)	38.9	113.2	26.7	35.1	23.9	21.9	58.3	93.3		90.1	52.6	
Level of Service	D	F	C	D	C	C	E	F		F	D	
Approach Delay (s)		73.9			25.1			83.5			66.0	
Approach LOS		E			C			F			E	

Intersection Summary					
HCM Average Control Delay	65.3	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.90				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	86.0%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley 11/6/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.96	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Volume (vph)	133	711	134	367	617	358	173	550	330	400	415	88
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)	140	748	141	386	649	377	182	579	347	421	437	93
RTOR Reduction (vph)	0	0	58	0	0	271	0	0	136	0	0	61
Lane Group Flow (vph)	140	748	83	386	649	106	182	579	211	421	437	32
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	11.6	19.0	19.0	18.0	25.4	25.4	13.6	16.0	16.0	21.0	23.4	23.4
Effective Green, g (s)	11.6	19.0	19.0	18.0	25.4	25.4	13.6	16.0	16.0	21.0	23.4	23.4
Actuated g/C Ratio	0.13	0.21	0.21	0.20	0.28	0.28	0.15	0.18	0.18	0.23	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	228	747	327	354	999	430	267	629	270	413	920	402
v/s Ratio Prot	0.08	c0.21		c0.22	0.18		0.10	c0.16		c0.24	0.12	
v/s Ratio Perm			0.05			0.07			0.14			0.02
v/c Ratio	0.61	1.00	0.26	1.09	0.65	0.25	0.68	0.92	0.78	1.02	0.47	0.08
Uniform Delay, d1	37.1	35.5	29.6	36.0	28.4	24.9	36.2	36.4	35.3	34.5	28.1	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	33.3	1.9	74.3	3.3	1.4	7.0	18.9	13.3	49.3	0.4	0.1
Delay (s)	41.9	68.8	31.5	110.3	31.7	26.3	43.1	55.3	48.6	83.8	28.5	25.2
Level of Service	D	E	C	F	C	C	D	E	D	F	C	C
Approach Delay (s)		60.0			51.7			51.2			52.7	
Approach LOS		E			D			D			D	

Intersection Summary				
HCM Average Control Delay	53.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	90.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

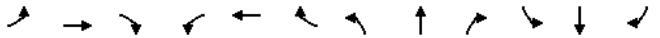
HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	19	286	33	6	277	28	26	52	7	30	23	8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	20	308	35	6	298	30	28	56	8	32	25	9
Pedestrians		1			2			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	328			349			720	713	333	729	716	314
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			349			720	713	333	729	716	314
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			91	84	99	89	93	99
cM capacity (veh/h)	1232			1204			312	348	704	287	346	726

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	363	334	91	66
Volume Left	20	6	28	32
Volume Right	35	30	8	9
cSH	1232	1204	350	335
Volume to Capacity	0.02	0.01	0.26	0.20
Queue Length 95th (ft)	1	0	26	18
Control Delay (s)	0.6	0.2	18.9	18.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.6	0.2	18.9	18.3
Approach LOS			C	C

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	39.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/6/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	143	519	0	0	396	0	103	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	152	552	0	0	421	0	110	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	421			552			1278	1278	552	1278	1278	421
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	421			552			1278	1278	552	1278	1278	421
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			15	100	100	100	100	100
cM capacity (veh/h)	1138			1018			128	144	533	128	144	632

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	152	552	421	110
Volume Left	152	0	0	110
Volume Right	0	0	0	0
cSH	1138	1700	1700	128
Volume to Capacity	0.13	0.32	0.25	0.85
Queue Length 95th (ft)	12	0	0	133
Control Delay (s)	8.7	0.0	0.0	108.7
Lane LOS	A			F
Approach Delay (s)	1.9		0.0	108.7
Approach LOS				F

Intersection Summary				
Average Delay	10.7			
Intersection Capacity Utilization	44.5%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/6/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	255	156	0	187	0	0	0	407	0	139
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	266	162	0	195	0	0	0	424	0	145
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							None			None	
Median storage veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	195			428			686	542	542	623	195
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	195			428			686	542	542	623	195
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	6	100	83
cM capacity (veh/h)	1378			1131			300	448	451	402	847

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	428	195	424	145
Volume Left	0	0	424	0
Volume Right	162	0	0	145
cSH	1700	1700	451	847
Volume to Capacity	0.25	0.11	0.94	0.17
Queue Length 95th (ft)	0	0	275	15
Control Delay (s)	0.0	0.0	58.9	10.1
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	46.5	
Approach LOS			E	

Intersection Summary				
Average Delay	22.2			
Intersection Capacity Utilization	38.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 11/6/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	717	2	0	2	4	344
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	779	2	0	2	4	374
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	0		1561	1559	1559	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1561	1559	1559	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	52		100	96	93	66
cM capacity (veh/h)	1623		35	58	58	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	779	2	2	378
Volume Left	779	0	0	0
Volume Right	0	2	0	374
cSH	1623	1700	58	903
Volume to Capacity	0.48	0.00	0.04	0.42
Queue Length 95th (ft)	68	0	3	52
Control Delay (s)	9.2	0.0	69.0	11.8
Lane LOS	A		F	B
Approach Delay (s)	9.2		69.0	11.8
Approach LOS			F	B

Intersection Summary			
Average Delay	10.2		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 11/6/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	705	58	43	209	55	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	766	63	47	227	60	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1596	0	1588	1564
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1596	0	1588	1564
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	53		17	79	0	80
cM capacity (veh/h)	1623		56	1085	14	59

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	829	47	227	72
Volume Left	766	0	0	60
Volume Right	63	0	227	0
cSH	1623	56	1085	16
Volume to Capacity	0.47	0.83	0.21	4.35
Queue Length 95th (ft)	65	91	20	Err
Control Delay (s)	8.8	189.9	9.2	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.8	40.0		Err
Approach LOS		E		F

Intersection Summary			
Average Delay	626.0		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1800		1770	1863	1583	1770	1863	1583
Flt Permitted	0.65	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1215	1863	1583	1356	1800		1770	1863	1583	1770	1863	1583
Volume (vph)	179	41	44	47	115	33	37	604	29	20	213	611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	195	45	48	51	125	36	40	657	32	22	232	664
RTOR Reduction (vph)	0	0	38	0	19	0	0	0	7	0	0	320
Lane Group Flow (vph)	195	45	10	51	142	0	40	657	25	22	232	344
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	11.0	11.0	11.0	11.0	11.0		2.8	27.9	27.9	1.3	26.4	26.4
Effective Green, g (s)	11.0	11.0	11.0	11.0	11.0		2.8	27.9	27.9	1.3	26.4	26.4
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.05	0.53	0.53	0.02	0.51	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	256	393	334	286	379		95	996	846	44	942	801
v/s Ratio Prot		0.02			0.08		c0.02	c0.35		0.01	0.12	
v/s Ratio Perm	c0.16		0.01	0.04					0.02			0.22
v/c Ratio	0.76	0.11	0.03	0.18	0.37		0.42	0.66	0.03	0.50	0.25	0.43
Uniform Delay, d1	19.4	16.7	16.4	16.9	17.7		23.9	8.7	5.7	25.1	7.3	8.1
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	12.6	0.1	0.0	0.3	0.6		3.0	1.6	0.0	8.7	0.1	0.4
Delay (s)	31.9	16.8	16.4	17.2	18.3		26.9	10.3	5.8	33.8	7.4	8.5
Level of Service	C	B	B	B	B		C	B	A	C	A	A
Approach Delay (s)		27.0			18.0			11.0			8.8	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX E

Intersection Level of Service Calculations
Cumulative Conditions

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 12/8/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1213	1193	37	0	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	1444	1420	44	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	0
cM capacity (veh/h)	0				0	0

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	722	722	947	517	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	44	10
cSH	0	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner
AM - Cumulative With Wagner
11/13/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3500		1770	3531			1643	1541		1669	1411
Flt Permitted	0.95	1.00		0.95	1.00			0.53	1.00		0.61	1.00
Satd. Flow (perm)	1652	3500		1770	3531			906	1541		1045	1411
Volume (vph)	17	1039	56	45	1034	14	127	29	79	127	55	13
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	1.00	0.84	0.84	0.84
Adj. Flow (vph)	20	1237	67	54	1231	17	151	35	79	151	65	15
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	55	0	0	6
Lane Group Flow (vph)	20	1301	0	54	1247	0	0	186	24	0	216	9
Confl. Peds. (#/hr)	3		16	16		3	24		10	10		24
Confl. Bikes (#/hr)			3						3			4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	2.8	44.0		4.1	45.3			26.6	26.6		26.6	26.6
Effective Green, g (s)	2.8	44.0		4.1	45.3			26.6	26.6		26.6	26.6
Actuated g/C Ratio	0.03	0.51		0.05	0.52			0.31	0.31		0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	53	1776		84	1845			278	473		321	433
v/s Ratio Prot	0.01	c0.37		c0.03	0.35							
v/s Ratio Perm								0.21	0.02		c0.21	0.01
v/c Ratio	0.38	0.73		0.64	0.68			0.67	0.05		0.67	0.02
Uniform Delay, d1	41.1	16.7		40.6	15.3			26.2	21.2		26.2	21.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	2.2		11.9	1.5			4.7	0.0		4.3	0.0
Delay (s)	42.7	18.9		52.5	16.8			30.9	21.2		30.6	21.0
Level of Service	D	B		D	B			C	C		C	C
Approach Delay (s)		19.3			18.3			28.0			30.0	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM Average Control Delay	20.4	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	86.7	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	63.2%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom

12/8/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1426	1770	3539	3505	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1426	1770	3539	3505	
Volume (vph)	78	178	118	1051	918	44
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	90	205	136	1208	1055	51
RTOR Reduction (vph)	0	172	0	0	5	0
Lane Group Flow (vph)	90	33	136	1208	1101	0
Confl. Peds. (#/hr)	39	22	21			21
Confl. Bikes (#/hr)						1
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	9.3	9.3	6.0	40.5	30.5	
Effective Green, g (s)	9.3	9.3	6.0	40.5	30.5	
Actuated g/C Ratio	0.16	0.16	0.10	0.70	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)	266	229	184	2480	1850	
v/s Ratio Prot	c0.05		c0.08	0.34	c0.31	
v/s Ratio Perm		0.02				
v/c Ratio	0.34	0.14	0.74	0.49	0.60	
Uniform Delay, d1	21.5	20.8	25.1	3.9	9.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.3	14.4	0.7	1.4	
Delay (s)	22.3	21.1	39.5	4.6	10.8	
Level of Service	C	C	D	A	B	
Approach Delay (s)	21.5			8.1	10.8	
Approach LOS	C			A	B	

Intersection Summary				
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington

12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	81	60	16	101	0	73	5	12	4	6	24
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	1	103	76	20	128	0	92	6	15	5	8	30

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	180	148	114	43
Volume Left (vph)	1	20	92	5
Volume Right (vph)	76	0	15	30
Hadj (s)	-0.22	0.06	0.12	-0.37
Departure Headway (s)	4.2	4.5	4.8	4.4
Degree Utilization, x	0.21	0.19	0.15	0.05
Capacity (veh/h)	813	751	698	738
Control Delay (s)	8.4	8.6	8.7	7.7
Approach Delay (s)	8.4	8.6	8.7	7.7
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	2	56	144	11	96	13	616	138	26	551	19
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	29	3	71	182	14	122	16	780	175	33	697	24
Pedestrians		2			9			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1718	1774	717	1663	1611	789	724			963		
vC1, stage 1 conf vol	777	777		822	822							
vC2, stage 2 conf vol	941	996		841	789							
vCu, unblocked vol	1718	1774	717	1663	1611	789	724			963		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	68	98	83	0	91	69	98			95		
cM capacity (veh/h)	92	136	426	123	159	388	877			709		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	103	182	135	16	780	175	33	722
Volume Left	29	182	0	16	0	0	33	0
Volume Right	71	0	122	0	0	175	0	24
cSH	205	123	338	877	1700	1700	709	1700
Volume to Capacity	0.50	1.48	0.40	0.02	0.46	0.10	0.05	0.42
Queue Length 95th (ft)	63	318	47	1	0	0	4	0
Control Delay (s)	39.0	317.6	22.6	9.2	0.0	0.0	10.3	0.0
Lane LOS	E	F	C	A			B	
Approach Delay (s)	39.0	191.8		0.2			0.5	
Approach LOS	E	F						

Intersection Summary				
Average Delay	30.5			
Intersection Capacity Utilization	53.7%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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
Frt	1.00	0.92		1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1693		1770	1770		1770	1806		1770	1863	1563
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1693		1770	1770		1770	1806		1770	1863	1563
Volume (vph)	426	177	203	160	172	60	297	387	82	35	376	257
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	192	221	174	187	65	323	421	89	38	409	279
RTOR Reduction (vph)	0	46	0	0	15	0	0	7	0	0	0	124
Lane Group Flow (vph)	463	367	0	174	237	0	323	503	0	38	409	155
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		15.6	15.6		16.0	33.2		4.5	21.7	40.7
Effective Green, g (s)	19.0	19.0		15.6	15.6		16.0	33.2		4.5	21.7	40.7
Actuated g/C Ratio	0.22	0.22		0.18	0.18		0.18	0.38		0.05	0.25	0.46
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	364		313	313		321	679		90	458	791
v/s Ratio Prot	c0.26	0.22		0.10	c0.13		c0.18	0.28		0.02	c0.22	0.04
v/s Ratio Perm												0.06
v/c Ratio	1.22	1.01		0.56	0.76		1.01	0.74		0.42	0.89	0.20
Uniform Delay, d1	34.6	34.6		33.2	34.6		36.1	23.8		40.6	32.2	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	118.6	49.6		2.1	10.0		51.8	7.1		3.2	22.4	0.1
Delay (s)	153.3	84.2		35.3	44.6		88.0	30.9		43.8	54.6	14.2
Level of Service	F	F		D	D		F	C		D	D	B
Approach Delay (s)		120.7			40.8			53.0			38.5	
Approach LOS		F			D			D			D	

Intersection Summary				
HCM Average Control Delay	68.3	HCM Level of Service		E
HCM Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	88.3	Sum of lost time (s)		16.0
Intersection Capacity Utilization	86.2%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1790		1770	1863	1583	1770	3280		1770	3376	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1790		1770	1863	1583	1770	3280		1770	3376	
Volume (vph)	276	399	123	266	454	166	151	297	222	183	685	263
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	300	434	134	289	493	180	164	323	241	199	745	286
RTOR Reduction (vph)	0	12	0	0	0	120	0	149	0	0	45	0
Lane Group Flow (vph)	300	556	0	289	493	60	164	415	0	199	986	0
Confl. Peds. (#/hr)			3	3			3		1	1		3
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.0	26.0		14.0	30.0	30.0	8.0	21.5		12.5	26.0	
Effective Green, g (s)	10.0	26.0		14.0	30.0	30.0	8.0	21.5		12.5	26.0	
Actuated g/C Ratio	0.11	0.29		0.16	0.33	0.33	0.09	0.24		0.14	0.29	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	517		275	621	528	157	784		246	975	
v/s Ratio Prot	0.09	c0.31		c0.16	c0.26		c0.09	0.13		c0.11	c0.29	
v/s Ratio Perm						0.04						
v/c Ratio	0.79	1.08		1.05	0.79	0.11	1.04	0.53		0.81	1.01	
Uniform Delay, d1	39.0	32.0		38.0	27.2	20.8	41.0	29.8		37.6	32.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	61.3		68.3	6.9	0.1	84.1	2.5		17.5	31.7	
Delay (s)	49.3	93.3		106.3	34.1	20.9	125.1	32.4		55.1	63.7	
Level of Service	D	F		F	C	C	F	C		E	E	
Approach Delay (s)		78.1			53.3			53.3			62.3	
Approach LOS		E			D			D			E	

Intersection Summary				
HCM Average Control Delay	61.9	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.03			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	92.4%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley

12/8/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.84	1.00	1.00	0.96		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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1532	3433	3539	1328	1610	3357	1514		3458	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1532	3433	3539	1328	1610	3357	1514		3458	1545
Volume (vph)	300	1172	767	311	1516	298	480	573	438	368	418	233
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	337	1317	862	349	1703	335	539	644	492	413	470	262
RTOR Reduction (vph)	0	0	346	0	0	106	0	0	179	0	0	167
Lane Group Flow (vph)	337	1317	516	349	1703	229	381	802	313	0	883	95
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	15.6	39.8	39.8	17.1	41.3	41.3	33.8	33.8	33.8		29.7	29.7
Effective Green, g (s)	15.8	41.5	41.5	17.3	43.0	43.0	34.0	34.0	34.0		31.0	31.0
Actuated g/C Ratio	0.11	0.30	0.30	0.12	0.31	0.31	0.24	0.24	0.24		0.22	0.22
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	388	1051	455	425	1089	408	392	816	368		767	343
v/s Ratio Prot	0.10	0.37		c0.10	c0.48		0.24	c0.24			c0.26	
v/s Ratio Perm			0.34			0.17			0.21			0.06
v/c Ratio	0.87	1.25	1.13	0.82	1.56	0.56	0.97	0.98	0.85		1.15	0.28
Uniform Delay, d1	61.0	49.2	49.2	59.7	48.4	40.5	52.4	52.6	50.5		54.4	45.1
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	18.2	121.8	84.3	12.0	258.2	2.9	37.9	27.1	17.0		82.7	0.5
Delay (s)	79.2	171.0	133.5	71.8	306.6	43.4	90.3	79.7	67.5		137.1	45.6
Level of Service	E	F	F	E	F	D	F	E	E		F	D
Approach Delay (s)		145.8			235.3			78.5			116.2	
Approach LOS		F			F			E			F	

Intersection Summary				
HCM Average Control Delay	154.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	139.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	109.1%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough

Cumulative AM
12/9/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	213	0	364	100	626	0	0	825	468
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.79	0.92	0.79	0.79	0.79	0.79	0.92
Hourly flow rate (vph)	0	0	0	270	0	461	109	792	0	0	1044	509
Pedestrians											1	
Lane Width (ft)											12.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								519				
pX, platoon unblocked	0.70	0.70		0.70	0.70	0.70				0.70		
vC, conflicting volume	2055	2054	1044	2054	2563	793	1553			792		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2514	2512	1044	2512	3242	704	1553			702		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	0	100	0	75			100		
cM capacity (veh/h)	0	15	278	11	5	304	426			624		

Direction, Lane #	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	270	461	109	792	1044	509
Volume Left	270	0	109	0	0	0
Volume Right	0	461	0	0	0	509
cSH	11	304	426	1700	1700	1700
Volume to Capacity	25.22	1.51	0.25	0.47	0.61	0.30
Queue Length 95th (ft)	Err	654	25	0	0	0
Control Delay (s)	Err	278.6	16.3	0.0	0.0	0.0
Lane LOS	F	F	C			
Approach Delay (s)	3866.9		2.0		0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	887.4			
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	330	0	40	0	0	0	0	496	51	205	883	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	402	0	49	0	0	0	0	605	62	250	1077	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	2213	2244	1077	2262	2213	636	1077			667		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2213	2244	1077	2262	2213	636	1077			667		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	82	100	100	100	100			73		
cM capacity (veh/h)	25	31	266	19	32	478	648			923		

Direction, Lane #	SE 1	SE 2	NE 1	SW 1	SW 2
Volume Total	402	49	667	250	1077
Volume Left	402	0	0	250	0
Volume Right	0	49	62	0	0
cSH	25	266	1700	923	1700
Volume to Capacity	16.19	0.18	0.39	0.27	0.63
Queue Length 95th (ft)	Err	16	0	28	0
Control Delay (s)	Err	21.5	0.0	10.3	0.0
Lane LOS	F	C		B	
Approach Delay (s)	8920.4		0.0	1.9	
Approach LOS	F				

Intersection Summary				
Average Delay	1647.2			
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom 12/8/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1554	1770	3539	1583	1770	3344		1770	3501	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1554	1770	3539	1583	1770	3344		1770	3501	
Volume (vph)	234	621	151	53	558	196	292	560	264	301	468	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	690	168	59	620	218	324	622	293	334	520	31
RTOR Reduction (vph)	0	0	33	0	0	59	0	47	0	0	3	0
Lane Group Flow (vph)	260	690	135	59	620	159	324	869	0	334	548	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.8	43.0	43.0	16.0	45.2	45.2	26.0	27.0		18.0	19.0	
Effective Green, g (s)	13.8	43.0	43.0	16.0	45.2	45.2	26.0	27.0		18.0	19.0	
Actuated g/C Ratio	0.12	0.36	0.36	0.13	0.38	0.38	0.22	0.22		0.15	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	668	557	236	1333	596	384	752		266	554	
v/s Ratio Prot	0.08	c0.37		0.03	c0.18		0.18	c0.26		c0.19	0.16	
v/s Ratio Perm			0.09			0.10						
v/c Ratio	0.66	1.03	0.24	0.25	0.47	0.27	0.84	1.15		1.26	0.99	
Uniform Delay, d1	50.8	38.5	27.0	46.6	28.3	25.9	45.1	46.5		51.0	50.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	43.6	0.2	2.5	0.3	0.2	19.8	84.4		142.0	34.9	
Delay (s)	54.8	82.1	27.3	49.1	28.5	26.2	64.8	130.9		193.0	85.3	
Level of Service	D	F	C	D	C	C	E	F		F	F	
Approach Delay (s)		67.5			29.3			113.7			125.9	
Approach LOS		E			C			F			F	

Intersection Summary				
HCM Average Control Delay	85.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	90.1%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Volume (vph)	92	507	139	280	484	260	182	530	240	282	416	91
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	111	611	167	337	583	313	219	639	289	340	501	110
RTOR Reduction (vph)	0	0	93	0	0	213	0	0	116	0	0	74
Lane Group Flow (vph)	111	611	74	337	583	100	219	639	173	340	501	36
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	7.1	17.8	17.8	15.0	25.7	25.7	12.9	16.0	16.0	16.0	19.1	19.1
Effective Green, g (s)	7.1	17.8	17.8	15.0	25.7	25.7	12.9	16.0	16.0	16.0	19.1	19.1
Actuated g/C Ratio	0.09	0.22	0.22	0.19	0.32	0.32	0.16	0.20	0.20	0.20	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	156	780	343	329	1126	494	283	701	307	350	837	363
v/s Ratio Prot	0.06	c0.17		c0.19	0.16		0.12	c0.18		c0.19	c0.14	
v/s Ratio Perm			0.05			0.06			0.11			0.02
v/c Ratio	0.71	0.78	0.22	1.02	0.52	0.20	0.77	0.91	0.56	0.97	0.60	0.10
Uniform Delay, d1	35.9	29.7	25.8	32.9	22.5	20.1	32.6	31.7	29.2	32.2	27.4	24.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	7.7	1.4	56.0	1.7	0.9	12.4	16.1	2.4	40.3	1.2	0.1
Delay (s)	50.1	37.4	27.2	88.9	24.2	21.0	44.9	47.8	31.6	72.5	28.6	24.2
Level of Service	D	D	C	F	C	C	D	D	C	E	C	C
Approach Delay (s)		37.1			41.1			43.2			43.8	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	41.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	73.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	177	23	5	229	19	23	22	1	57	26	4
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	19	253	33	7	327	27	33	31	1	81	37	6
Pedestrians		1			2			7			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	358			293			694	686	278	685	689	346
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	358			293			694	686	278	685	689	346
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			90	91	100	75	90	99
cM capacity (veh/h)	1196			1261			317	359	755	328	358	694

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	304	361	66	124
Volume Left	19	7	33	81
Volume Right	33	27	1	6
cSH	1196	1261	340	345
Volume to Capacity	0.02	0.01	0.19	0.36
Queue Length 95th (ft)	1	0	18	40
Control Delay (s)	0.6	0.2	18.1	21.2
Lane LOS	A	A	C	C
Approach Delay (s)	0.6	0.2	18.1	21.2
Approach LOS			C	C

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	31.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 12/10/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	137	544	0	0	402	0	102	0	0	0	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)	144	573	0	0	423	0	107	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	423			573			1284	1284	573	1284	1284	423
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	423			573			1284	1284	573	1284	1284	423
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			16	100	100	100	100	100
cM capacity (veh/h)	1136			1000			128	144	519	128	144	631

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	144	573	423	107
Volume Left	144	0	0	107
Volume Right	0	0	0	0
cSH	1136	1700	1700	128
Volume to Capacity	0.13	0.34	0.25	0.84
Queue Length 95th (ft)	11	0	0	130
Control Delay (s)	8.6	0.0	0.0	106.3
Lane LOS	A			F
Approach Delay (s)	1.7		0.0	106.3
Approach LOS				F

Intersection Summary				
Average Delay	10.1			
Intersection Capacity Utilization	44.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	249	149	0	218	0	0	0	624	0	151
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	286	171	0	251	0	0	0	717	0	174
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	251			457			796	622	622	708	251
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	251			457			796	622	622	708	251
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	0	100	78
cM capacity (veh/h)	1315			1103			238	403	399	360	788

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	457	251	717	174
Volume Left	0	0	717	0
Volume Right	171	0	0	174
cSH	1700	1700	399	788
Volume to Capacity	0.27	0.15	1.80	0.22
Queue Length 95th (ft)	0	0	1142	21
Control Delay (s)	0.0	0.0	392.6	10.9
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	318.2	
Approach LOS			F	

Intersection Summary				
Average Delay	177.3			
Intersection Capacity Utilization	49.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 12/8/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	568	36	45	272	289	96
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	617	39	49	296	314	104
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1274	0	1279	1254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1274	0	1279	1254
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	62		53	73	0	2
cM capacity (veh/h)	1623		104	1085	48	106

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	657	49	296	418
Volume Left	617	0	0	314
Volume Right	39	0	296	0
cSH	1623	104	1085	55
Volume to Capacity	0.38	0.47	0.27	7.59
Queue Length 95th (ft)	45	52	28	Err
Control Delay (s)	8.3	67.6	9.6	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.3	17.8		Err
Approach LOS		C		F

Intersection Summary				
Average Delay	2955.8			
Intersection Capacity Utilization	68.0%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport 12/8/2008

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	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	0.89		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1659		1770	1863	1583	1770	1863	1583
Flt Permitted	0.73	1.00	1.00	0.67	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1863	1583	1249	1659		1770	1863	1583	1770	1863	1583
Volume (vph)	391	124	52	20	9	25	14	487	99	32	378	588
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	425	135	57	22	10	27	15	529	108	35	411	639
RTOR Reduction (vph)	0	0	38	0	18	0	0	0	38	0	0	380
Lane Group Flow (vph)	425	135	19	22	19	0	15	529	70	35	411	259
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		1.3	19.2	19.2	2.5	20.4	20.4
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		1.3	19.2	19.2	2.5	20.4	20.4
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.03	0.38	0.38	0.05	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	452	617	525	414	550		46	710	603	88	754	641
v/s Ratio Prot		0.07			0.01		0.01	c0.28		c0.02	0.22	
v/s Ratio Perm	c0.31		0.01	0.02					0.04			0.16
v/c Ratio	0.94	0.22	0.04	0.05	0.03		0.33	0.75	0.12	0.40	0.55	0.40
Uniform Delay, d1	16.4	12.1	11.4	11.5	11.4		24.1	13.5	10.1	23.2	11.5	10.7
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	27.8	0.2	0.0	0.1	0.0		4.1	4.3	0.1	2.9	0.8	0.4
Delay (s)	44.2	12.3	11.4	11.5	11.4		28.2	17.7	10.2	26.2	12.3	11.1
Level of Service	D	B	B	B	B		C	B	B	C	B	B
Approach Delay (s)		34.2			11.5			16.7			12.0	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM Average Control Delay	19.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	61.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 12/8/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1448	1550	76	0	15
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1508	1615	79	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.66	
vC, conflicting volume	1694				2408	847
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1694				2621	847
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	95
cM capacity (veh/h)	373				13	305

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	754	754	1076	617	16
Volume Left	0	0	0	0	0
Volume Right	0	0	0	79	16
cSH	1700	1700	1700	1700	305
Volume to Capacity	0.44	0.44	0.63	0.36	0.05
Queue Length 95th (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	17.4
Lane LOS					C
Approach Delay (s)	0.0		0.0		17.4
Approach LOS					C

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	55.3%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.96		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3475		1770	3526			1640	1515		1658	1396
Flt Permitted	0.95	1.00		0.95	1.00			0.61	1.00		0.53	1.00
Satd. Flow (perm)	1652	3475		1770	3526			1040	1515		909	1396
Volume (vph)	40	1284	130	76	1286	24	168	56	91	113	44	27
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	1324	134	78	1326	25	173	58	94	116	45	28
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	68	0	0	15
Lane Group Flow (vph)	41	1452	0	78	1350	0	0	231	26	0	161	13
Confl. Peds. (#/hr)	11		9	9		11	27		19	19		27
Confl. Bikes (#/hr)			2						6			8
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	4.8	49.3		6.5	51.0			26.6	26.6		26.6	26.6
Effective Green, g (s)	4.8	49.3		6.5	51.0			26.6	26.6		26.6	26.6
Actuated g/C Ratio	0.05	0.52		0.07	0.54			0.28	0.28		0.28	0.28
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	84	1815		122	1905			293	427		256	393
v/s Ratio Prot	0.02	c0.42		c0.04	0.38							
v/s Ratio Perm								c0.22	0.02		0.18	0.01
v/c Ratio	0.49	0.80		0.64	0.71			0.79	0.06		0.63	0.03
Uniform Delay, d1	43.6	18.5		42.8	16.2			31.3	24.8		29.6	24.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	3.1		7.8	1.8			12.2	0.0		3.5	0.0
Delay (s)	45.2	21.6		50.6	18.0			43.5	24.8		33.0	24.6
Level of Service	D	C		D	B			D	C		C	C
Approach Delay (s)		22.3			19.8			38.1			31.8	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	94.4	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

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport

12/8/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	594	2	3	6	5	445
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	646	2	3	7	5	484
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	0		1294	1291	1291	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1294	1291	1291	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	60		94	93	94	55
cM capacity (veh/h)	1623		51	98	98	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	646	2	10	489
Volume Left	646	0	3	0
Volume Right	0	2	0	484
cSH	1623	1700	75	976
Volume to Capacity	0.40	0.00	0.13	0.50
Queue Length 95th (ft)	49	0	11	72
Control Delay (s)	8.7	0.0	59.9	12.3
Lane LOS	A		F	B
Approach Delay (s)	8.6		59.9	12.3
Approach LOS			F	B

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom

12/8/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1454	1770	3539	3509	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1454	1770	3539	3509	
Volume (vph)	50	260	266	1305	1053	49
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	274	280	1374	1108	52
RTOR Reduction (vph)	0	232	0	0	5	0
Lane Group Flow (vph)	53	42	280	1374	1155	0
Confl. Peds. (#/hr)		4	10			10
Confl. Bikes (#/hr)						2
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	7.9	7.9	10.7	36.1	21.4	
Effective Green, g (s)	7.9	7.9	10.7	36.1	21.4	
Actuated g/C Ratio	0.15	0.15	0.21	0.69	0.41	
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)	251	221	364	2457	1444	
v/s Ratio Prot	c0.03		c0.16	0.39	c0.33	
v/s Ratio Perm		0.03				
v/c Ratio	0.21	0.19	0.77	0.56	0.80	
Uniform Delay, d1	19.3	19.3	19.5	4.0	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.4	9.4	0.9	4.7	
Delay (s)	19.7	19.7	28.9	4.9	18.1	
Level of Service	B	B	C	A	B	
Approach Delay (s)	19.7			9.0	18.1	
Approach LOS	B			A	B	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington

12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	9	85	53	10	85	4	55	9	14	2	8	14
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	11	100	62	12	100	5	65	11	16	2	9	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	173	116	92	28
Volume Left (vph)	11	12	65	2
Volume Right (vph)	62	5	16	16
Hadj (s)	-0.17	0.03	0.07	-0.30
Departure Headway (s)	4.1	4.4	4.6	4.4
Degree Utilization, x	0.20	0.14	0.12	0.03
Capacity (veh/h)	838	780	727	757
Control Delay (s)	8.2	8.1	8.3	7.5
Approach Delay (s)	8.2	8.1	8.3	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	60	3	63	96	16	96	70	665	96	22	793	45
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	64	3	67	102	17	102	74	707	102	23	844	48
Pedestrians		8			12			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1890	1893	877	1828	1815	720	899			822		
vC1, stage 1 conf vol	922	922		868	868							
vC2, stage 2 conf vol	968	971		960	946							
vCu, unblocked vol	1890	1893	877	1828	1815	720	899			822		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	26	97	81	0	86	76	90			97		
cM capacity (veh/h)	86	122	345	85	120	423	750			800		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	134	102	119	74	707	102	23	891
Volume Left	64	102	0	74	0	0	23	0
Volume Right	67	0	102	0	0	102	0	48
cSH	139	85	311	750	1700	1700	800	1700
Volume to Capacity	0.96	1.20	0.38	0.10	0.42	0.06	0.03	0.52
Queue Length 95th (ft)	169	183	44	8	0	0	2	0
Control Delay (s)	128.8	248.3	23.6	10.3	0.0	0.0	9.6	0.0
Lane LOS	F	F	C	B			A	
Approach Delay (s)	128.8	127.3		0.9			0.2	
Approach LOS	F	F						

Intersection Summary				
Average Delay	21.6			
Intersection Capacity Utilization	72.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		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
Frt	1.00	0.91		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1664		1770	1823		1770	1726		1770	1863	1562
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1664		1770	1823		1770	1726		1770	1863	1562
Volume (vph)	220	220	363	121	182	22	317	211	147	18	308	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	239	395	132	198	24	345	229	160	20	335	318
RTOR Reduction (vph)	0	66	0	0	5	0	0	24	0	0	0	112
Lane Group Flow (vph)	239	568	0	132	217	0	345	365	0	20	335	206
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		14.8	14.8		16.0	35.6		2.9	22.5	41.5
Effective Green, g (s)	19.0	19.0		14.8	14.8		16.0	35.6		2.9	22.5	41.5
Actuated g/C Ratio	0.22	0.22		0.17	0.17		0.18	0.40		0.03	0.25	0.47
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	358		297	306		321	696		58	475	805
v/s Ratio Prot	0.14	c0.34		0.07	c0.12		c0.19	0.21		0.01	c0.18	0.06
v/s Ratio Perm												0.08
v/c Ratio	0.63	1.59		0.44	0.71		1.07	0.52		0.34	0.71	0.26
Uniform Delay, d1	31.4	34.6		33.1	34.7		36.1	19.9		41.8	29.9	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.2	277.0		1.1	7.3		71.5	2.8		3.6	8.5	0.2
Delay (s)	34.7	311.7		34.1	42.1		107.7	22.7		45.3	38.4	14.3
Level of Service	C	F		C	D		F	C		D	D	B
Approach Delay (s)		235.8			39.1			62.7			27.2	
Approach LOS		F			D			E			C	

Intersection Summary					
HCM Average Control Delay	107.8	HCM Level of Service		F	
HCM Volume to Capacity ratio	1.02				
Actuated Cycle Length (s)	88.3	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	87.7%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1807		1770	1863	1561	1770	3394		1770	3403	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1807		1770	1863	1561	1770	3394		1770	3403	
Volume (vph)	352	418	92	303	350	201	165	795	241	236	503	175
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	363	431	95	312	361	207	170	820	248	243	519	180
RTOR Reduction (vph)	0	7	0	0	0	145	0	26	0	0	31	0
Lane Group Flow (vph)	363	519	0	312	361	62	170	1042	0	243	668	0
Confl. Peds. (#/hr)	1		2	2		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	13.8	29.0		18.0	33.2	33.2	13.3	33.0		14.0	33.7	
Effective Green, g (s)	13.8	29.0		18.0	33.2	33.2	13.3	33.0		14.0	33.7	
Actuated g/C Ratio	0.13	0.26		0.16	0.30	0.30	0.12	0.30		0.13	0.31	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	431	476		290	562	471	214	1018		225	1043	
v/s Ratio Prot	0.11	c0.29		c0.18	0.19		0.10	c0.31		c0.14	0.20	
v/s Ratio Perm						0.04						
v/c Ratio	0.84	1.09		1.08	0.64	0.13	0.79	1.02		1.08	0.64	
Uniform Delay, d1	47.0	40.5		46.0	33.3	27.9	47.0	38.5		48.0	32.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.9	67.7		74.5	2.5	0.1	18.1	34.4		82.9	3.0	
Delay (s)	60.9	108.2		120.5	35.8	28.1	65.1	72.9		130.9	35.9	
Level of Service	E	F		F	D	C	E	E		F	D	
Approach Delay (s)		88.9			64.0			71.8			60.4	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	71.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Main & Harkins Slough

12/8/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97		1.00	0.95
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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1545	3433	3539	1551	1610	3316	1539		3461	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1545	3433	3539	1551	1610	3316	1539		3461	1507
Volume (vph)	518	1520	227	401	1300	362	788	475	423	284	344	255
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	551	1617	241	427	1383	385	838	505	450	302	366	271
RTOR Reduction (vph)	0	0	88	0	0	140	0	0	195	0	0	161
Lane Group Flow (vph)	551	1617	153	427	1383	245	432	911	255	0	668	110
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	18.8	48.0	48.0	16.8	46.0	46.0	36.8	36.8	36.8		29.0	29.0
Effective Green, g (s)	19.0	49.7	49.7	17.0	47.7	47.7	37.0	37.0	37.0		30.3	30.3
Actuated g/C Ratio	0.13	0.33	0.33	0.11	0.32	0.32	0.25	0.25	0.25		0.20	0.20
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	435	1173	512	389	1125	493	397	818	380		699	304
v/s Ratio Prot	0.16	c0.46		0.12	c0.39		0.27	c0.27			c0.19	
v/s Ratio Perm			0.10			0.16			0.17			0.07
v/c Ratio	1.27	1.38	0.30	1.10	1.23	0.50	1.09	1.11	0.67		0.96	0.36
Uniform Delay, d1	65.5	50.1	37.2	66.5	51.1	41.4	56.5	56.5	51.0		59.2	51.5
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	137.2	175.7	0.7	74.6	111.2	1.6	71.0	67.5	4.6		23.6	0.9
Delay (s)	202.7	225.9	37.9	141.1	162.3	43.1	127.5	124.0	55.6		82.8	52.4
Level of Service	F	F	D	F	F	D	F	F	E		F	D
Approach Delay (s)		201.8			137.3			107.7			74.0	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	143.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	221	0	23	0	0	0	0	128	22	406	404	0
Peak Hour Factor	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Hourly flow rate (vph)	240	0	25	0	0	0	0	144	25	456	454	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	1522	1535	454	1547	1522	156	454			169		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1522	1535	454	1547	1522	156	454			169		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	96	100	100	100	100			68		
cM capacity (veh/h)	73	79	606	67	80	889	1107			1409		

Direction, Lane #	SE 1	SE 2	NE 1	SW 1	SW 2
Volume Total	240	25	169	456	454
Volume Left	240	0	0	456	0
Volume Right	0	25	25	0	0
cSH	73	606	1700	1409	1700
Volume to Capacity	3.31	0.04	0.10	0.32	0.27
Queue Length 95th (ft)	Err	3	0	35	0
Control Delay (s)	Err	11.2	0.0	8.8	0.0
Lane LOS	F	B		A	
Approach Delay (s)	9057.5		0.0	4.4	
Approach LOS	F				

Intersection Summary				
Average Delay	1790.5			
Intersection Capacity Utilization	57.0%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/8/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1533	1770	3539	1556	1770	3404		1770	3358	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1533	1770	3539	1556	1770	3404		1770	3358	
Volume (vph)	343	583	240	116	479	167	269	566	162	330	468	146
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	354	601	247	120	494	172	277	584	167	340	482	151
RTOR Reduction (vph)	0	0	75	0	0	77	0	30	0	0	33	0
Lane Group Flow (vph)	354	601	172	120	494	95	277	721	0	340	600	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.8	26.0	26.0	16.0	28.2	28.2	16.0	16.0		16.0	16.0	
Effective Green, g (s)	13.8	26.0	26.0	16.0	28.2	28.2	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.15	0.29	0.29	0.18	0.31	0.31	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	526	538	443	315	1109	488	315	605		315	597	
v/s Ratio Prot	0.10	c0.32		0.07	c0.14		0.16	c0.21		c0.19	0.18	
v/s Ratio Perm			0.11			0.06						
v/c Ratio	0.67	1.12	0.39	0.38	0.45	0.19	0.88	1.19		1.08	1.01	
Uniform Delay, d1	36.0	32.0	25.6	32.6	24.7	22.6	36.1	37.0		37.0	37.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	75.1	0.6	3.5	0.3	0.2	27.6	102.2		73.5	38.1	
Delay (s)	39.4	107.1	26.2	36.1	24.9	22.8	63.7	139.2		110.5	75.1	
Level of Service	D	F	C	D	C	C	E	F		F	E	
Approach Delay (s)		70.5			26.2			118.8			87.5	
Approach LOS		E			C			F			F	

Intersection Summary					
HCM Average Control Delay	78.4	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.94				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	89.7%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
12: Freedom & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.96	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Volume (vph)	169	699	167	371	622	359	238	711	334	392	478	106
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)	178	736	176	391	655	378	251	748	352	413	503	112
RTOR Reduction (vph)	0	0	73	0	0	276	0	0	107	0	0	66
Lane Group Flow (vph)	178	736	103	391	655	102	251	748	245	413	503	46
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	12.6	19.0	19.0	18.0	24.4	24.4	15.7	16.0	16.0	21.0	21.3	21.3
Effective Green, g (s)	12.6	19.0	19.0	18.0	24.4	24.4	15.7	16.0	16.0	21.0	21.3	21.3
Actuated g/C Ratio	0.14	0.21	0.21	0.20	0.27	0.27	0.17	0.18	0.18	0.23	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	248	747	327	354	959	413	309	629	270	413	838	366
v/s Ratio Prot	0.10	c0.21		c0.22	0.19		0.14	c0.21		c0.23	0.14	
v/s Ratio Perm			0.07			0.07			0.16			0.03
v/c Ratio	0.72	0.99	0.32	1.10	0.68	0.25	0.81	1.19	0.91	1.00	0.60	0.12
Uniform Delay, d1	37.0	35.4	30.0	36.0	29.3	25.6	35.7	37.0	36.3	34.5	30.6	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.5	29.5	2.5	79.0	3.9	1.4	14.9	100.4	31.4	44.3	1.2	0.2
Delay (s)	46.5	64.9	32.5	115.0	33.3	27.1	50.6	137.4	67.7	78.8	31.8	27.2
Level of Service	D	E	C	F	C	C	D	F	E	E	C	C
Approach Delay (s)		56.7			54.1			103.1			50.2	
Approach LOS		E			D			F			D	

Intersection Summary				
HCM Average Control Delay	67.4	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.06			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	94.6%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington

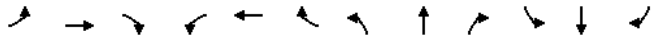
12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	27	263	35	2	254	12	26	22	2	19	15	5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	29	283	38	2	273	13	28	24	2	20	16	5
Pedestrians		1			2			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	286			326			664	656	310	660	668	281
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286			326			664	656	310	660	668	281
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			92	94	100	94	96	99
cM capacity (veh/h)	1276			1227			349	374	726	349	368	758

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	349	288	54	42
Volume Left	29	2	28	20
Volume Right	38	13	2	5
cSH	1276	1227	367	383
Volume to Capacity	0.02	0.00	0.15	0.11
Queue Length 95th (ft)	2	0	13	9
Control Delay (s)	0.9	0.1	16.5	15.6
Lane LOS	A	A	C	C
Approach Delay (s)	0.9	0.1	16.5	15.6
Approach LOS			C	C

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	45.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 12/10/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	141	606	0	0	416	0	103	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	150	645	0	0	443	0	110	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	443			645			1387	1387	645	1387	1387	443
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	443			645			1387	1387	645	1387	1387	443
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			0	100	100	100	100	100
cM capacity (veh/h)	1117			940			108	124	472	108	124	615

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	150	645	443	110
Volume Left	150	0	0	110
Volume Right	0	0	0	0
cSH	1117	1700	1700	108
Volume to Capacity	0.13	0.38	0.26	1.02
Queue Length 95th (ft)	12	0	0	163
Control Delay (s)	8.7	0.0	0.0	165.5
Lane LOS	A			F
Approach Delay (s)	1.6		0.0	165.5
Approach LOS				F

Intersection Summary				
Average Delay	14.4			
Intersection Capacity Utilization	45.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	253	150	0	171	0	0	0	614	0	146
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	264	156	0	178	0	0	0	640	0	152
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	178			420			672	520	520	598	178
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	178			420			672	520	520	598	178
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	0	100	82
cM capacity (veh/h)	1398			1139			305	461	467	416	865

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	420	178	640	152
Volume Left	0	0	640	0
Volume Right	156	0	0	152
cSH	1700	1700	467	865
Volume to Capacity	0.25	0.10	1.37	0.18
Queue Length 95th (ft)	0	0	742	16
Control Delay (s)	0.0	0.0	204.1	10.0
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	166.8	
Approach LOS			F	

Intersection Summary				
Average Delay	95.0			
Intersection Capacity Utilization	49.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 12/8/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	678	3	2	2	5	429
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	737	3	2	2	5	466
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	0		1477	1474	1474	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1477	1474	1474	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	55		94	97	92	57
cM capacity (veh/h)	1623		36	69	69	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	737	3	4	472
Volume Left	737	0	2	0
Volume Right	0	3	0	466
cSH	1623	1700	47	928
Volume to Capacity	0.45	0.00	0.09	0.51
Queue Length 95th (ft)	61	0	7	74
Control Delay (s)	9.0	0.0	88.3	12.8
Lane LOS	A		F	B
Approach Delay (s)	9.0		88.3	12.8
Approach LOS			F	B

Intersection Summary			
Average Delay	10.8		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 12/8/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	671	58	70	218	236	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	729	63	76	237	257	107
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1522	0	1528	1490
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1522	0	1528	1490
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	55		0	78	0	0
cM capacity (veh/h)	1623		65	1085	0	68

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	792	76	237	363
Volume Left	729	0	0	257
Volume Right	63	0	237	0
cSH	1623	65	1085	0
Volume to Capacity	0.45	1.17	0.22	Err
Queue Length 95th (ft)	60	152	21	Err
Control Delay (s)	8.6	272.4	9.2	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.6	73.2		Err
Approach LOS		F		F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1769		1770	1863	1583	1770	1863	1583
Flt Permitted	0.65	1.00	1.00	0.71	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1210	1863	1583	1319	1769		1770	1863	1583	1770	1863	1583
Volume (vph)	316	69	69	66	104	52	37	470	23	27	299	607
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	75	75	72	113	57	40	511	25	29	325	660
RTOR Reduction (vph)	0	0	50	0	27	0	0	0	9	0	0	411
Lane Group Flow (vph)	343	75	25	72	143	0	40	511	16	29	325	249
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		2.6	19.0	19.0	2.6	19.0	19.0
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		2.6	19.0	19.0	2.6	19.0	19.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.05	0.38	0.38	0.05	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	402	619	526	438	587		91	704	598	91	704	598
v/s Ratio Prot		0.04			0.08		c0.02	c0.27		0.02	0.17	
v/s Ratio Perm	c0.28		0.02	0.05					0.01			0.16
v/c Ratio	0.85	0.12	0.05	0.16	0.24		0.44	0.73	0.03	0.32	0.46	0.42
Uniform Delay, d1	15.7	11.7	11.4	11.9	12.2		23.1	13.4	9.8	23.0	11.8	11.6
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	15.9	0.1	0.0	0.2	0.2		3.4	3.7	0.0	2.0	0.5	0.5
Delay (s)	31.6	11.8	11.4	12.0	12.4		26.5	17.1	9.9	25.0	12.3	12.0
Level of Service	C	B	B	B	B		C	B	A	C	B	B
Approach Delay (s)		25.5			12.3			17.5			12.5	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	50.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX F

Intersection Level of Service Calculations
Cumulative + Project Conditions

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson

12/8/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1218	1193	38	0	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	1450	1420	45	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.72	
vC, conflicting volume	1465				2168	733
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1465				2233	733
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	457				26	363

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	725	725	947	519	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	45	10
cSH	1700	1700	1700	1700	363
Volume to Capacity	0.43	0.43	0.56	0.31	0.03
Queue Length 95th (ft)	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	15.2
Lane LOS					C
Approach Delay (s)	0.0		0.0		15.2
Approach LOS					C

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3500		1770	3531			1643	1539		1672	1408
Flt Permitted	0.95	1.00		0.95	1.00			0.48	1.00		0.60	1.00
Satd. Flow (perm)	1652	3500		1770	3531			817	1539		1033	1408
Volume (vph)	50	1039	56	45	1116	14	127	29	79	132	67	29
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	1.00	0.84	0.84	0.84
Adj. Flow (vph)	60	1237	67	54	1329	17	151	35	79	157	80	35
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	56	0	0	13
Lane Group Flow (vph)	60	1301	0	54	1345	0	0	186	23	0	237	22
Confl. Peds. (#/hr)	3		16	16		3	24		10	10		24
Confl. Bikes (#/hr)			3						3			4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	7.1	49.5		4.3	46.7			26.5	26.5		26.5	26.5
Effective Green, g (s)	7.1	49.5		4.3	46.7			26.5	26.5		26.5	26.5
Actuated g/C Ratio	0.08	0.54		0.05	0.51			0.29	0.29		0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	127	1877		82	1787			235	442		297	404
v/s Ratio Prot	0.04	c0.37		c0.03	c0.38							
v/s Ratio Perm								0.23	0.01		c0.23	0.02
v/c Ratio	0.47	0.69		0.66	0.75			0.79	0.05		0.80	0.05
Uniform Delay, d1	40.8	15.8		43.3	18.2			30.4	23.8		30.4	23.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	1.7		13.6	2.4			15.5	0.0		13.0	0.0
Delay (s)	41.8	17.5		56.9	20.6			45.8	23.8		43.4	23.9
Level of Service	D	B		E	C			D	C		D	C
Approach Delay (s)		18.5			22.0			39.3			40.9	
Approach LOS		B			C			D			D	

Intersection Summary					
HCM Average Control Delay	23.5	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.78				
Actuated Cycle Length (s)	92.3	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	65.5%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom 12/8/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1426	1770	3539	3494	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1426	1770	3539	3494	
Volume (vph)	138	183	118	1051	918	60
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	159	210	136	1208	1055	69
RTOR Reduction (vph)	0	171	0	0	7	0
Lane Group Flow (vph)	159	39	136	1208	1117	0
Confl. Peds. (#/hr)	39	22	21			21
Confl. Bikes (#/hr)						1
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	10.8	10.8	5.7	38.9	29.2	
Effective Green, g (s)	10.8	10.8	5.7	38.9	29.2	
Actuated g/C Ratio	0.19	0.19	0.10	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)	309	267	175	2386	1768	
v/s Ratio Prot	c0.10		c0.08	0.34	c0.32	
v/s Ratio Perm		0.03				
v/c Ratio	0.51	0.15	0.78	0.51	0.63	
Uniform Delay, d1	21.1	19.6	25.4	4.6	10.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.3	19.2	0.8	1.7	
Delay (s)	22.5	19.9	44.6	5.4	12.1	
Level of Service	C	B	D	A	B	
Approach Delay (s)	21.0			9.4	12.1	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	43	0	507	35	314	0	0	767	288
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	47	0	551	38	341	0	0	834	313
Pedestrians								1			3	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	1805	1251	835	1252	1564	344	1147			341		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1805	1251	835	1252	1564	344	1147			341		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	67	100	21	94			100		
cM capacity (veh/h)	12	162	367	142	105	697	609			1218		

Direction, Lane #	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	47	551	38	341	834	313
Volume Left	47	0	38	0	0	0
Volume Right	0	551	0	0	0	313
cSH	142	697	609	1700	1700	1700
Volume to Capacity	0.33	0.79	0.06	0.20	0.49	0.18
Queue Length 95th (ft)	33	198	5	0	0	0
Control Delay (s)	42.4	26.8	11.3	0.0	0.0	0.0
Lane LOS	E	D	B			
Approach Delay (s)	28.0		1.1		0.0	
Approach LOS	D					

Intersection Summary					
Average Delay	8.1				
Intersection Capacity Utilization	57.0%	ICU Level of Service	B		
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
4: Crestview & Brewington 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	81	60	16	101	5	73	8	12	20	18	89
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	23	103	76	20	128	6	92	10	15	25	23	113

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	201	154	118	161
Volume Left (vph)	23	20	92	25
Volume Right (vph)	76	6	15	113
Hadj (s)	-0.17	0.04	0.11	-0.35
Departure Headway (s)	4.6	4.9	5.1	4.6
Degree Utilization, x	0.26	0.21	0.17	0.20
Capacity (veh/h)	724	685	649	721
Control Delay (s)	9.2	9.2	9.1	8.8
Approach Delay (s)	9.2	9.2	9.1	8.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay			9.1	
HCM Level of Service			A	
Intersection Capacity Utilization		30.4%	ICU Level of Service	A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	2	58	144	11	49	14	616	138	26	551	23
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	47	3	73	182	14	62	18	780	175	33	697	29
Pedestrians		2			9			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1664	1779	720	1668	1619	789	729			963		
vC1, stage 1 conf vol	780	780		824	824							
vC2, stage 2 conf vol	884	999		844	794							
vCu, unblocked vol	1664	1779	720	1668	1619	789	729			963		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	60	98	83	0	91	84	98			95		
cM capacity (veh/h)	116	135	425	122	158	388	874			709		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	123	182	76	18	780	175	33	727
Volume Left	47	182	0	18	0	0	33	0
Volume Right	73	0	62	0	0	175	0	29
cSH	207	122	306	874	1700	1700	709	1700
Volume to Capacity	0.59	1.50	0.25	0.02	0.46	0.10	0.05	0.43
Queue Length 95th (ft)	83	322	24	2	0	0	4	0
Control Delay (s)	45.1	326.3	20.6	9.2	0.0	0.0	10.3	0.0
Lane LOS	E	F	C	A			B	
Approach Delay (s)	45.1	236.4		0.2			0.4	
Approach LOS	E	F						

Intersection Summary						
Average Delay		31.8				
Intersection Capacity Utilization		53.7%	ICU Level of Service			A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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
Frt	1.00	0.92		1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1693		1770	1770		1770	1806		1770	1863	1563
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1693		1770	1770		1770	1806		1770	1863	1563
Volume (vph)	426	177	203	161	172	60	297	399	84	35	379	257
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	192	221	175	187	65	323	434	91	38	412	279
RTOR Reduction (vph)	0	46	0	0	15	0	0	7	0	0	0	124
Lane Group Flow (vph)	463	367	0	175	237	0	323	518	0	38	412	155
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		15.6	15.6		16.0	33.2		4.5	21.7	40.7
Effective Green, g (s)	19.0	19.0		15.6	15.6		16.0	33.2		4.5	21.7	40.7
Actuated g/C Ratio	0.22	0.22		0.18	0.18		0.18	0.38		0.05	0.25	0.46
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	364		313	313		321	679		90	458	791
v/s Ratio Prot	c0.26	0.22		0.10	c0.13		c0.18	0.29		0.02	c0.22	0.04
v/s Ratio Perm												0.06
v/c Ratio	1.22	1.01		0.56	0.76		1.01	0.76		0.42	0.90	0.20
Uniform Delay, d1	34.6	34.6		33.2	34.6		36.1	24.1		40.6	32.2	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	118.6	49.6		2.2	10.0		51.8	7.9		3.2	23.2	0.1
Delay (s)	153.3	84.2		35.4	44.6		88.0	32.0		43.8	55.5	14.2
Level of Service	F	F		D	D		F	C		D	E	B
Approach Delay (s)		120.7			40.8			53.3			39.1	
Approach LOS		F			D			D			D	

Intersection Summary				
HCM Average Control Delay	68.4	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	86.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1790		1770	1863	1583	1770	3282		1770	3371	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1790		1770	1863	1583	1770	3282		1770	3371	
Volume (vph)	276	399	123	266	454	166	151	302	222	183	656	263
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	300	434	134	289	493	180	164	328	241	199	713	286
RTOR Reduction (vph)	0	12	0	0	0	120	0	147	0	0	48	0
Lane Group Flow (vph)	300	556	0	289	493	60	164	422	0	199	951	0
Confl. Peds. (#/hr)			3	3			3		1	1		3
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.0	26.0		14.0	30.0	30.0	8.0	21.5		12.5	26.0	
Effective Green, g (s)	10.0	26.0		14.0	30.0	30.0	8.0	21.5		12.5	26.0	
Actuated g/C Ratio	0.11	0.29		0.16	0.33	0.33	0.09	0.24		0.14	0.29	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	517		275	621	528	157	784		246	974	
v/s Ratio Prot	0.09	c0.31		c0.16	c0.26		c0.09	0.13		c0.11	c0.28	
v/s Ratio Perm						0.04						
v/c Ratio	0.79	1.08		1.05	0.79	0.11	1.04	0.54		0.81	0.98	
Uniform Delay, d1	39.0	32.0		38.0	27.2	20.8	41.0	29.9		37.6	31.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	61.3		68.3	6.9	0.1	84.1	2.6		17.5	23.7	
Delay (s)	49.3	93.3		106.3	34.1	20.9	125.1	32.6		55.1	55.4	
Level of Service	D	F		F	C	C	F	C		E	E	
Approach Delay (s)		78.1			53.3			53.3			55.4	
Approach LOS		E			D			D			E	

Intersection Summary				
HCM Average Control Delay	59.7	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	91.6%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley

12/8/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.84	1.00	1.00	0.96		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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1532	3433	3539	1328	1610	3357	1514		3460	1545
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1532	3433	3539	1328	1610	3357	1514		3460	1545
Volume (vph)	304	1172	767	311	1516	298	480	577	438	368	432	247
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	342	1317	862	349	1703	335	539	648	492	413	485	278
RTOR Reduction (vph)	0	0	344	0	0	106	0	0	179	0	0	167
Lane Group Flow (vph)	342	1317	518	349	1703	229	382	805	313	0	898	111
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	15.7	39.9	39.9	17.1	41.3	41.3	33.8	33.8	33.8		29.7	29.7
Effective Green, g (s)	15.9	41.6	41.6	17.3	43.0	43.0	34.0	34.0	34.0		31.0	31.0
Actuated g/C Ratio	0.11	0.30	0.30	0.12	0.31	0.31	0.24	0.24	0.24		0.22	0.22
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	390	1052	456	425	1088	408	391	816	368		767	342
v/s Ratio Prot	0.10	0.37		c0.10	c0.48		0.24	c0.24			c0.26	
v/s Ratio Perm			0.34			0.17			0.21			0.07
v/c Ratio	0.88	1.25	1.14	0.82	1.57	0.56	0.98	0.99	0.85		1.17	0.32
Uniform Delay, d1	61.0	49.1	49.1	59.8	48.5	40.6	52.6	52.7	50.5		54.5	45.7
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	19.3	121.3	84.7	12.0	258.9	2.9	39.0	27.9	17.0		90.5	0.7
Delay (s)	80.3	170.5	133.9	71.8	307.3	43.4	91.6	80.6	67.5		145.0	46.3
Level of Service	F	F	F	E	F	D	F	F	E		F	D
Approach Delay (s)		145.7			235.9			79.3			121.6	
Approach LOS		F			F			E			F	

Intersection Summary				
HCM Average Control Delay	155.4	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	139.9	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	109.6%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	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	213	0	368	100	626	0	0	825	482
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.79	0.92	0.79	0.79	0.79	0.79	0.92
Hourly flow rate (vph)	0	0	0	270	0	466	109	792	0	0	1044	524
Pedestrians											1	
Lane Width (ft)											12.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								519				
pX, platoon unblocked												
vC, conflicting volume	2055	2054	1044	2054	2578	793	1568			792		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2055	2054	1044	2054	2578	793	1568			792		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	0	100	0	74			100		
cM capacity (veh/h)	0	41	278	33	19	388	421			828		

Direction, Lane #	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	270	466	109	792	1044	524
Volume Left	270	0	109	0	0	0
Volume Right	0	466	0	0	0	524
cSH	33	388	421	1700	1700	1700
Volume to Capacity	8.25	1.20	0.26	0.47	0.61	0.31
Queue Length 95th (ft)	Err	474	25	0	0	0
Control Delay (s)	Err	143.3	16.5	0.0	0.0	0.0
Lane LOS	F	F	C			
Approach Delay (s)	3756.5		2.0		0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	883.3			
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	330	0	40	0	0	0	0	496	51	219	883	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	402	0	49	0	0	0	0	605	62	267	1077	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	2247	2278	1077	2296	2247	636	1077			667		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2247	2278	1077	2296	2247	636	1077			667		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	82	100	100	100	100			71		
cM capacity (veh/h)	23	28	266	17	30	478	648			923		

Direction, Lane #	SE 1	SE 2	NE 1	SW 1	SW 2
Volume Total	402	49	667	267	1077
Volume Left	402	0	0	267	0
Volume Right	0	49	62	0	0
cSH	23	266	1700	923	1700
Volume to Capacity	17.46	0.18	0.39	0.29	0.63
Queue Length 95th (ft)	Err	16	0	30	0
Control Delay (s)	Err	21.5	0.0	10.5	0.0
Lane LOS	F	C		B	
Approach Delay (s)	8920.4		0.0	2.1	
Approach LOS	F				

Intersection Summary				
Average Delay	1635.9			
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/8/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1554	1770	3539	1583	1770	3345		1770	3502	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1554	1770	3539	1583	1770	3345		1770	3502	
Volume (vph)	234	621	163	53	558	196	292	564	264	347	482	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	690	181	59	620	218	324	627	293	386	536	31
RTOR Reduction (vph)	0	0	36	0	0	59	0	46	0	0	3	0
Lane Group Flow (vph)	260	690	145	59	620	159	324	874	0	386	564	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.8	43.0	43.0	16.0	45.2	45.2	26.0	27.0		18.0	19.0	
Effective Green, g (s)	13.8	43.0	43.0	16.0	45.2	45.2	26.0	27.0		18.0	19.0	
Actuated g/C Ratio	0.12	0.36	0.36	0.13	0.38	0.38	0.22	0.22		0.15	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	668	557	236	1333	596	384	753		266	554	
v/s Ratio Prot	0.08	c0.37		0.03	c0.18		0.18	c0.26		c0.22	0.16	
v/s Ratio Perm			0.09			0.10						
v/c Ratio	0.66	1.03	0.26	0.25	0.47	0.27	0.84	1.16		1.45	1.02	
Uniform Delay, d1	50.8	38.5	27.2	46.6	28.3	25.9	45.1	46.5		51.0	50.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	43.6	0.3	2.5	0.3	0.2	19.8	86.9		222.8	42.7	
Delay (s)	54.8	82.1	27.5	49.1	28.5	26.2	64.8	133.4		273.8	93.2	
Level of Service	D	F	C	D	C	C	E	F		F	F	
Approach Delay (s)		67.1			29.3			115.5			166.4	
Approach LOS		E			C			F			F	

Intersection Summary					
HCM Average Control Delay	95.7	HCM Level of Service		F	
HCM Volume to Capacity ratio	1.02				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	92.8%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1557	1770	3539	1553	1770	3539	1550	1770	3539	1534
Volume (vph)	92	523	139	326	544	265	182	530	252	283	416	91
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	111	630	167	393	655	319	219	639	304	341	501	110
RTOR Reduction (vph)	0	0	90	0	0	218	0	0	123	0	0	74
Lane Group Flow (vph)	111	630	77	393	655	101	219	639	181	341	501	36
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	7.1	17.8	17.8	15.0	25.7	25.7	12.9	16.0	16.0	16.0	19.1	19.1
Effective Green, g (s)	7.1	17.8	17.8	15.0	25.7	25.7	12.9	16.0	16.0	16.0	19.1	19.1
Actuated g/C Ratio	0.09	0.22	0.22	0.19	0.32	0.32	0.16	0.20	0.20	0.20	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	156	780	343	329	1126	494	283	701	307	350	837	363
v/s Ratio Prot	0.06	c0.18		c0.22	0.19		0.12	c0.18		c0.19	c0.14	
v/s Ratio Perm			0.05			0.07			0.12			0.02
v/c Ratio	0.71	0.81	0.23	1.19	0.58	0.21	0.77	0.91	0.59	0.97	0.60	0.10
Uniform Delay, d1	35.9	29.9	25.8	32.9	23.1	20.1	32.6	31.7	29.4	32.2	27.4	24.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	8.8	1.5	113.5	2.2	0.9	12.4	16.1	3.0	40.9	1.2	0.1
Delay (s)	50.1	38.7	27.4	146.4	25.2	21.0	44.9	47.8	32.5	73.1	28.6	24.2
Level of Service	D	D	C	F	C	C	D	D	C	E	C	C
Approach Delay (s)		38.0			59.1			43.3			44.0	
Approach LOS		D			E			D			D	

Intersection Summary				
HCM Average Control Delay	47.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	76.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington

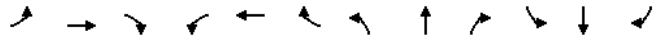
12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	177	23	5	229	19	23	24	1	57	42	9
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	20	253	33	7	327	27	33	34	1	81	60	13
Pedestrians		1			2			7			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	358			293			715	689	278	689	692	346
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	358			293			715	689	278	689	692	346
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			89	90	100	75	83	98
cM capacity (veh/h)	1196			1261			287	357	755	324	356	694

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	306	361	69	154
Volume Left	20	7	33	81
Volume Right	33	27	1	13
cSH	1196	1261	323	352
Volume to Capacity	0.02	0.01	0.21	0.44
Queue Length 95th (ft)	1	0	20	54
Control Delay (s)	0.7	0.2	19.1	23.0
Lane LOS	A	A	C	C
Approach Delay (s)	0.7	0.2	19.1	23.0
Approach LOS			C	C

Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	32.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 12/10/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	138	544	0	0	402	0	102	0	0	0	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)	145	573	0	0	423	0	107	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	423			573			1286	1286	573	1286	1286	423
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	423			573			1286	1286	573	1286	1286	423
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			16	100	100	100	100	100
cM capacity (veh/h)	1136			1000			127	143	519	127	143	631

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	145	573	423	107
Volume Left	145	0	0	107
Volume Right	0	0	0	0
cSH	1136	1700	1700	127
Volume to Capacity	0.13	0.34	0.25	0.84
Queue Length 95th (ft)	11	0	0	130
Control Delay (s)	8.6	0.0	0.0	107.3
Lane LOS	A			F
Approach Delay (s)	1.7		0.0	107.3
Approach LOS				F

Intersection Summary				
Average Delay	10.2			
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	250	149	0	218	0	0	0	624	0	153
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	287	171	0	251	0	0	0	717	0	176
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	251			459			799	624	624	709	251
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	251			459			799	624	624	709	251
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	0	100	78
cM capacity (veh/h)	1315			1102			236	402	398	359	788

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	459	251	717	176
Volume Left	0	0	717	0
Volume Right	171	0	0	176
cSH	1700	1700	398	788
Volume to Capacity	0.27	0.15	1.80	0.22
Queue Length 95th (ft)	0	0	1144	21
Control Delay (s)	0.0	0.0	394.0	10.9
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	318.6	
Approach LOS			F	

Intersection Summary				
Average Delay	177.6			
Intersection Capacity Utilization	49.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 12/8/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	603	2	3	6	5	445
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	655	2	3	7	5	484
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	0		1314	1311	1311	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1314	1311	1311	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	60		93	93	94	55
cM capacity (veh/h)	1623		49	95	95	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	655	2	10	489
Volume Left	655	0	3	0
Volume Right	0	2	0	484
cSH	1623	1700	72	972
Volume to Capacity	0.40	0.00	0.14	0.50
Queue Length 95th (ft)	50	0	11	72
Control Delay (s)	8.7	0.0	62.3	12.4
Lane LOS	A		F	B
Approach Delay (s)	8.7		62.3	12.4
Approach LOS			F	B

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 12/8/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	603	36	45	277	289	96
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	655	39	49	301	314	104
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1350	0	1355	1330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1350	0	1355	1330
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	60		45	72	0	0
cM capacity (veh/h)	1623		90	1085	37	92

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	695	49	301	418
Volume Left	655	0	0	314
Volume Right	39	0	301	0
cSH	1623	90	1085	44
Volume to Capacity	0.40	0.55	0.28	9.60
Queue Length 95th (ft)	50	61	28	Err
Control Delay (s)	8.4	85.4	9.6	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.4	20.2		Err
Approach LOS		C		F

Intersection Summary			
Average Delay	2868.9		
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport 12/8/2008

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	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	0.89		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1657		1770	1863	1583	1770	1863	1583
Flt Permitted	0.73	1.00	1.00	0.67	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1364	1863	1583	1249	1657		1770	1863	1583	1770	1863	1583
Volume (vph)	391	124	52	20	9	26	14	496	99	37	378	623
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	425	135	57	22	10	28	15	539	108	40	411	677
RTOR Reduction (vph)	0	0	38	0	19	0	0	0	37	0	0	401
Lane Group Flow (vph)	425	135	19	22	19	0	15	539	71	40	411	276
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		1.3	19.4	19.4	2.5	20.6	20.6
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		1.3	19.4	19.4	2.5	20.6	20.6
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.03	0.38	0.38	0.05	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	450	615	522	412	547		45	714	607	87	758	644
v/s Ratio Prot		0.07			0.01		0.01	c0.29		c0.02	0.22	
v/s Ratio Perm	c0.31		0.01	0.02					0.04			0.17
v/c Ratio	0.94	0.22	0.04	0.05	0.04		0.33	0.75	0.12	0.46	0.54	0.43
Uniform Delay, d1	16.5	12.2	11.5	11.6	11.5		24.2	13.5	10.1	23.4	11.4	10.8
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	28.6	0.2	0.0	0.1	0.0		4.3	4.5	0.1	3.8	0.8	0.5
Delay (s)	45.1	12.4	11.5	11.6	11.5		28.6	18.1	10.2	27.2	12.2	11.2
Level of Service	D	B	B	B	B		C	B	B	C	B	B
Approach Delay (s)		34.9			11.6			17.0			12.2	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM Average Control Delay	19.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	50.6	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				

HCM Unsignalized Intersection Capacity Analysis
1: Freedom & Atkinson 12/8/2008

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1451	1550	81	0	81
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1511	1615	84	0	84
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		150				
pX, platoon unblocked					0.67	
vC, conflicting volume	1699				2412	849
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1699				2612	849
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	72
cM capacity (veh/h)	371				13	304

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	756	756	1076	623	84
Volume Left	0	0	0	0	0
Volume Right	0	0	0	84	84
cSH	1700	1700	1700	1700	304
Volume to Capacity	0.44	0.44	0.63	0.37	0.28
Queue Length 95th (ft)	0	0	0	0	28
Control Delay (s)	0.0	0.0	0.0	0.0	21.3
Lane LOS					C
Approach Delay (s)	0.0		0.0		21.3
Approach LOS					C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Freedom & Gardner 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	12	10	12	12	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.96		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)	1652	3475		1770	3526			1640	1513		1660	1392
Flt Permitted	0.95	1.00		0.95	1.00			0.57	1.00		0.49	1.00
Satd. Flow (perm)	1652	3475		1770	3526			977	1513		849	1392
Volume (vph)	167	1284	130	76	1347	24	168	56	91	116	51	36
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	172	1324	134	78	1389	25	173	58	94	120	53	37
RTOR Reduction (vph)	0	6	0	0	2	0	0	0	69	0	0	19
Lane Group Flow (vph)	172	1452	0	78	1412	0	0	231	25	0	173	18
Confl. Peds. (#/hr)	11		9	9		11	27		19	19		27
Confl. Bikes (#/hr)			2						6			8
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4		4	8		8
Actuated Green, G (s)	12.1	54.9		6.7	49.5			26.3	26.3		26.3	26.3
Effective Green, g (s)	12.1	54.9		6.7	49.5			26.3	26.3		26.3	26.3
Actuated g/C Ratio	0.12	0.55		0.07	0.50			0.26	0.26		0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	6.0		1.0	6.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	200	1910		119	1747			257	398		224	366
v/s Ratio Prot	c0.10	0.42		0.04	c0.40							
v/s Ratio Perm								c0.24	0.02		0.20	0.01
v/c Ratio	0.86	0.76		0.66	0.81			0.90	0.06		0.77	0.05
Uniform Delay, d1	43.1	17.4		45.5	21.2			35.5	27.6		34.0	27.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	28.0	2.4		9.5	3.4			30.1	0.0		13.9	0.0
Delay (s)	71.0	19.8		55.0	24.6			65.6	27.6		48.0	27.5
Level of Service	E	B		D	C			E	C		D	C
Approach Delay (s)		25.2			26.2			54.6			44.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Crestview & Freedom 12/8/2008

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1454	1770	3539	3476	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1652	1454	1770	3539	3476	
Volume (vph)	85	263	271	1305	1053	111
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	277	285	1374	1108	117
RTOR Reduction (vph)	0	231	0	0	12	0
Lane Group Flow (vph)	89	46	285	1374	1213	0
Confl. Peds. (#/hr)		4	10			10
Confl. Bikes (#/hr)						2
Turn Type		Perm	Prot			
Protected Phases	8		1	6	2	
Permitted Phases		8				
Actuated Green, G (s)	8.7	8.7	10.8	36.1	21.3	
Effective Green, g (s)	8.7	8.7	10.8	36.1	21.3	
Actuated g/C Ratio	0.16	0.16	0.20	0.68	0.40	
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)	272	240	362	2420	1402	
v/s Ratio Prot	c0.05		c0.16	0.39	c0.35	
v/s Ratio Perm		0.03				
v/c Ratio	0.33	0.19	0.79	0.57	0.87	
Uniform Delay, d1	19.5	19.0	19.9	4.3	14.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	10.8	1.0	7.4	
Delay (s)	20.2	19.4	30.7	5.3	21.8	
Level of Service	C	B	C	A	C	
Approach Delay (s)	19.6			9.7	21.8	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

I

Intersection: 3: Crestview & Freedom

Movement	WB	WB	SE	SE	SE	NW	NW
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	51	74	175	253	268	246	251
Average Queue (ft)	31	49	146	96	115	148	148
95th Queue (ft)	42	80	185	185	206	214	224
Link Distance (ft)	1364			945	945	916	916
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		50	150				
Storage Blk Time (%)	2	5	6				
Queuing Penalty (veh)	5	4	42				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	76	85	53	10	85	20	55	21	14	11	15	52
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	89	100	62	12	100	24	65	25	16	13	18	61

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	252	135	106	92
Volume Left (vph)	89	12	65	13
Volume Right (vph)	62	24	16	61
Hadj (s)	-0.04	-0.05	0.06	-0.34
Departure Headway (s)	4.5	4.6	5.0	4.6
Degree Utilization, x	0.32	0.17	0.15	0.12
Capacity (veh/h)	754	726	662	703
Control Delay (s)	9.6	8.6	8.9	8.2
Approach Delay (s)	9.6	8.6	8.9	8.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay		9.0		
HCM Level of Service		A		
Intersection Capacity Utilization		37.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	68	3	64	96	16	96	72	665	96	22	793	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	72	3	68	102	17	102	77	707	102	23	844	63
Pedestrians		8			12			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1902	1905	884	1834	1834	720	914			822		
vC1, stage 1 conf vol	930	930		873	873							
vC2, stage 2 conf vol	972	975		961	961							
vCu, unblocked vol	1902	1905	884	1834	1834	720	914			822		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	15	97	80	0	85	76	90			97		
cM capacity (veh/h)	85	121	342	84	117	423	741			800		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	144	102	119	77	707	102	23	906
Volume Left	72	102	0	77	0	0	23	0
Volume Right	68	0	102	0	0	102	0	63
cSH	133	84	308	741	1700	1700	800	1700
Volume to Capacity	1.08	1.22	0.39	0.10	0.42	0.06	0.03	0.53
Queue Length 95th (ft)	201	186	44	9	0	0	2	0
Control Delay (s)	165.6	259.1	23.9	10.4	0.0	0.0	9.6	0.0
Lane LOS	F	F	C	B			A	
Approach Delay (s)	165.6	132.5		0.9			0.2	
Approach LOS	F	F						

Intersection Summary				
Average Delay	24.8			
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		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
Frt	1.00	0.91		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1664		1770	1823		1770	1726		1770	1863	1562
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1664		1770	1823		1770	1726		1770	1863	1562
Volume (vph)	220	220	363	123	182	22	317	211	148	18	320	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	239	395	134	198	24	345	229	161	20	348	318
RTOR Reduction (vph)	0	66	0	0	5	0	0	24	0	0	0	112
Lane Group Flow (vph)	239	568	0	134	217	0	345	366	0	20	348	206
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		14.8	14.8		16.0	35.6		2.9	22.5	41.5
Effective Green, g (s)	19.0	19.0		14.8	14.8		16.0	35.6		2.9	22.5	41.5
Actuated g/C Ratio	0.22	0.22		0.17	0.17		0.18	0.40		0.03	0.25	0.47
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	358		297	306		321	696		58	475	805
v/s Ratio Prot	0.14	c0.34		0.08	c0.12		c0.19	0.21		0.01	c0.19	0.06
v/s Ratio Perm												0.08
v/c Ratio	0.63	1.59		0.45	0.71		1.07	0.53		0.34	0.73	0.26
Uniform Delay, d1	31.4	34.6		33.1	34.7		36.1	20.0		41.8	30.1	14.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.2	277.0		1.1	7.3		71.5	2.8		3.6	9.6	0.2
Delay (s)	34.7	311.7		34.2	42.1		107.7	22.8		45.3	39.8	14.3
Level of Service	C	F		C	D		F	C		D	D	B
Approach Delay (s)		235.8			39.1			62.6			28.1	
Approach LOS		F			D			E			C	

Intersection Summary					
HCM Average Control Delay	107.6	HCM Level of Service		F	
HCM Volume to Capacity ratio	1.03				
Actuated Cycle Length (s)	88.3	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	88.4%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
7: Airport & Harkins Slough

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1807		1770	1863	1561	1770	3394		1770	3403	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1807		1770	1863	1561	1770	3394		1770	3403	
Volume (vph)	352	418	92	303	350	201	165	798	241	236	508	175
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	363	431	95	312	361	207	170	823	248	243	524	180
RTOR Reduction (vph)	0	7	0	0	0	145	0	26	0	0	31	0
Lane Group Flow (vph)	363	519	0	312	361	62	170	1045	0	243	673	0
Confl. Peds. (#/hr)	1		2	2		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	13.8	29.0		18.0	33.2	33.2	13.3	33.0		14.0	33.7	
Effective Green, g (s)	13.8	29.0		18.0	33.2	33.2	13.3	33.0		14.0	33.7	
Actuated g/C Ratio	0.13	0.26		0.16	0.30	0.30	0.12	0.30		0.13	0.31	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	431	476		290	562	471	214	1018		225	1043	
v/s Ratio Prot	0.11	c0.29		c0.18	0.19		0.10	c0.31		c0.14	0.20	
v/s Ratio Perm						0.04						
v/c Ratio	0.84	1.09		1.08	0.64	0.13	0.79	1.03		1.08	0.65	
Uniform Delay, d1	47.0	40.5		46.0	33.3	27.9	47.0	38.5		48.0	33.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.9	67.7		74.5	2.5	0.1	18.1	35.2		82.9	3.1	
Delay (s)	60.9	108.2		120.5	35.8	28.1	65.1	73.7		130.9	36.1	
Level of Service	E	F		F	D	C	E	E		F	D	
Approach Delay (s)		88.9			64.0			72.5			60.4	
Approach LOS		F			E			E			E	

Intersection Summary				
HCM Average Control Delay	71.4	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.06			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	100.6%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

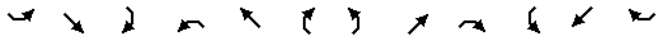
HCM Signalized Intersection Capacity Analysis
8: Main & Harkins Slough

12/8/2008

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	0.91	0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97		1.00	0.95
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	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00		0.98	1.00
Satd. Flow (prot)	3433	3539	1545	3433	3539	1551	1610	3318	1539		3462	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00		0.98	1.00
Satd. Flow (perm)	3433	3539	1545	3433	3539	1551	1610	3318	1539		3462	1507
Volume (vph)	532	1520	227	401	1300	362	788	489	423	284	352	263
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	566	1617	241	427	1383	385	838	520	450	302	374	280
RTOR Reduction (vph)	0	0	88	0	0	140	0	0	195	0	0	161
Lane Group Flow (vph)	566	1617	153	427	1383	245	437	921	255	0	676	119
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	18.8	48.0	48.0	16.8	46.0	46.0	36.8	36.8	36.8		29.0	29.0
Effective Green, g (s)	19.0	49.7	49.7	17.0	47.7	47.7	37.0	37.0	37.0		30.3	30.3
Actuated g/C Ratio	0.13	0.33	0.33	0.11	0.32	0.32	0.25	0.25	0.25		0.20	0.20
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.2	4.2	4.2		5.3	5.3
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0		3.5	3.5
Lane Grp Cap (vph)	435	1173	512	389	1125	493	397	818	380		699	304
v/s Ratio Prot	0.16	c0.46		0.12	c0.39		0.27	c0.28			c0.20	
v/s Ratio Perm			0.10			0.16			0.17			0.08
v/c Ratio	1.30	1.38	0.30	1.10	1.23	0.50	1.10	1.13	0.67		0.97	0.39
Uniform Delay, d1	65.5	50.1	37.2	66.5	51.1	41.4	56.5	56.5	51.0		59.4	51.9
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	151.5	175.7	0.7	74.6	111.2	1.6	75.2	72.1	4.6		26.0	1.0
Delay (s)	217.0	225.9	37.9	141.1	162.3	43.1	131.7	128.6	55.6		85.3	52.8
Level of Service	F	F	D	F	F	D	F	F	E		F	D
Approach Delay (s)		205.1			137.3			111.2			75.8	
Approach LOS		F			F			F			E	

Intersection Summary				
HCM Average Control Delay	145.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.21			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	112.6%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 12/8/2008



Movement	SEL	SET	SER	NWL	NWT	NWR	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	43	0	521	35	314	0	0	767	296
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	47	0	566	38	341	0	0	834	322
Pedestrians								1			3	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1820	1251	835	1252	1573	344	1155			341		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1820	1251	835	1252	1573	344	1155			341		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	67	100	19	94			100		
cM capacity (veh/h)	11	162	367	142	103	697	605			1218		

Direction, Lane #	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	47	566	38	341	834	322
Volume Left	47	0	38	0	0	0
Volume Right	0	566	0	0	0	322
cSH	142	697	605	1700	1700	1700
Volume to Capacity	0.33	0.81	0.06	0.20	0.49	0.19
Queue Length 95th (ft)	33	214	5	0	0	0
Control Delay (s)	42.4	28.6	11.4	0.0	0.0	0.0
Lane LOS	E	D	B			
Approach Delay (s)	29.6		1.1		0.0	
Approach LOS	D					

Intersection Summary				
Average Delay	8.7			
Intersection Capacity Utilization	57.0%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	221	0	23	0	0	0	0	128	22	414	404	0
Peak Hour Factor	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Hourly flow rate (vph)	240	0	25	0	0	0	0	144	25	465	454	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	1540	1553	454	1565	1540	156	454			169		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1540	1553	454	1565	1540	156	454			169		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	96	100	100	100	100			67		
cM capacity (veh/h)	70	76	606	64	77	889	1107			1409		

Direction, Lane #	SE 1	SE 2	NE 1	SW 1	SW 2
Volume Total	240	25	169	465	454
Volume Left	240	0	0	465	0
Volume Right	0	25	25	0	0
cSH	70	606	1700	1409	1700
Volume to Capacity	3.43	0.04	0.10	0.33	0.27
Queue Length 95th (ft)	Err	3	0	37	0
Control Delay (s)	Err	11.2	0.0	8.8	0.0
Lane LOS	F	B		A	
Approach Delay (s)	9057.5		0.0	4.5	
Approach LOS	F				

Intersection Summary				
Average Delay	1778.7			
Intersection Capacity Utilization	57.0%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom 12/8/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1533	1770	3539	1556	1770	3404		1770	3361	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1533	1770	3539	1556	1770	3404		1770	3361	
Volume (vph)	343	583	288	116	479	167	269	566	162	357	476	146
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	354	601	297	120	494	172	277	584	167	368	491	151
RTOR Reduction (vph)	0	0	91	0	0	77	0	30	0	0	32	0
Lane Group Flow (vph)	354	601	206	120	494	95	277	721	0	368	610	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.8	26.0	26.0	16.0	28.2	28.2	16.0	16.0		16.0	16.0	
Effective Green, g (s)	13.8	26.0	26.0	16.0	28.2	28.2	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.15	0.29	0.29	0.18	0.31	0.31	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	526	538	443	315	1109	488	315	605		315	598	
v/s Ratio Prot	0.10	c0.32		0.07	c0.14		0.16	c0.21		c0.21	0.18	
v/s Ratio Perm			0.13			0.06						
v/c Ratio	0.67	1.12	0.46	0.38	0.45	0.19	0.88	1.19		1.17	1.02	
Uniform Delay, d1	36.0	32.0	26.3	32.6	24.7	22.6	36.1	37.0		37.0	37.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	75.1	0.8	3.5	0.3	0.2	27.6	102.2		104.5	41.9	
Delay (s)	39.4	107.1	27.1	36.1	24.9	22.8	63.7	139.2		141.5	78.9	
Level of Service	D	F	C	D	C	C	E	F		F	E	
Approach Delay (s)		69.0			26.2			118.8			101.7	
Approach LOS		E			C			F			F	

Intersection Summary				
HCM Average Control Delay	81.4	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	91.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & Harkins Slough 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.96	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1551	1770	3539	1522	1770	3539	1516	1770	3539	1546
Volume (vph)	169	761	167	398	357	362	238	711	382	397	478	106
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)	178	801	176	419	376	381	251	748	402	418	503	112
RTOR Reduction (vph)	0	0	67	0	0	278	0	0	123	0	0	66
Lane Group Flow (vph)	178	801	109	419	376	103	251	748	279	418	503	46
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	12.6	19.0	19.0	18.0	24.4	24.4	15.7	16.0	16.0	21.0	21.3	21.3
Effective Green, g (s)	12.6	19.0	19.0	18.0	24.4	24.4	15.7	16.0	16.0	21.0	21.3	21.3
Actuated g/C Ratio	0.14	0.21	0.21	0.20	0.27	0.27	0.17	0.18	0.18	0.23	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	248	747	327	354	959	413	309	629	270	413	838	366
v/s Ratio Prot	0.10	c0.23		c0.24	0.11		0.14	c0.21		c0.24	0.14	
v/s Ratio Perm			0.07			0.07			0.18			0.03
v/c Ratio	0.72	1.07	0.33	1.18	0.39	0.25	0.81	1.19	1.04	1.01	0.60	0.12
Uniform Delay, d1	37.0	35.5	30.1	36.0	26.8	25.6	35.7	37.0	37.0	34.5	30.6	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.5	54.0	2.7	107.8	1.2	1.4	14.9	100.4	64.2	47.4	1.2	0.2
Delay (s)	46.5	89.5	32.8	143.8	28.0	27.1	50.6	137.4	101.2	81.9	31.8	27.2
Level of Service	D	F	C	F	C	C	D	F	F	F	C	C
Approach Delay (s)		74.3			68.9			111.5			51.5	
Approach LOS		E			E			F			D	

Intersection Summary				
HCM Average Control Delay	79.0	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.11			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	98.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
13: Martinelli & Brewington 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	263	35	2	254	12	26	29	2	57	77	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	34	283	38	2	273	13	28	31	2	61	83	19
Pedestrians		1			2			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	286			326			722	667	310	674	679	281
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286			326			722	667	310	674	679	281
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			89	92	100	82	77	97
cM capacity (veh/h)	1276			1227			266	367	726	334	361	758

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	355	288	61	163
Volume Left	34	2	28	61
Volume Right	38	13	2	19
cSH	1276	1227	318	373
Volume to Capacity	0.03	0.00	0.19	0.44
Queue Length 95th (ft)	2	0	18	54
Control Delay (s)	1.0	0.1	19.0	22.0
Lane LOS	A	A	C	C
Approach Delay (s)	1.0	0.1	19.0	22.0
Approach LOS			C	C

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	52.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 12/10/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	143	606	0	0	416	0	103	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	152	645	0	0	443	0	110	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	443			645			1391	1391	645	1391	1391	443
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	443			645			1391	1391	645	1391	1391	443
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			0	100	100	100	100	100
cM capacity (veh/h)	1117			940			107	123	472	107	123	615

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	152	645	443	110
Volume Left	152	0	0	110
Volume Right	0	0	0	0
cSH	1117	1700	1700	107
Volume to Capacity	0.14	0.38	0.26	1.02
Queue Length 95th (ft)	12	0	0	164
Control Delay (s)	8.7	0.0	0.0	168.8
Lane LOS	A			F
Approach Delay (s)	1.7		0.0	168.8
Approach LOS				F

Intersection Summary				
Average Delay	14.7			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 12/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Sign Control		Free			Free		Stop			Stop	
Grade		0%			0%		0%			0%	
Volume (veh/h)	0	255	150	0	171	0	0	0	614	0	147
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	266	156	0	178	0	0	0	640	0	153
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	178			422			675	522	522	600	178
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	178			422			675	522	522	600	178
tC, single (s)	4.1			4.1			7.1	6.5	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.5	4.0	3.3
p0 queue free %	100			100			100	100	0	100	82
cM capacity (veh/h)	1398			1137			303	459	465	415	865

Direction, Lane #	EB 1	WB 1	SW 1	SW 2
Volume Total	422	178	640	153
Volume Left	0	0	640	0
Volume Right	156	0	0	153
cSH	1700	1700	465	865
Volume to Capacity	0.25	0.10	1.37	0.18
Queue Length 95th (ft)	0	0	746	16
Control Delay (s)	0.0	0.0	206.0	10.1
Lane LOS			F	B
Approach Delay (s)	0.0	0.0	168.1	
Approach LOS			F	

Intersection Summary			
Average Delay	95.7		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport 12/8/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	564	3	2	2	5	429
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	613	3	2	2	5	466
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	0		1229	1226	1226	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1229	1226	1226	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	62		96	98	95	57
cM capacity (veh/h)	1623		60	111	111	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	613	3	4	472
Volume Left	613	0	2	0
Volume Right	0	3	0	466
cSH	1623	1700	78	985
Volume to Capacity	0.38	0.00	0.06	0.48
Queue Length 95th (ft)	45	0	4	66
Control Delay (s)	8.6	0.0	53.8	12.0
Lane LOS	A		F	B
Approach Delay (s)	8.5		53.8	12.0
Approach LOS			F	B

Intersection Summary			
Average Delay	10.2		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps

12/8/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	691	58	70	218	236	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	751	63	76	237	257	107
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1565	0	1572	1534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1565	0	1572	1534
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	54		0	78	0	0
cM capacity (veh/h)	1623		60	1085	0	63

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	814	76	237	363
Volume Left	751	0	0	257
Volume Right	63	0	237	0
cSH	1623	60	1085	0
Volume to Capacity	0.46	1.27	0.22	Err
Queue Length 95th (ft)	63	161	21	Err
Control Delay (s)	8.7	321.9	9.2	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.7	85.2		Err
Approach LOS		F		F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
18: Larkin Valley & Airport

12/8/2008

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	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	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1764		1770	1863	1583	1770	1863	1583
Flt Permitted	0.65	1.00	1.00	0.71	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1205	1863	1583	1319	1764		1770	1863	1583	1770	1863	1583
Volume (vph)	316	69	69	66	104	57	37	506	23	30	299	627
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	75	75	72	113	62	40	550	25	33	325	682
RTOR Reduction (vph)	0	0	49	0	29	0	0	0	7	0	0	416
Lane Group Flow (vph)	343	75	26	72	146	0	40	550	18	33	325	266
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	19.3	19.3	19.3	19.3	19.3		2.4	21.5	21.5	2.4	21.5	21.5
Effective Green, g (s)	19.3	19.3	19.3	19.3	19.3		2.4	21.5	21.5	2.4	21.5	21.5
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35		0.04	0.39	0.39	0.04	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	421	651	553	461	617		77	726	617	77	726	617
v/s Ratio Prot		0.04			0.08		c0.02	c0.30		0.02	0.17	
v/s Ratio Perm	c0.28		0.02	0.05					0.01			0.17
v/c Ratio	0.81	0.12	0.05	0.16	0.24		0.52	0.76	0.03	0.43	0.45	0.43
Uniform Delay, d1	16.3	12.2	11.9	12.3	12.7		25.8	14.6	10.4	25.7	12.5	12.4
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	11.5	0.1	0.0	0.2	0.2		5.8	4.5	0.0	3.8	0.4	0.5
Delay (s)	27.8	12.2	11.9	12.5	12.9		31.6	19.1	10.4	29.5	12.9	12.8
Level of Service	C	B	B	B	B		C	B	B	C	B	B
Approach Delay (s)		23.0			12.8			19.6			13.4	
Approach LOS		C			B			B			B	

Intersection Summary					
HCM Average Control Delay	16.9	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.77				
Actuated Cycle Length (s)	55.2	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	67.2%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

APPENDIX F

Intersection Level of Service Calculations
Mitigated Conditions

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake 1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1722	1549	1770	1780		1770	1819		1770	1863	1561
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1722	1549	1770	1780		1770	1819		1770	1863	1561
Volume (vph)	374	113	159	132	159	54	254	340	53	26	353	268
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	123	173	143	173	59	276	370	58	28	384	291
RTOR Reduction (vph)	0	0	140	0	16	0	0	6	0	0	0	133
Lane Group Flow (vph)	258	272	33	143	216	0	276	422	0	28	384	158
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split		Perm	Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases			4									6
Actuated Green, G (s)	14.9	14.9	14.9	13.2	13.2		13.1	31.7		3.0	21.6	36.5
Effective Green, g (s)	14.9	14.9	14.9	13.2	13.2		13.1	31.7		3.0	21.6	36.5
Actuated g/C Ratio	0.19	0.19	0.19	0.17	0.17		0.17	0.40		0.04	0.27	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	318	326	293	296	298		294	732		67	511	802
v/s Ratio Prot	0.15	c0.16		0.08	c0.12		c0.16	0.23		0.02	c0.21	0.04
v/s Ratio Perm			0.02									0.06
v/c Ratio	0.81	0.83	0.11	0.48	0.73		0.94	0.58		0.42	0.75	0.20
Uniform Delay, d1	30.6	30.8	26.5	29.7	31.1		32.5	18.3		37.0	26.1	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.5	16.6	0.2	1.2	8.5		36.1	3.3		4.2	9.8	0.1
Delay (s)	45.1	47.3	26.6	31.0	39.6		68.5	21.6		41.2	35.9	12.6
Level of Service	D	D	C	C	D		E	C		D	D	B
Approach Delay (s)		41.4			36.3			40.0			26.5	
Approach LOS		D			D			D			C	

Intersection Summary				
HCM Average Control Delay	36.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	71.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		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
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1766	1544	1770	1834		1770	1734		1770	1863	1558
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1766	1544	1770	1834		1770	1734		1770	1863	1558
Volume (vph)	175	170	315	102	165	16	289	173	110	14	297	295
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	185	342	111	179	17	314	188	120	15	323	321
RTOR Reduction (vph)	0	0	288	0	4	0	0	21	0	0	0	123
Lane Group Flow (vph)	183	192	54	111	192	0	314	287	0	15	323	198
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split		Perm	Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases			4									6
Actuated Green, G (s)	13.3	13.3	13.3	12.7	12.7		17.8	41.2		1.4	24.8	38.1
Effective Green, g (s)	13.3	13.3	13.3	12.7	12.7		17.8	41.2		1.4	24.8	38.1
Actuated g/C Ratio	0.16	0.16	0.16	0.15	0.15		0.21	0.49		0.02	0.29	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	264	278	243	266	275		372	844		29	546	775
v/s Ratio Prot	c0.11	0.11		0.06	c0.10		c0.18	0.17		0.01	c0.17	0.04
v/s Ratio Perm			0.03									0.09
v/c Ratio	0.69	0.69	0.22	0.42	0.70		0.84	0.34		0.52	0.59	0.26
Uniform Delay, d1	33.7	33.7	31.1	32.6	34.1		32.1	13.3		41.3	25.6	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.6	7.2	0.5	1.1	7.5		15.9	1.1		14.7	4.7	0.2
Delay (s)	41.4	40.9	31.6	33.7	41.6		48.0	14.4		56.0	30.2	14.6
Level of Service	D	D	C	C	D		D	B		E	C	B
Approach Delay (s)		36.6			38.7			31.4			23.2	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM Average Control Delay	31.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	64.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1803		1770	1863	1583	1770	3341		1770	3539	1563
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1803		1770	1863	1583	1770	3341		1770	3539	1563
Volume (vph)	198	297	72	150	353	118	25	323	157	192	466	247
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	323	78	163	384	128	27	351	171	209	507	268
RTOR Reduction (vph)	0	13	0	0	0	94	0	81	0	0	0	144
Lane Group Flow (vph)	215	388	0	163	384	34	27	441	0	209	507	124
Confl. Peds. (#/hr)			3	3			3		1	1		3
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	6.0	17.1		8.0	19.1	19.1	3.2	20.5		9.9	27.2	33.2
Effective Green, g (s)	6.0	17.1		8.0	19.1	19.1	3.2	20.5		9.9	27.2	33.2
Actuated g/C Ratio	0.08	0.24		0.11	0.27	0.27	0.04	0.29		0.14	0.38	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	288	431		198	498	423	79	958		245	1346	813
v/s Ratio Prot	0.06	c0.22		c0.09	0.21		0.02	c0.13		c0.12	0.14	0.01
v/s Ratio Perm						0.02						0.07
v/c Ratio	0.75	0.90		0.82	0.77	0.08	0.34	0.46		0.85	0.38	0.15
Uniform Delay, d1	32.0	26.4		31.1	24.2	19.6	33.1	21.0		30.1	16.0	11.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.1	21.4		23.3	7.3	0.1	2.6	1.6		23.8	0.8	0.1
Delay (s)	42.1	47.8		54.4	31.4	19.7	35.7	22.5		53.9	16.8	11.1
Level of Service	D	D		D	C	B	D	C		D	B	B
Approach Delay (s)		45.8			34.8			23.2			23.2	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM Average Control Delay	30.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley 1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1813		1770	1863	1562	1770	3365		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1813		1770	1863	1562	1770	3365		1770	3539	1583
Volume (vph)	312	306	59	169	300	206	88	548	215	190	462	189
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	322	315	61	174	309	212	91	565	222	196	476	195
RTOR Reduction (vph)	0	10	0	0	0	166	0	59	0	0	0	107
Lane Group Flow (vph)	322	366	0	174	309	46	91	728	0	196	476	88
Confl. Peds. (#/hr)	1		2	2		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	8.9	16.2		8.0	15.3	15.3	6.9	19.9		9.7	22.7	31.6
Effective Green, g (s)	8.9	16.2		8.0	15.3	15.3	6.9	19.9		9.7	22.7	31.6
Actuated g/C Ratio	0.13	0.23		0.11	0.22	0.22	0.10	0.29		0.14	0.33	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	438	421		203	408	342	175	959		246	1151	807
v/s Ratio Prot	0.09	c0.20		c0.10	0.17		0.05	c0.22		c0.11	c0.13	0.01
v/s Ratio Perm						0.03						0.04
v/c Ratio	0.74	0.87		0.86	0.76	0.14	0.52	0.76		0.80	0.41	0.11
Uniform Delay, d1	29.3	25.8		30.3	25.5	21.9	29.9	22.8		29.1	18.4	11.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.3	17.1		28.1	7.8	0.2	2.8	5.6		16.2	1.1	0.1
Delay (s)	35.6	42.9		58.5	33.3	22.1	32.6	28.4		45.3	19.5	11.1
Level of Service	D	D		E	C	C	C	C		D	B	B
Approach Delay (s)		39.5			36.2			28.8			23.4	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM Average Control Delay	31.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	75.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley 12/11/2008

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.93	1.00	1.00	0.97	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1559	3433	3539	1473	3433	3539	1538	3433	1863	1555
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1559	3433	3539	1473	3433	3539	1538	3433	1863	1555
Volume (vph)	201	922	542	375	1034	334	315	629	544	278	475	241
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	226	1036	609	421	1162	375	354	707	611	312	534	271
RTOR Reduction (vph)	0	0	0	0	0	17	0	0	37	0	0	29
Lane Group Flow (vph)	226	1036	609	421	1162	358	354	707	574	312	534	242
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Free	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases			Free			2			4			8
Actuated Green, G (s)	13.7	41.2	139.5	20.2	47.7	67.2	19.5	39.2	59.4	19.5	39.2	52.9
Effective Green, g (s)	13.9	42.9	139.5	20.4	49.4	70.2	19.7	39.4	59.8	20.8	40.5	54.4
Actuated g/C Ratio	0.10	0.31	1.00	0.15	0.35	0.50	0.14	0.28	0.43	0.15	0.29	0.39
Clearance Time (s)	4.2	5.7		4.2	5.7	5.3	4.2	4.2	4.2	5.3	5.3	4.2
Vehicle Extension (s)	3.0	5.0		3.0	5.0	3.5	3.0	3.0	3.0	3.5	3.5	3.0
Lane Grp Cap (vph)	342	1088	1559	502	1253	783	485	1000	703	512	541	651
v/s Ratio Prot	0.07	0.29		c0.12	c0.33	0.07	c0.10	0.20	c0.12	0.09	c0.29	0.04
v/s Ratio Perm			c0.39			0.17			0.25			0.12
v/c Ratio	0.66	0.95	0.39	0.84	0.93	0.46	0.73	0.71	0.82	0.61	0.99	0.37
Uniform Delay, d1	60.5	47.3	0.0	57.9	43.3	22.4	57.4	44.9	35.0	55.5	49.2	30.4
Progression Factor	1.00	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	4.7	17.3	0.7	11.7	12.3	0.5	5.5	2.3	7.3	2.2	35.1	0.4
Delay (s)	65.3	64.6	0.7	69.6	55.6	22.9	62.8	47.2	42.4	57.7	84.3	30.7
Level of Service	E	E	A	E	E	C	E	D	D	E	F	C
Approach Delay (s)		43.9			52.3			48.7			63.9	
Approach LOS		D			D			D			E	

Intersection Summary				
HCM Average Control Delay	51.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	83.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley 12/11/2008

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3433	3539	1565	3433	3539	1557	3433	1863	1542
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3433	3539	1565	3433	3539	1557	3433	1863	1542
Volume (vph)	367	1202	133	396	909	427	534	586	572	322	335	186
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	390	1279	141	421	967	454	568	623	609	343	356	198
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	31	0	0	17
Lane Group Flow (vph)	390	1279	141	421	967	446	568	623	578	343	356	181
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Free	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases			Free			2			4			8
Actuated Green, G (s)	23.5	48.8	147.5	22.8	48.1	70.0	27.8	34.6	57.4	21.9	28.7	52.2
Effective Green, g (s)	23.7	50.5	147.5	23.0	49.8	73.0	28.0	34.8	57.8	23.2	30.0	53.7
Actuated g/C Ratio	0.16	0.34	1.00	0.16	0.34	0.49	0.19	0.24	0.39	0.16	0.20	0.36
Clearance Time (s)	4.2	5.7		4.2	5.7	5.3	4.2	4.2	4.2	5.3	5.3	4.2
Vehicle Extension (s)	3.0	5.0		3.0	5.0	3.5	3.0	3.0	3.0	3.5	3.5	3.0
Lane Grp Cap (vph)	552	1212	1562	535	1195	775	652	835	652	540	379	561
v/s Ratio Prot	0.11	c0.36		0.12	0.27	0.09	c0.17	0.18	c0.14	0.10	0.19	0.05
v/s Ratio Perm			0.09			0.19			0.23			0.07
v/c Ratio	0.71	1.06	0.09	0.79	0.81	0.58	0.87	0.75	0.89	0.64	0.94	0.32
Uniform Delay, d1	58.6	48.5	0.0	59.9	44.5	26.3	58.0	52.3	41.8	58.2	57.9	33.8
Progression Factor	1.00	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	4.1	41.8	0.1	7.5	4.7	1.1	12.2	3.7	13.7	2.6	31.0	0.3
Delay (s)	62.7	90.3	0.1	67.4	49.2	27.4	70.2	55.9	55.5	60.7	88.9	34.1
Level of Service	E	F	A	E	D	C	E	E	E	E	F	C
Approach Delay (s)		77.3			48.0			60.3			66.0	
Approach LOS		E			D			E			E	

Intersection Summary				
HCM Average Control Delay	62.4	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	147.5	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 11/17/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	1863			1863
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	1863			1863
Volume (vph)	213	267	496	0	0	888
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	270	338	628	0	0	1124
RTOR Reduction (vph)	0	248	0	0	0	0
Lane Group Flow (vph)	270	90	628	0	0	1124
Confl. Peds. (#/hr)		1				
Turn Type		Prot				
Protected Phases	2	2	4			8
Permitted Phases						
Actuated Green, G (s)	13.2	13.2	39.7			39.7
Effective Green, g (s)	13.2	13.2	39.7			39.7
Actuated g/C Ratio	0.22	0.22	0.65			0.65
Clearance Time (s)	4.0	4.0	4.0			4.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	384	343	1214			1214
v/s Ratio Prot	c0.15	0.06	0.34			c0.60
v/s Ratio Perm						
v/c Ratio	0.70	0.26	0.52			0.93
Uniform Delay, d1	22.0	19.8	5.6			9.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	5.7	0.4	0.4			11.9
Delay (s)	27.8	20.2	5.9			21.2
Level of Service	C	C	A			C
Approach Delay (s)	23.6		5.9			21.2
Approach LOS	C		A			C

Intersection Summary				
HCM Average Control Delay	17.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	65.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough

11/17/2008

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	1863			1863
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	1863			1863
Volume (vph)	43	465	128	0	0	436
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	505	139	0	0	474
RTOR Reduction (vph)	0	350	0	0	0	0
Lane Group Flow (vph)	47	155	139	0	0	474
Confl. Peds. (#/hr)	1	3				
Turn Type		Prot				
Protected Phases	2	2	4			8
Permitted Phases						
Actuated Green, G (s)	8.7	8.7	11.7			11.7
Effective Green, g (s)	8.7	8.7	11.7			11.7
Actuated g/C Ratio	0.31	0.31	0.41			0.41
Clearance Time (s)	4.0	4.0	4.0			4.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	542	485	768			768
v/s Ratio Prot	0.03	c0.10	0.07			c0.25
v/s Ratio Perm						
v/c Ratio	0.09	0.32	0.18			0.62
Uniform Delay, d1	7.0	7.6	5.3			6.6
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.1	0.4	0.1			1.5
Delay (s)	7.1	8.0	5.4			8.1
Level of Service	A	A	A			A
Approach Delay (s)	7.9		5.4			8.1
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	28.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/11/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3432		1770	3539	1583	1770	3332		3433	3500	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3432		1770	3539	1583	1770	3332		3433	3500	
Volume (vph)	206	609	135	45	510	173	287	488	256	311	397	27
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	229	677	150	50	567	192	319	542	284	346	441	30
RTOR Reduction (vph)	0	21	0	0	0	72	0	75	0	0	6	0
Lane Group Flow (vph)	229	806	0	50	567	120	319	751	0	346	465	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	11.0	21.0		16.0	26.0	26.0	20.0	21.0		16.0	17.0	
Effective Green, g (s)	11.0	21.0		16.0	26.0	26.0	20.0	21.0		16.0	17.0	
Actuated g/C Ratio	0.12	0.23		0.18	0.29	0.29	0.22	0.23		0.18	0.19	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	420	801		315	1022	457	393	777		610	661	
v/s Ratio Prot	0.07	c0.23		0.03	c0.16		c0.18	c0.23		0.10	0.13	
v/s Ratio Perm						0.08						
v/c Ratio	0.55	1.01		0.16	0.55	0.26	0.81	0.97		0.57	0.70	
Uniform Delay, d1	37.1	34.5		31.3	27.1	24.6	33.2	34.2		33.8	34.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	33.4		1.1	0.7	0.3	16.5	24.1		3.8	3.4	
Delay (s)	38.6	67.9		32.4	27.8	24.9	49.7	58.2		37.6	37.6	
Level of Service	D	E		C	C	C	D	E		D	D	
Approach Delay (s)		61.6			27.4			55.8			37.6	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM Average Control Delay	47.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/11/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3341		1770	3539	1557	1770	3402		3433	3347	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3341		1770	3539	1557	1770	3402		3433	3347	
Volume (vph)	304	592	267	100	431	147	256	508	148	308	414	141
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	313	610	275	103	444	152	264	524	153	318	427	145
RTOR Reduction (vph)	0	57	0	0	0	75	0	30	0	0	37	0
Lane Group Flow (vph)	313	828	0	103	444	77	264	647	0	318	535	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	13.0	23.0		16.0	26.0	26.0	16.0	18.7		16.0	18.7	
Effective Green, g (s)	13.0	23.0		16.0	26.0	26.0	16.0	18.7		16.0	18.7	
Actuated g/C Ratio	0.14	0.26		0.18	0.29	0.29	0.18	0.21		0.18	0.21	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	498	857		316	1026	451	316	709		612	698	
v/s Ratio Prot	0.09	c0.25		0.06	c0.13		c0.15	c0.19		0.09	0.16	
v/s Ratio Perm						0.05						
v/c Ratio	0.63	0.97		0.33	0.43	0.17	0.84	0.91		0.52	0.77	
Uniform Delay, d1	36.1	33.0		32.1	25.9	23.8	35.6	34.7		33.4	33.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	22.5		2.7	0.3	0.2	22.2	16.1		3.1	5.0	
Delay (s)	38.6	55.5		34.9	26.2	24.0	57.8	50.8		36.5	38.5	
Level of Service	D	E		C	C	C	E	D		D	D	
Approach Delay (s)		51.1			27.0			52.8			37.8	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	43.8	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	74.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps

11/17/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			1.00			1.00				
Flt Protected	0.95	1.00			1.00			0.95				
Satd. Flow (prot)	1770	1863			1863			1770				
Flt Permitted	0.95	1.00			1.00			0.95				
Satd. Flow (perm)	1770	1863			1863			1770				
Volume (vph)	89	452	0	0	362	0	102	0	0	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)	94	476	0	0	381	0	107	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	94	476	0	0	381	0	0	107	0	0	0	0
Turn Type	Prot						Perm					
Protected Phases	7	4			8			2				
Permitted Phases							2					
Actuated Green, G (s)	2.5	18.7			12.2			7.9				
Effective Green, g (s)	2.5	18.7			12.2			7.9				
Actuated g/C Ratio	0.07	0.54			0.35			0.23				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	128	1007			657			404				
v/s Ratio Prot	0.05	c0.26			c0.20							
v/s Ratio Perm								0.06				
v/c Ratio	0.73	0.47			0.58			0.26				
Uniform Delay, d1	15.7	4.9			9.1			11.0				
Progression Factor	1.00	1.00			1.00			1.00				
Incremental Delay, d2	19.5	0.4			1.2			0.4				
Delay (s)	35.2	5.3			10.4			11.3				
Level of Service	D	A			B			B				
Approach Delay (s)		10.2			10.4			11.3			0.0	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM Average Control Delay	10.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	39.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
14: Riverside & SR-1 NB Ramps 11/17/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			1.00			1.00				
Flt Protected	0.95	1.00			1.00			0.95				
Satd. Flow (prot)	1770	1863			1863			1770				
Flt Permitted	0.95	1.00			1.00			0.95				
Satd. Flow (perm)	1770	1863			1863			1770				
Volume (vph)	143	519	0	0	396	0	103	0	0	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	152	552	0	0	421	0	110	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	152	552	0	0	421	0	0	110	0	0	0	0
Turn Type	Prot						Perm					
Protected Phases	7	4			8			2				
Permitted Phases							2					
Actuated Green, G (s)	5.1	22.0			12.9			7.8				
Effective Green, g (s)	5.1	22.0			12.9			7.8				
Actuated g/C Ratio	0.13	0.58			0.34			0.21				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	239	1084			636			365				
v/s Ratio Prot	0.09	c0.30			c0.23							
v/s Ratio Perm								0.06				
v/c Ratio	0.64	0.51			0.66			0.30				
Uniform Delay, d1	15.5	4.7			10.6			12.7				
Progression Factor	1.00	1.00			1.00			1.00				
Incremental Delay, d2	5.5	0.4			2.6			0.5				
Delay (s)	20.9	5.1			13.2			13.2				
Level of Service	C	A			B			B				
Approach Delay (s)		8.5			13.2			13.2			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	37.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/17/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0				4.0		4.0
Lane Util. Factor		1.00			1.00				1.00		1.00
Frt		0.93			1.00				1.00		0.85
Flt Protected		1.00			1.00				0.95		1.00
Satd. Flow (prot)		1729			1863				1770		1583
Flt Permitted		1.00			1.00				0.95		1.00
Satd. Flow (perm)		1729			1863				1770		1583
Volume (vph)	0	133	152	0	234	0	0	0	408	0	262
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	153	175	0	269	0	0	0	469	0	301
RTOR Reduction (vph)	0	121	0	0	0	0	0	0	0	0	185
Lane Group Flow (vph)	0	207	0	0	269	0	0	0	469	0	116
Turn Type		custom							custom		
Protected Phases		4			8						
Permitted Phases									6		6
Actuated Green, G (s)		7.4			7.4				9.7		9.7
Effective Green, g (s)		7.4			7.4				9.7		9.7
Actuated g/C Ratio		0.29			0.29				0.39		0.39
Clearance Time (s)		4.0			4.0				4.0		4.0
Vehicle Extension (s)		3.0			3.0				3.0		3.0
Lane Grp Cap (vph)		510			549				684		612
v/s Ratio Prot		0.12			c0.14						
v/s Ratio Perm									c0.27		0.07
v/c Ratio		0.41			0.49				0.69		0.19
Uniform Delay, d1		7.1			7.3				6.4		5.1
Progression Factor		1.00			1.00				1.00		1.00
Incremental Delay, d2		0.5			0.7				2.9		0.2
Delay (s)		7.6			8.0				9.3		5.3
Level of Service		A			A				A		A
Approach Delay (s)		7.6			8.0		0.0			7.7	
Approach LOS		A			A		A			A	

Intersection Summary				
HCM Average Control Delay	7.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	25.1	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
15: Riverside & SR-1 SB Ramps 11/17/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0				4.0		4.0
Lane Util. Factor		1.00			1.00				1.00		1.00
Frt		0.95			1.00				1.00		0.85
Flt Protected		1.00			1.00				0.95		1.00
Satd. Flow (prot)		1768			1863				1770		1583
Flt Permitted		1.00			1.00				0.95		1.00
Satd. Flow (perm)		1768			1863				1770		1583
Volume (vph)	0	255	156	0	187	0	0	0	407	0	139
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	266	162	0	195	0	0	0	424	0	145
RTOR Reduction (vph)	0	58	0	0	0	0	0	0	0	0	89
Lane Group Flow (vph)	0	370	0	0	195	0	0	0	424	0	56
Turn Type		custom							custom		
Protected Phases		4			8						
Permitted Phases									6		6
Actuated Green, G (s)		11.2			11.2				12.1		12.1
Effective Green, g (s)		11.2			11.2				12.1		12.1
Actuated g/C Ratio		0.36			0.36				0.39		0.39
Clearance Time (s)		4.0			4.0				4.0		4.0
Vehicle Extension (s)		3.0			3.0				3.0		3.0
Lane Grp Cap (vph)		633			667				684		612
v/s Ratio Prot		c0.21			0.10						
v/s Ratio Perm									c0.24		0.04
v/c Ratio		0.58			0.29				0.62		0.09
Uniform Delay, d1		8.2			7.2				7.7		6.1
Progression Factor		1.00			1.00				1.00		1.00
Incremental Delay, d2		1.4			0.2				1.7		0.1
Delay (s)		9.5			7.5				9.4		6.2
Level of Service		A			A				A		A
Approach Delay (s)		9.5			7.5		0.0			8.6	
Approach LOS		A			A		A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	31.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			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Default Scenario           Tue Nov 18, 2008 09:18:51                Page 2-1
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--------------------------------------------------------------------------------
                      Level Of Service Computation Report
                 FHWA Roundabout Method (Base Volume Alternative)
********************************************************************************
Intersection #17 AM Ex + Bkgrd + Proj Hwy 1 NB Ramps / Larkin
********************************************************************************
Average Delay (sec/veh):      5.5       Level Of Service: A
********************************************************************************
Street Name:          Hwy 1 NB Ramps                Larkin Valley Road
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Yield Sign       Yield Sign       Yield Sign       Yield Sign
Lanes:              1                1                1                1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      28    0   328     0    0    0     0   57   28   601   17    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:   28    0   328     0    0    0     0   57   28   601   17    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:     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 Volume:    28    0   328     0    0    0     0   57   28   601   17    0
Reduct Vol:     0    0     0     0    0    0     0    0    0     0    0    0
Reduced Vol:   28    0   328     0    0    0     0   57   28   601   17    0
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:   28    0   328     0    0    0     0   57   28   601   17    0
------------|---------------||---------------||---------------||---------------|
PCE Module:
AutoPCE:       28    0   328     0    0    0     0   57   28   601   17    0
TruckPCE:       0    0     0     0    0    0     0    0    0     0    0    0
ComboPCE:       0    0     0     0    0    0     0    0    0     0    0    0
BicyclePCE:     0    0     0     0    0    0     0    0    0     0    0    0
AdjVolume:     28    0   328     0    0    0     0   57   28   601   17    0
------------|---------------||---------------||---------------||---------------|
Delay Module: >> Time Period: 0.25 hours <<
CircVolume:          57              646               601               28
MaxVolume:         1169           xxxxxx               875             1185
PedVolume:            0                0                 0                0
AdjMaxVol:         1169           xxxxxx               875             1185
ApproachVol:        356           xxxxxx                85              618
ApproachDel:        4.4           xxxxxx               4.6              6.3
Queue:              1.3             xxxx               0.3              3.1

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Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #17 PM Ex + Bkgrd + Project Hwy 1 NB Ramps / Larkin

Average Delay (sec/veh): 7.2 Level Of Service: A

Street Name:	Hwy 1 NB Ramps						Larkin Valley Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	43	0	209	0	0	0	0	55	11	705	58	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:	43	0	209	0	0	0	0	55	11	705	58	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:	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 Volume:	43	0	209	0	0	0	0	55	11	705	58	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	43	0	209	0	0	0	0	55	11	705	58	0
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	0	209	0	0	0	0	55	11	705	58	0
PCE Module:												
AutoPCE:	43	0	209	0	0	0	0	55	11	705	58	0
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	43	0	209	0	0	0	0	55	11	705	58	0

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	55	806	705	43
MaxVolume:	1170	xxxxxx	819	1177
PedVolume:	0	0	0	0
AdjMaxVol:	1170	xxxxxx	819	1177
ApproachVol:	252	xxxxxx	66	763
ApproachDel:	3.9	xxxxxx	4.8	8.5
Queue:	0.8	xxxx	0.3	5.0

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #18 AM Ex + Bkgr + Proj Airport / Larkin V

Average Delay (sec/veh): 10.7 Level Of Service: B

Street Name:	Airport Blvd						Larkin Valley Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	14	592	119	26	268	598	264	83	38	9	6	11
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:	14	592	119	26	268	598	264	83	38	9	6	11
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:	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 Volume:	14	592	119	26	268	598	264	83	38	9	6	11
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	14	592	119	26	268	598	264	83	38	9	6	11
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:	14	592	119	26	268	598	264	83	38	9	6	11
PCE Module:												
AutoPCE:	14	592	119	26	268	598	264	83	38	9	6	11
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	14	592	119	26	268	598	264	83	38	9	6	11

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	373	29	303	870
MaxVolume:	999	1184	1036	730
PedVolume:	0	0	0	0
AdjMaxVol:	999	1184	1036	730
ApproachVol:	725	892	385	26
ApproachDel:	12.5	11.6	5.5	5.1
Queue:	6.7	7.6	1.7	0.1

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #18 PM Ext + Bkgrd + Proj Airport / Larkin V

Average Delay (sec/veh): 10.0 Level Of Service: A

Street Name:	Airport Blvd						Larkin Valley Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	37	604	29	20	213	611	179	41	44	47	115	38
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:	37	604	29	20	213	611	179	41	44	47	115	38
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:	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 Volume:	37	604	29	20	213	611	179	41	44	47	115	38
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	604	29	20	213	611	179	41	44	47	115	38
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:	37	604	29	20	213	611	179	41	44	47	115	38
PCE Module:												
AutoPCE:	37	604	29	20	213	611	179	41	44	47	115	38
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	37	604	29	20	213	611	179	41	44	47	115	38
Delay Module: >> Time Period: 0.25 hours <<												
CircVolume:	240			199			280			820		
MaxVolume:	1070			1093			1049			757		
PedVolume:	0			0			0			0		
AdjMaxVol:	1070			1093			1049			757		
ApproachVol:	670			844			264			200		
ApproachDel:	8.8			13.5			4.6			6.5		
Queue:	4.6			8.1			1.0			1.1		

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #5 AM Cumulative - East Lake / Wagner

Average Delay (sec/veh): 7.5 Level Of Service: A

Street Name:	East Lake						Holohan					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:AM - Cumulative												
Base Vol:	13	616	138	26	551	19	23	2	56	144	11	49
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:	13	616	138	26	551	19	23	2	56	144	11	49
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:	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 Volume:	13	616	138	26	551	19	23	2	56	144	11	49
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	13	616	138	26	551	19	23	2	56	144	11	49
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:	13	616	138	26	551	19	23	2	56	144	11	49
PCE Module:												
AutoPCE:	13	616	138	26	551	19	23	2	56	144	11	49
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	13	616	138	26	551	19	23	2	56	144	11	49
Delay Module: >> Time Period: 0.25 hours <<												
CircVolume:	51			168			721			652		
MaxVolume:	1172			1109			811			848		
PedVolume:	0			0			0			0		
AdjMaxVol:	1172			1109			811			848		
ApproachVol:	767			596			81			204		
ApproachDel:	8.7			6.9			4.9			5.6		
Queue:	5.2			3.3			0.3			0.9		

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #5 PM Cumulative - East Lake / Wagner

Average Delay (sec/veh): 11.3 Level Of Service: B

Street Name:	East Lake						Holohan					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module: PM - Cumulative												
Base Vol:	70	665	96	22	793	45	60	3	63	96	16	96
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:	70	665	96	22	793	45	60	3	63	96	16	96
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:	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 Volume:	70	665	96	22	793	45	60	3	63	96	16	96
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	70	665	96	22	793	45	60	3	63	96	16	96
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:	70	665	96	22	793	45	60	3	63	96	16	96
PCE Module:												
AutoPCE:	70	665	96	22	793	45	60	3	63	96	16	96
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	70	665	96	22	793	45	60	3	63	96	16	96
Delay Module: >> Time Period: 0.25 hours <<												
CircVolume:	85			182			911			795		
MaxVolume:	1154			1102			708			771		
PedVolume:	0			0			0			0		
AdjMaxVol:	1154			1102			708			771		
ApproachVol:	831			860			126			208		
ApproachDel:	10.7			13.8			6.2			6.4		
Queue:	6.6			8.4			0.6			1.1		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.98		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.91		1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1633		1756	1612		1768	1863	1550	1766	1852	
Flt Permitted		0.90		0.80	1.00		0.27	1.00	1.00	0.23	1.00	
Satd. Flow (perm)		1483		1479	1612		508	1863	1550	436	1852	
Volume (vph)	23	2	56	144	11	96	13	616	138	26	551	19
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	29	3	71	182	14	122	16	780	175	33	697	24
RTOR Reduction (vph)	0	54	0	0	94	0	0	0	69	0	2	0
Lane Group Flow (vph)	0	49	0	182	42	0	16	780	106	33	719	0
Confl. Peds. (#/hr)			6	6			2		9	9		2
Confl. Bikes (#/hr)									3			
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		11.4		11.4	11.4		29.6	29.6	29.6	29.6	29.6	
Effective Green, g (s)		11.4		11.4	11.4		29.6	29.6	29.6	29.6	29.6	
Actuated g/C Ratio		0.23		0.23	0.23		0.60	0.60	0.60	0.60	0.60	
Clearance Time (s)		4.0		4.0	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	3.0	3.0	
Lane Grp Cap (vph)		345		344	375		307	1125	936	263	1119	
v/s Ratio Prot					0.03			c0.42			0.39	
v/s Ratio Perm		0.03		c0.12			0.03		0.07	0.08		
v/c Ratio		0.14		0.53	0.11		0.05	0.69	0.11	0.13	0.64	
Uniform Delay, d1		14.9		16.5	14.8		4.0	6.6	4.1	4.2	6.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.2		1.5	0.1		0.1	1.9	0.1	0.2	1.3	
Delay (s)		15.1		17.9	15.0		4.0	8.5	4.2	4.4	7.6	
Level of Service		B		B	B		A	A	A	A	A	
Approach Delay (s)		15.1			16.7			7.6			7.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Wagner & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.99		1.00	0.98		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	1.00	1.00	
Frt		0.93		1.00	0.87		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1671		1767	1593		1765	1863	1540	1763	1844	
Flt Permitted		0.79		0.69	1.00		0.22	1.00	1.00	0.32	1.00	
Satd. Flow (perm)		1350		1284	1593		414	1863	1540	600	1844	
Volume (vph)	60	3	63	96	16	96	70	665	96	22	793	45
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	3	67	102	17	102	74	707	102	23	844	48
RTOR Reduction (vph)	0	56	0	0	85	0	0	0	31	0	3	0
Lane Group Flow (vph)	0	78	0	102	34	0	74	707	71	23	889	0
Confl. Peds. (#/hr)	1		1	1		1	8		12	12		8
Confl. Bikes (#/hr)			3						8			2
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		9.6		9.6	9.6		40.1	40.1	40.1	40.1	40.1	
Effective Green, g (s)		9.6		9.6	9.6		40.1	40.1	40.1	40.1	40.1	
Actuated g/C Ratio		0.17		0.17	0.17		0.69	0.69	0.69	0.69	0.69	
Clearance Time (s)		4.0		4.0	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	3.0	3.0	
Lane Grp Cap (vph)		225		214	265		288	1295	1070	417	1282	
v/s Ratio Prot					0.02			0.38			c0.48	
v/s Ratio Perm		0.06		c0.08			0.18		0.05	0.04		
v/c Ratio		0.35		0.48	0.13		0.26	0.55	0.07	0.06	0.69	
Uniform Delay, d1		21.3		21.8	20.5		3.3	4.3	2.8	2.8	5.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9		1.7	0.2		0.5	0.5	0.0	0.1	1.6	
Delay (s)		22.2		23.4	20.7		3.7	4.8	2.8	2.8	6.8	
Level of Service		C		C	C		A	A	A	A	A	
Approach Delay (s)		22.2			22.0			4.5			6.7	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM Average Control Delay	8.3	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	72.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1732	1549	1770	1778		1770	1806		1770	1863	1561
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1732	1549	1770	1778		1770	1806		1770	1863	1561
Volume (vph)	426	177	203	160	172	60	297	387	82	35	376	257
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	192	221	174	187	65	323	421	89	38	409	279
RTOR Reduction (vph)	0	0	147	0	14	0	0	8	0	0	0	99
Lane Group Flow (vph)	319	336	74	174	238	0	323	502	0	38	409	180
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split		Perm	Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases			4									6
Actuated Green, G (s)	18.0	18.0	18.0	14.7	14.7		17.0	37.1		4.6	24.7	42.7
Effective Green, g (s)	18.0	18.0	18.0	14.7	14.7		17.0	37.1		4.6	24.7	42.7
Actuated g/C Ratio	0.20	0.20	0.20	0.16	0.16		0.19	0.41		0.05	0.27	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	335	345	308	288	289		333	741		90	509	806
v/s Ratio Prot	0.19	c0.19		0.10	c0.13		c0.18	0.28		0.02	c0.22	0.04
v/s Ratio Perm			0.05									0.07
v/c Ratio	0.95	0.97	0.24	0.60	0.82		0.97	0.68		0.42	0.80	0.22
Uniform Delay, d1	35.8	36.0	30.4	35.1	36.6		36.4	21.8		41.6	30.6	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	36.5	41.2	0.4	3.6	17.0		40.7	4.9		3.2	12.7	0.1
Delay (s)	72.3	77.1	30.8	38.7	53.6		77.2	26.7		44.8	43.2	14.2
Level of Service	E	E	C	D	D		E	C		D	D	B
Approach Delay (s)		63.7			47.5			46.3			32.2	
Approach LOS		E			D			D			C	

Intersection Summary				
HCM Average Control Delay	48.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	79.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake 1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		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
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1767	1546	1770	1826		1770	1726		1770	1863	1562
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1767	1546	1770	1826		1770	1726		1770	1863	1562
Volume (vph)	220	220	363	121	182	22	317	211	147	18	308	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	239	395	132	198	24	345	229	160	20	335	318
RTOR Reduction (vph)	0	0	312	0	3	0	0	17	0	0	0	62
Lane Group Flow (vph)	233	245	83	132	219	0	345	372	0	20	335	256
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split		Perm	Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases			4									6
Actuated Green, G (s)	21.2	21.2	21.2	15.2	15.2		23.2	45.1		2.8	24.7	45.9
Effective Green, g (s)	21.2	21.2	21.2	15.2	15.2		23.2	45.1		2.8	24.7	45.9
Actuated g/C Ratio	0.21	0.21	0.21	0.15	0.15		0.23	0.45		0.03	0.25	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	355	373	327	268	277		409	776		49	459	777
v/s Ratio Prot	0.14	c0.14		0.07	c0.12		c0.19	0.22		0.01	c0.18	0.07
v/s Ratio Perm			0.05									0.09
v/c Ratio	0.66	0.66	0.26	0.49	0.79		0.84	0.48		0.41	0.73	0.33
Uniform Delay, d1	36.2	36.2	33.0	39.0	41.0		36.8	19.4		47.9	34.7	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.3	4.1	0.4	1.4	13.8		14.6	2.1		5.5	9.8	0.3
Delay (s)	40.5	40.4	33.4	40.4	54.8		51.4	21.5		53.4	44.5	17.6
Level of Service	D	D	C	D	D		D	C		D	D	B
Approach Delay (s)		37.3			49.5			35.6			32.1	
Approach LOS		D			D			D			C	

Intersection Summary				
HCM Average Control Delay	37.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	100.3	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	70.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley 1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1798		1770	1863	1583	1770	3327		1770	3539	1563
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1798		1770	1863	1583	1770	3327		1770	3539	1563
Volume (vph)	198	320	86	167	402	99	29	364	196	166	487	270
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	348	93	182	437	108	32	396	213	180	529	293
RTOR Reduction (vph)	0	13	0	0	0	76	0	91	0	0	0	161
Lane Group Flow (vph)	215	428	0	182	437	32	32	518	0	180	529	132
Confl. Peds. (#/hr)			3	3			3		1	1		3
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	7.0	19.7		9.6	22.3	22.3	3.1	20.5		9.6	27.0	34.0
Effective Green, g (s)	7.0	19.7		9.6	22.3	22.3	3.1	20.5		9.6	27.0	34.0
Actuated g/C Ratio	0.09	0.26		0.13	0.30	0.30	0.04	0.27		0.13	0.36	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	319	470		225	551	468	73	905		225	1267	788
v/s Ratio Prot	0.06	c0.24		c0.10	c0.23		0.02	c0.16		c0.10	0.15	0.02
v/s Ratio Perm						0.02						0.07
v/c Ratio	0.67	0.91		0.81	0.79	0.07	0.44	0.57		0.80	0.42	0.17
Uniform Delay, d1	33.1	27.0		32.0	24.4	19.1	35.3	23.7		32.0	18.3	12.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.5	21.6		18.9	7.7	0.1	4.2	2.6		18.1	1.0	0.1
Delay (s)	38.6	48.6		50.9	32.1	19.1	39.5	26.3		50.1	19.3	12.4
Level of Service	D	D		D	C	B	D	C		D	B	B
Approach Delay (s)		45.3			34.9			27.0			22.8	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM Average Control Delay	31.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	70.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley 1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1807		1770	1863	1561	1770	3394		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1807		1770	1863	1561	1770	3394		1770	3539	1583
Volume (vph)	352	418	92	303	350	206	165	795	241	236	503	189
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	363	431	95	312	361	212	170	820	248	243	519	195
RTOR Reduction (vph)	0	7	0	0	0	148	0	26	0	0	0	113
Lane Group Flow (vph)	363	519	0	312	361	64	170	1042	0	243	519	82
Confl. Peds. (#/hr)	1		2	2		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	13.8	29.0		18.0	33.2	33.2	14.8	33.0		14.0	32.2	46.0
Effective Green, g (s)	13.8	29.0		18.0	33.2	33.2	14.8	33.0		14.0	32.2	46.0
Actuated g/C Ratio	0.13	0.26		0.16	0.30	0.30	0.13	0.30		0.13	0.29	0.42
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	431	476		290	562	471	238	1018		225	1036	720
v/s Ratio Prot	0.11	c0.29		c0.18	0.19		0.10	c0.31		c0.14	0.15	0.01
v/s Ratio Perm						0.04						0.04
v/c Ratio	0.84	1.09		1.08	0.64	0.14	0.71	1.02		1.08	0.50	0.11
Uniform Delay, d1	47.0	40.5		46.0	33.3	28.0	45.6	38.5		48.0	32.2	19.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.9	67.7		74.5	2.5	0.1	9.7	34.4		82.9	1.7	0.1
Delay (s)	60.9	108.2		120.5	35.8	28.1	55.3	72.9		130.9	34.0	19.6
Level of Service	E	F		F	D	C	E	E		F	C	B
Approach Delay (s)		88.9			63.8			70.4			55.7	
Approach LOS		F			E			E			E	

Intersection Summary				
HCM Average Control Delay	69.5	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	100.5%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley 12/11/2008

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.93	1.00	1.00	0.97	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1559	3433	3539	1470	3433	3539	1532	3433	1863	1557
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1559	3433	3539	1470	3433	3539	1532	3433	1863	1557
Volume (vph)	300	1172	767	311	1516	298	480	573	438	368	418	233
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	337	1317	862	349	1703	335	539	644	492	413	470	262
RTOR Reduction (vph)	0	0	0	0	0	7	0	0	19	0	0	7
Lane Group Flow (vph)	337	1317	862	349	1703	328	539	644	473	413	470	255
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Free	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases			Free			2			4			8
Actuated Green, G (s)	15.8	53.0	147.9	15.8	53.0	77.0	26.9	34.6	50.4	24.0	31.7	47.5
Effective Green, g (s)	16.0	54.7	147.9	16.0	54.7	80.0	28.2	35.9	51.9	25.3	33.0	49.0
Actuated g/C Ratio	0.11	0.37	1.00	0.11	0.37	0.54	0.19	0.24	0.35	0.17	0.22	0.33
Clearance Time (s)	4.2	5.7		4.2	5.7	5.3	5.3	5.3	4.2	5.3	5.3	4.2
Vehicle Extension (s)	3.0	5.0		3.0	5.0	3.5	3.5	3.5	3.0	3.5	3.5	3.0
Lane Grp Cap (vph)	371	1309	1559	371	1309	835	655	859	579	587	416	558
v/s Ratio Prot	0.10	0.37		0.10	c0.48	0.07	c0.16	0.18	c0.09	0.12	c0.25	0.05
v/s Ratio Perm			c0.55			0.16			0.22			0.11
v/c Ratio	0.91	1.01	0.55	0.94	1.30	0.39	0.82	0.75	0.82	0.70	1.13	0.46
Uniform Delay, d1	65.2	46.6	0.0	65.5	46.6	19.8	57.5	51.8	43.7	57.8	57.4	39.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.1	26.4	1.4	31.8	141.2	0.4	8.5	3.7	8.7	4.0	84.5	0.6
Delay (s)	90.3	73.0	1.4	97.2	187.8	20.2	65.9	55.6	52.3	61.7	141.9	39.6
Level of Service	F	E	A	F	F	C	E	E	D	E	F	D
Approach Delay (s)		50.8			151.0			58.0			89.6	
Approach LOS		D			F			E			F	

Intersection Summary				
HCM Average Control Delay	89.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.08			
Actuated Cycle Length (s)	147.9	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	100.0%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & Harkins Slough 12/11/2008

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	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	0.97	1.00	1.00	0.96
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3433	3539	1559	3433	3539	1538	3433	1863	1520
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3433	3539	1559	3433	3539	1538	3433	1863	1520
Volume (vph)	518	1520	227	401	1300	362	788	475	423	284	344	255
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	551	1617	241	427	1383	385	838	505	450	302	366	271
RTOR Reduction (vph)	0	0	0	0	0	21	0	0	11	0	0	3
Lane Group Flow (vph)	551	1617	241	427	1383	364	838	505	439	302	366	268
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Free	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases			Free			2			4			8
Actuated Green, G (s)	19.0	56.0	140.0	15.0	52.0	69.0	29.0	36.0	51.0	17.0	24.0	43.0
Effective Green, g (s)	19.0	56.0	140.0	15.0	52.0	69.0	29.0	36.0	51.0	17.0	24.0	43.0
Actuated g/C Ratio	0.14	0.40	1.00	0.11	0.37	0.49	0.21	0.26	0.36	0.12	0.17	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	466	1416	1562	368	1314	813	711	910	604	417	319	510
v/s Ratio Prot	c0.16	c0.46		0.12	0.39	0.05	c0.24	0.14	0.08	0.09	c0.20	0.07
v/s Ratio Perm			0.15			0.18			0.21			0.10
v/c Ratio	1.18	1.14	0.15	1.16	1.05	0.45	1.18	0.55	0.73	0.72	1.15	0.52
Uniform Delay, d1	60.5	42.0	0.0	62.5	44.0	23.1	55.5	45.1	38.5	59.2	58.0	40.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	102.2	72.8	0.2	98.2	39.9	0.4	94.6	0.7	4.3	6.1	96.5	1.0
Delay (s)	162.7	114.8	0.2	160.7	83.9	23.5	150.1	45.8	42.8	65.4	154.5	41.0
Level of Service	F	F	A	F	F	C	F	D	D	E	F	D
Approach Delay (s)		114.3			88.2			93.8			93.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	98.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis AM - Cumulative With Wagner (Mitigated)
9: SR-1 NB Off Ramp & Harkins Slough 11/14/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	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	1.00	1.00			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				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770		1583	1770	1863			1863	1583
Flt Permitted				0.95		1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)				1770		1583	180	1863			1863	1583
Volume (vph)	0	0	0	213	0	364	100	626	0	0	825	468
Peak-hour factor, PHF	0.92	0.92	0.92	0.79	0.92	0.79	0.92	0.79	0.79	0.79	0.79	0.92
Adj. Flow (vph)	0	0	0	270	0	461	109	792	0	0	1044	509
RTOR Reduction (vph)	0	0	0	0	0	182	0	0	0	0	0	180
Lane Group Flow (vph)	0	0	0	270	0	279	109	792	0	0	1044	329
Confl. Peds. (#/hr)						1						
Turn Type				custom		custom	Perm					Perm
Protected Phases						2		4			8	
Permitted Phases				2			4					8
Actuated Green, G (s)				16.0		16.0	43.8	43.8			43.8	43.8
Effective Green, g (s)				16.0		16.0	43.8	43.8			43.8	43.8
Actuated g/C Ratio				0.24		0.24	0.65	0.65			0.65	0.65
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)				418		374	116	1204			1204	1023
v/s Ratio Prot						c0.18		0.43			0.56	
v/s Ratio Perm				0.15			c0.61					0.21
v/c Ratio				0.65		0.75	0.94	0.66			0.87	0.32
Uniform Delay, d1				23.3		24.0	10.8	7.4			9.7	5.4
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				3.4		7.9	64.0	1.3			6.8	0.2
Delay (s)				26.8		31.9	74.8	8.7			16.5	5.5
Level of Service				C		C	E	A			B	A
Approach Delay (s)		0.0			30.0			16.7			12.9	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	67.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — PM - Cumulative With Wagner (Mitigated)
9: SR-1 NB Off Ramp & Harkins Slough — 11/14/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	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	1.00	1.00			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				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1768		1583	1770	1863			1863	1583
Flt Permitted				0.95		1.00	0.19	1.00			1.00	1.00
Satd. Flow (perm)				1768		1583	351	1863			1863	1583
Volume (vph)	0	0	0	43	0	507	35	314	0	0	767	288
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	47	0	551	38	341	0	0	834	313
RTOR Reduction (vph)	0	0	0	0	0	388	0	0	0	0	0	132
Lane Group Flow (vph)	0	0	0	47	0	163	38	341	0	0	834	181
Confl. Peds. (#/hr)				1		3						
Turn Type				custom		custom	Perm					Perm
Protected Phases						2		4			8	
Permitted Phases				2			4					8
Actuated Green, G (s)				9.5		9.5	23.9	23.9			23.9	23.9
Effective Green, g (s)				9.5		9.5	23.9	23.9			23.9	23.9
Actuated g/C Ratio				0.23		0.23	0.58	0.58			0.58	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)				406		363	203	1076			1076	914
v/s Ratio Prot						c0.10		0.18			c0.45	
v/s Ratio Perm				0.03			0.11					0.11
v/c Ratio				0.12		0.45	0.19	0.32			0.78	0.20
Uniform Delay, d1				12.6		13.7	4.1	4.5			6.7	4.2
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.1		0.9	0.4	0.2			3.6	0.1
Delay (s)				12.8		14.6	4.6	4.7			10.2	4.3
Level of Service				B		B	A	A			B	A
Approach Delay (s)		0.0			14.5			4.7			8.6	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.6	HCM Level of Service		A
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	41.4	Sum of lost time (s)		8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough — 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	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					1.00		1.00	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1770		1583					1839		1770	1863	
Flt Permitted	0.95		1.00					1.00		0.30	1.00	
Satd. Flow (perm)	1770		1583					1839		560	1863	
Volume (vph)	330	0	40	0	0	0	0	496	51	205	883	0
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	402	0	49	0	0	0	0	605	62	250	1077	0
RTOR Reduction (vph)	0	0	36	0	0	0	0	5	0	0	0	0
Lane Group Flow (vph)	402	0	13	0	0	0	0	662	0	250	1077	0
Turn Type	custom		custom							Perm		
Protected Phases								4			8	
Permitted Phases	6		6							8		
Actuated Green, G (s)	18.1		18.1					42.2		42.2	42.2	
Effective Green, g (s)	18.1		18.1					42.2		42.2	42.2	
Actuated g/C Ratio	0.27		0.27					0.62		0.62	0.62	
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)	469		420					1136		346	1151	
v/s Ratio Prot								0.36			c0.58	
v/s Ratio Perm	c0.23		0.01							0.45		
v/c Ratio	0.86		0.03					0.58		0.72	0.94	
Uniform Delay, d1	23.9		18.6					7.8		9.0	11.8	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	14.3		0.0					0.8		7.3	13.7	
Delay (s)	38.2		18.6					8.6		16.3	25.5	
Level of Service	D		B					A		B	C	
Approach Delay (s)		36.1			0.0			8.6			23.8	
Approach LOS		D			A			A			C	

Intersection Summary				
HCM Average Control Delay	21.9	HCM Level of Service		C
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	68.3	Sum of lost time (s)		8.0
Intersection Capacity Utilization	71.4%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	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	1.00	1.00			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				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1768		1583	1770	1863			1863	1583
Flt Permitted				0.95		1.00	0.19	1.00			1.00	1.00
Satd. Flow (perm)				1768		1583	351	1863			1863	1583
Volume (vph)	0	0	0	43	0	507	35	314	0	0	767	288
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	47	0	551	38	341	0	0	834	313
RTOR Reduction (vph)	0	0	0	0	0	388	0	0	0	0	0	132
Lane Group Flow (vph)	0	0	0	47	0	163	38	341	0	0	834	181
Confl. Peds. (#/hr)				1		3						
Turn Type				custom		custom	Perm					Perm
Protected Phases						2		4			8	
Permitted Phases				2			4					8
Actuated Green, G (s)				9.5		9.5	23.9	23.9			23.9	23.9
Effective Green, g (s)				9.5		9.5	23.9	23.9			23.9	23.9
Actuated g/C Ratio				0.23		0.23	0.58	0.58			0.58	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)				406		363	203	1076			1076	914
v/s Ratio Prot						c0.10		0.18			c0.45	
v/s Ratio Perm				0.03			0.11					0.11
v/c Ratio				0.12		0.45	0.19	0.32			0.78	0.20
Uniform Delay, d1				12.6		13.7	4.1	4.5			6.7	4.2
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.1		0.9	0.4	0.2			3.6	0.1
Delay (s)				12.8		14.6	4.6	4.7			10.2	4.3
Level of Service				B		B	A	A			B	A
Approach Delay (s)		0.0			14.5			4.7			8.6	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.0	HCM Level of Service		A
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	41.4	Sum of lost time (s)		8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/11/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3424		1770	3539	1583	1770	3346		3433	3502	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3424		1770	3539	1583	1770	3346		3433	3502	
Volume (vph)	234	621	151	53	558	196	292	560	264	301	468	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	690	168	59	620	218	324	622	293	334	520	31
RTOR Reduction (vph)	0	22	0	0	0	71	0	58	0	0	5	0
Lane Group Flow (vph)	260	836	0	59	620	147	324	857	0	334	546	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	12.3	23.0		16.0	26.7	26.7	22.0	25.0		16.0	19.0	
Effective Green, g (s)	12.3	23.0		16.0	26.7	26.7	22.0	25.0		16.0	19.0	
Actuated g/C Ratio	0.13	0.24		0.17	0.28	0.28	0.23	0.26		0.17	0.20	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	440	820		295	984	440	406	871		572	693	
v/s Ratio Prot	0.08	c0.24		0.03	c0.18		c0.18	c0.26		0.10	0.16	
v/s Ratio Perm						0.09						
v/c Ratio	0.59	1.02		0.20	0.63	0.33	0.80	0.98		0.58	0.79	
Uniform Delay, d1	39.5	36.5		34.5	30.3	27.6	34.9	35.3		36.9	36.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	36.4		1.5	1.3	0.4	15.0	26.3		4.3	5.9	
Delay (s)	41.6	72.9		36.0	31.7	28.0	49.9	61.6		41.2	42.5	
Level of Service	D	E		D	C	C	D	E		D	D	
Approach Delay (s)		65.6			31.1			58.5			42.0	
Approach LOS		E			C			E			D	

Intersection Summary				
HCM Average Control Delay	51.0	HCM Level of Service		D
HCM Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	96.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	71.4%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom 12/11/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	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	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3353		1770	3539	1556	1770	3404		3433	3358	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3353		1770	3539	1556	1770	3404		3433	3358	
Volume (vph)	343	583	240	116	479	167	269	566	162	330	468	146
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	354	601	247	120	494	172	277	584	167	340	482	151
RTOR Reduction (vph)	0	50	0	0	0	77	0	30	0	0	33	0
Lane Group Flow (vph)	354	798	0	120	494	95	277	721	0	340	600	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	13.8	22.0		16.0	24.2	24.2	16.0	20.0		16.0	20.0	
Effective Green, g (s)	13.8	22.0		16.0	24.2	24.2	16.0	20.0		16.0	20.0	
Actuated g/C Ratio	0.15	0.24		0.18	0.27	0.27	0.18	0.22		0.18	0.22	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	526	820		315	952	418	315	756		610	746	
v/s Ratio Prot	0.10	c0.24		0.07	c0.14		c0.16	c0.21		0.10	0.18	
v/s Ratio Perm						0.06						
v/c Ratio	0.67	0.97		0.38	0.52	0.23	0.88	0.95		0.56	0.80	
Uniform Delay, d1	36.0	33.7		32.6	28.0	25.6	36.1	34.5		33.8	33.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	24.8		3.5	0.5	0.3	27.6	22.1		3.6	6.3	
Delay (s)	39.4	58.6		36.1	28.4	25.9	63.7	56.6		37.4	39.4	
Level of Service	D	E		D	C	C	E	E		D	D	
Approach Delay (s)		52.9			29.1			58.5			38.7	
Approach LOS		D			C			E			D	

Intersection Summary				
HCM Average Control Delay	46.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	76.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley 12/11/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	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	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1558	1770	3539	1553	3433	3352		3433	3425	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1558	1770	3539	1553	3433	3352		3433	3425	
Volume (vph)	92	507	139	280	484	260	182	530	240	282	416	91
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	111	611	167	337	583	313	219	639	289	340	501	110
RTOR Reduction (vph)	0	0	99	0	0	213	0	70	0	0	25	0
Lane Group Flow (vph)	111	611	68	337	583	100	219	858	0	340	586	0
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						
Actuated Green, G (s)	7.7	16.8	16.8	15.0	24.1	24.1	8.6	20.0		8.0	19.4	
Effective Green, g (s)	7.7	16.8	16.8	15.0	24.1	24.1	8.6	20.0		8.0	19.4	
Actuated g/C Ratio	0.10	0.22	0.22	0.20	0.32	0.32	0.11	0.26		0.11	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	180	784	345	350	1125	494	389	884		362	877	
v/s Ratio Prot	0.06	c0.17		c0.19	0.16		0.06	c0.26		c0.10	0.17	
v/s Ratio Perm			0.04			0.06						
v/c Ratio	0.62	0.78	0.20	0.96	0.52	0.20	0.56	0.97		0.94	0.67	
Uniform Delay, d1	32.6	27.8	24.0	30.1	21.1	18.8	31.8	27.6		33.7	25.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.2	7.5	1.3	38.1	1.7	0.9	1.9	23.2		31.6	1.9	
Delay (s)	38.8	35.3	25.3	68.2	22.8	19.8	33.7	50.8		65.3	27.3	
Level of Service	D	D	C	E	C	B	C	D		E	C	
Approach Delay (s)		33.9			34.4			47.6			40.9	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM Average Control Delay	39.9	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	73.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & Harkins Slough 12/11/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1550	1770	3539	1518	3433	3321		3433	3427	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1550	1770	3539	1518	3433	3321		3433	3427	
Volume (vph)	169	699	167	371	622	359	238	711	334	392	478	106
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)	178	736	176	391	655	378	251	748	352	413	503	112
RTOR Reduction (vph)	0	0	66	0	0	210	0	56	0	0	19	0
Lane Group Flow (vph)	178	736	110	391	655	168	251	1044	0	413	596	0
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						
Actuated Green, G (s)	12.4	20.0	20.0	22.0	29.6	29.6	11.2	30.0		12.0	30.8	
Effective Green, g (s)	12.4	20.0	20.0	22.0	29.6	29.6	11.2	30.0		12.0	30.8	
Actuated g/C Ratio	0.12	0.20	0.20	0.22	0.30	0.30	0.11	0.30		0.12	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	219	708	310	389	1048	449	384	996		412	1056	
v/s Ratio Prot	0.10	c0.21		c0.22	0.19		0.07	c0.31		c0.12	0.17	
v/s Ratio Perm			0.07			0.11						
v/c Ratio	0.81	1.04	0.36	1.01	0.62	0.37	0.65	1.05		1.00	0.56	
Uniform Delay, d1	42.7	40.0	34.5	39.0	30.4	27.9	42.5	35.0		44.0	29.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.1	44.5	3.2	46.9	2.8	2.4	4.0	42.0		44.9	0.7	
Delay (s)	62.7	84.5	37.6	85.9	33.2	30.3	46.5	77.0		88.9	29.7	
Level of Service	E	F	D	F	C	C	D	E		F	C	
Approach Delay (s)		73.4			46.9			71.3			53.5	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM Average Control Delay	60.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #17 AM CUM _ HWY 1 NB / LARKIN VALLEY RD

Average Delay (sec/veh): 6.2 Level Of Service: A

Street Name:	HWY 1 NB RAMPS				LARKIN VALLEY ROAD			
Approach:	North Bound		South Bound		East Bound		West Bound	
Movement:	L - T - R		L - T - R		L - T - R		L - T - R	
Control:	Yield Sign		Yield Sign		Yield Sign		Yield Sign	
Lanes:	1		1		1		1	
Volume Module:								
Base Vol:	45 0 277		0 0 0		0 289 96		568 36 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:	45 0 277		0 0 0		0 289 96		568 36 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:	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 Volume:	45 0 277		0 0 0		0 289 96		568 36 0	
Reduct Vol:	0 0 0		0 0 0		0 0 0		0 0 0	
Reduced Vol:	45 0 277		0 0 0		0 289 96		568 36 0	
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:	45 0 277		0 0 0		0 289 96		568 36 0	
PCE Module:								
AutoPCE:	45 0 277		0 0 0		0 289 96		568 36 0	
TruckPCE:	0 0 0		0 0 0		0 0 0		0 0 0	
ComboPCE:	0 0 0		0 0 0		0 0 0		0 0 0	
BicyclePCE:	0 0 0		0 0 0		0 0 0		0 0 0	
AdjVolume:	45 0 277		0 0 0		0 289 96		568 36 0	
Delay Module: >> Time Period: 0.25 hours <<								
CircVolume:	289		649		568		45	
MaxVolume:	1044		xxxxxx		893		1176	
PedVolume:	0		0		0		0	
AdjMaxVol:	1044		xxxxxx		893		1176	
ApproachVol:	322		xxxxxx		385		604	
ApproachDel:	5.0		xxxxxx		7.0		6.3	
Queue:	1.3		xxxx		2.2		3.0	

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #17 PM_CUM_HWY 1 NB / LARKIN VALLEY RD

Average Delay (sec/veh): 7.1 Level Of Service: A

Street Name:	HWY 1 NB RAMPS						LARKIN VALLEY RD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	70	0	218	0	0	0	0	236	98	671	58	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:	70	0	218	0	0	0	0	236	98	671	58	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:	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 Volume:	70	0	218	0	0	0	0	236	98	671	58	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	70	0	218	0	0	0	0	236	98	671	58	0
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:	70	0	218	0	0	0	0	236	98	671	58	0
PCE Module:												
AutoPCE:	70	0	218	0	0	0	0	236	98	671	58	0
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	70	0	218	0	0	0	0	236	98	671	58	0

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	236	799	671	70
MaxVolume:	1073	xxxxxx	838	1162
PedVolume:	0	0	0	0
AdjMaxVol:	1073	xxxxxx	838	1162
ApproachVol:	288	xxxxxx	334	729
ApproachDel:	4.6	xxxxxx	7.1	8.2
Queue:	1.1	xxxx	1.9	4.6

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #18 AM _ CUM _ AIRPORT BLVD / LARKIN V RD

Average Delay (sec/veh): 13.2 Level Of Service: B

Street Name:	AIRPORT BLVD						LARKIN VALLEY ROAD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	14	487	99	32	378	588	391	124	52	20	9	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:	14	487	99	32	378	588	391	124	52	20	9	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:	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 Volume:	14	487	99	32	378	588	391	124	52	20	9	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	14	487	99	32	378	588	391	124	52	20	9	25
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:	14	487	99	32	378	588	391	124	52	20	9	25
PCE Module:												
AutoPCE:	14	487	99	32	378	588	391	124	52	20	9	25
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	14	487	99	32	378	588	391	124	52	20	9	25

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	547	43	430	892
MaxVolume:	905	1177	968	718
PedVolume:	0	0	0	0
AdjMaxVol:	905	1177	968	718
ApproachVol:	600	998	567	54
ApproachDel:	11.4	17.2	8.8	5.4
Queue:	5.2	11.2	3.9	0.2

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #18 PM _ CUM _ AIRPORT / LARKIN VALLY ROAD

Average Delay (sec/veh): 12.5 Level Of Service: B

Street Name:	AIRPORT BLVD						LARKIN VALLEY ROAD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	37	470	23	27	299	607	316	69	69	66	104	52
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:	37	470	23	27	299	607	316	69	69	66	104	52
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:	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 Volume:	37	470	23	27	299	607	316	69	69	66	104	52
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	470	23	27	299	607	316	69	69	66	104	52
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:	37	470	23	27	299	607	316	69	69	66	104	52
PCE Module:												
AutoPCE:	37	470	23	27	299	607	316	69	69	66	104	52
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	37	470	23	27	299	607	316	69	69	66	104	52

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	412	207	392	823
MaxVolume:	978	1088	988	756
PedVolume:	0	0	0	0
AdjMaxVol:	978	1088	988	756
ApproachVol:	530	933	454	222
ApproachDel:	8.0	19.2	6.7	6.7
Queue:	3.4	11.4	2.5	1.2

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #5 AM Cumulative + Project - East Lake / Wagner

Average Delay (sec/veh): 7.6 Level Of Service: A

Street Name:	East Lake						Holohan					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:AM - CUM + PROJ												
Base Vol:	14	616	138	26	551	23	37	2	58	144	11	49
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:	14	616	138	26	551	23	37	2	58	144	11	49
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:	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 Volume:	14	616	138	26	551	23	37	2	58	144	11	49
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	14	616	138	26	551	23	37	2	58	144	11	49
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:	14	616	138	26	551	23	37	2	58	144	11	49
PCE Module:												
AutoPCE:	14	616	138	26	551	23	37	2	58	144	11	49
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	14	616	138	26	551	23	37	2	58	144	11	49

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	65	169	721	667
MaxVolume:	1165	1109	811	840
PedVolume:	0	0	0	0
AdjMaxVol:	1165	1109	811	840
ApproachVol:	768	600	97	204
ApproachDel:	8.9	7.0	5.0	5.7
Queue:	5.2	3.4	0.4	1.0

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #5 PM Cumulative + Project - East Lake / Wagner

Average Delay (sec/veh): 11.7 Level Of Service: B

Street Name:	East Lake						Holohan					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module: PM CUM + PROJ												
Base Vol:	72	665	96	22	793	59	68	3	64	96	16	96
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:	72	665	96	22	793	59	68	3	64	96	16	96
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:	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 Volume:	72	665	96	22	793	59	68	3	64	96	16	96
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	72	665	96	22	793	59	68	3	64	96	16	96
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:	72	665	96	22	793	59	68	3	64	96	16	96
PCE Module:												
AutoPCE:	72	665	96	22	793	59	68	3	64	96	16	96
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	72	665	96	22	793	59	68	3	64	96	16	96
Delay Module: >> Time Period: 0.25 hours <<												
CircVolume:	93			184			911			805		
MaxVolume:	1150			1101			708			765		
PedVolume:	0			0			0			0		
AdjMaxVol:	1150			1101			708			765		
ApproachVol:	833			874			135			208		
ApproachDel:	10.9			14.5			6.3			6.5		
Queue:	6.7			8.8			0.7			1.1		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.98		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.92		1.00	0.88		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1652		1756	1635		1768	1863	1549	1766	1850	
Flt Permitted		0.88		0.74	1.00		0.25	1.00	1.00	0.22	1.00	
Satd. Flow (perm)		1474		1375	1635		472	1863	1549	405	1850	
Volume (vph)	37	2	58	144	11	49	14	616	138	26	551	23
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	47	3	73	182	14	62	18	780	175	33	697	29
RTOR Reduction (vph)	0	54	0	0	46	0	0	0	73	0	3	0
Lane Group Flow (vph)	0	69	0	182	30	0	18	780	102	33	723	0
Confl. Peds. (#/hr)			6	6			2		9	9		2
Confl. Bikes (#/hr)									3			
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		13.3		13.3	13.3		29.8	29.8	29.8	29.8	29.8	
Effective Green, g (s)		13.3		13.3	13.3		29.8	29.8	29.8	29.8	29.8	
Actuated g/C Ratio		0.26		0.26	0.26		0.58	0.58	0.58	0.58	0.58	
Clearance Time (s)		4.0		4.0	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	3.0	3.0	
Lane Grp Cap (vph)		384		358	426		275	1086	903	236	1079	
v/s Ratio Prot					0.02			c0.42			0.39	
v/s Ratio Perm		0.05		c0.13			0.04		0.07	0.08		
v/c Ratio		0.18		0.51	0.07		0.07	0.72	0.11	0.14	0.67	
Uniform Delay, d1		14.7		16.1	14.2		4.6	7.6	4.8	4.8	7.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.2		1.1	0.1		0.1	2.3	0.1	0.3	1.7	
Delay (s)		14.9		17.3	14.3		4.7	9.9	4.8	5.1	8.9	
Level of Service		B		B	B		A	A	A	A	A	
Approach Delay (s)		14.9			16.4			8.9			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Wagner & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.99		1.00	0.98		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	1.00	1.00	
Frt		0.94		1.00	0.87		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1678		1768	1593		1766	1863	1543	1764	1839	
Flt Permitted		0.79		0.72	1.00		0.17	1.00	1.00	0.29	1.00	
Satd. Flow (perm)		1356		1339	1593		319	1863	1543	547	1839	
Volume (vph)	68	3	64	96	16	96	72	665	96	22	793	59
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	72	3	68	102	17	102	77	707	102	23	844	63
RTOR Reduction (vph)	0	49	0	0	77	0	0	0	38	0	4	0
Lane Group Flow (vph)	0	94	0	102	42	0	77	707	64	23	903	0
Confl. Peds. (#/hr)	1		1	1		1	8		12	12		8
Confl. Bikes (#/hr)			3						8			2
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		10.2		10.2	10.2		30.3	30.3	30.3	30.3	30.3	
Effective Green, g (s)		10.2		10.2	10.2		30.3	30.3	30.3	30.3	30.3	
Actuated g/C Ratio		0.21		0.21	0.21		0.62	0.62	0.62	0.62	0.62	
Clearance Time (s)		4.0		4.0	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	3.0	3.0	
Lane Grp Cap (vph)		285		282	335		199	1164	964	342	1149	
v/s Ratio Prot					0.03			0.38			c0.49	
v/s Ratio Perm		0.07		c0.08			0.24		0.04	0.04		
v/c Ratio		0.33		0.36	0.13		0.39	0.61	0.07	0.07	0.79	
Uniform Delay, d1		16.3		16.4	15.5		4.5	5.5	3.6	3.6	6.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7		0.8	0.2		1.3	0.9	0.0	0.1	3.6	
Delay (s)		16.9		17.2	15.7		5.8	6.4	3.6	3.6	10.3	
Level of Service		B		B	B		A	A	A	A	B	
Approach Delay (s)		16.9			16.4			6.0			10.2	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	9.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	48.5	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake with Additional NL

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
Lane Util. Factor	0.95	0.95		1.00	1.00		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1615		1770	1778		3433	1806		1770	1863	1543
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1615		1770	1778		3433	1806		1770	1863	1543
Volume (vph)	426	177	203	161	172	60	297	399	84	35	379	257
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	192	221	175	187	65	323	434	91	38	412	279
RTOR Reduction (vph)	0	39	0	0	14	0	0	8	0	0	0	132
Lane Group Flow (vph)	428	409	0	175	238	0	323	517	0	38	412	147
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split			Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	23.0	23.0		14.7	14.7		9.0	32.1		4.6	27.7	27.7
Effective Green, g (s)	23.0	23.0		14.7	14.7		9.0	32.1		4.6	27.7	27.7
Actuated g/C Ratio	0.25	0.25		0.16	0.16		0.10	0.36		0.05	0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	428	411		288	289		342	641		90	571	473
v/s Ratio Prot	c0.25	0.25		0.10	c0.13		c0.09	c0.29		0.02	0.22	
v/s Ratio Perm												0.10
v/c Ratio	1.00	1.00		0.61	0.82		0.94	0.81		0.42	0.72	0.31
Uniform Delay, d1	33.7	33.7		35.2	36.6		40.5	26.3		41.6	27.9	24.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	43.5	43.0		3.6	17.0		34.2	10.5		3.2	7.7	1.7
Delay (s)	77.2	76.6		38.8	53.6		74.6	36.8		44.8	35.6	25.7
Level of Service	E	E		D	D		E	D		D	D	C
Approach Delay (s)		76.9			47.5			51.2			32.3	
Approach LOS		E			D			D			C	

Intersection Summary				
HCM Average Control Delay	53.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	78.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake

1/2/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1732	1549	1770	1778		1770	1806		1770	1863	1561
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1732	1549	1770	1778		1770	1806		1770	1863	1561
Volume (vph)	426	177	203	161	172	60	297	399	84	35	379	257
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	192	221	175	187	65	323	434	91	38	412	279
RTOR Reduction (vph)	0	0	147	0	14	0	0	8	0	0	0	99
Lane Group Flow (vph)	319	336	74	175	238	0	323	517	0	38	412	180
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			1			1						2
Turn Type	Split		Perm	Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases			4									6
Actuated Green, G (s)	18.0	18.0	18.0	14.7	14.7		17.0	37.1		4.6	24.7	42.7
Effective Green, g (s)	18.0	18.0	18.0	14.7	14.7		17.0	37.1		4.6	24.7	42.7
Actuated g/C Ratio	0.20	0.20	0.20	0.16	0.16		0.19	0.41		0.05	0.27	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	335	345	308	288	289		333	741		90	509	806
v/s Ratio Prot	0.19	c0.19		0.10	c0.13		c0.18	0.29		0.02	c0.22	0.04
v/s Ratio Perm			0.05									0.07
v/c Ratio	0.95	0.97	0.24	0.61	0.82		0.97	0.70		0.42	0.81	0.22
Uniform Delay, d1	35.8	36.0	30.4	35.2	36.6		36.4	22.0		41.6	30.7	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	36.5	41.2	0.4	3.6	17.0		40.7	5.4		3.2	13.0	0.1
Delay (s)	72.3	77.1	30.8	38.8	53.6		77.2	27.4		44.8	43.7	14.2
Level of Service	E	E	C	D	D		E	C		D	D	B
Approach Delay (s)		63.7			47.5			46.4			32.5	
Approach LOS		E			D			D			C	

Intersection Summary				
HCM Average Control Delay	48.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	79.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake with Additional NL

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
Lane Util. Factor	0.95	0.95		1.00	1.00		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1582		1770	1827		3433	1724		1770	1863	1540
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1582		1770	1827		3433	1724		1770	1863	1540
Volume (vph)	220	220	363	123	182	22	317	211	148	18	320	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	239	395	134	198	24	345	229	161	20	348	318
RTOR Reduction (vph)	0	66	0	0	5	0	0	25	0	0	0	176
Lane Group Flow (vph)	239	568	0	134	217	0	345	365	0	20	348	142
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	31.0	31.0		14.1	14.1		9.0	26.5		3.0	20.5	20.5
Effective Green, g (s)	31.0	31.0		14.1	14.1		9.0	26.5		3.0	20.5	20.5
Actuated g/C Ratio	0.34	0.34		0.16	0.16		0.10	0.29		0.03	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	575	541		275	284		341	504		59	422	348
v/s Ratio Prot	0.14	c0.36		0.08	c0.12		c0.10	0.21		0.01	c0.19	
v/s Ratio Perm												0.09
v/c Ratio	0.42	1.05		0.49	0.76		1.01	0.72		0.34	0.82	0.41
Uniform Delay, d1	22.9	29.8		34.9	36.7		40.8	28.8		42.8	33.3	29.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	52.2		1.4	11.5		51.7	8.7		3.4	16.6	3.5
Delay (s)	23.3	82.0		36.3	48.2		92.5	37.5		46.2	49.9	33.4
Level of Service	C	F		D	D		F	D		D	D	C
Approach Delay (s)		65.9			43.7			63.3			42.1	
Approach LOS		E			D			E			D	

Intersection Summary				
HCM Average Control Delay	56.1	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	73.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake 12/11/2008

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
Lane Util. Factor	0.95	0.95		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1582		1770	1826		1770	1724		1770	1863	1537
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1582		1770	1826		1770	1724		1770	1863	1537
Volume (vph)	220	220	363	123	182	22	317	211	148	18	320	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	239	395	134	198	24	345	229	161	20	348	318
RTOR Reduction (vph)	0	50	0	0	3	0	0	20	0	0	0	135
Lane Group Flow (vph)	239	584	0	134	219	0	345	370	0	20	348	183
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	42.0	42.0		15.8	15.8		23.0	45.3		3.1	25.4	25.4
Effective Green, g (s)	42.0	42.0		15.8	15.8		23.0	45.3		3.1	25.4	25.4
Actuated g/C Ratio	0.34	0.34		0.13	0.13		0.19	0.37		0.03	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	578	544		229	236		333	639		45	387	319
v/s Ratio Prot	0.14	c0.37		0.08	c0.12		c0.19	0.21		0.01	c0.19	
v/s Ratio Perm												0.12
v/c Ratio	0.41	1.07		0.59	0.93		1.04	0.58		0.44	0.90	0.57
Uniform Delay, d1	30.7	40.1		50.1	52.6		49.6	30.8		58.7	47.2	43.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	59.9		3.8	38.5		59.0	3.8		6.9	26.3	7.3
Delay (s)	31.2	100.0		53.9	91.2		108.6	34.6		65.6	73.4	50.9
Level of Service	C	F		D	F		F	C		E	E	D
Approach Delay (s)		81.1			77.1			69.3			62.7	
Approach LOS		F			E			E			E	

Intersection Summary				
HCM Average Control Delay	72.6	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	82.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley 1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1798		1770	1863	1583	1770	3329		1770	3539	1563
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1798		1770	1863	1583	1770	3329		1770	3539	1563
Volume (vph)	198	320	86	167	402	99	29	369	196	166	488	270
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	348	93	182	437	108	32	401	213	180	530	293
RTOR Reduction (vph)	0	13	0	0	0	76	0	89	0	0	0	161
Lane Group Flow (vph)	215	428	0	182	437	32	32	525	0	180	530	132
Confl. Peds. (#/hr)			3	3			3		1	1		3
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	7.0	19.7		9.6	22.3	22.3	3.1	20.5		9.6	27.0	34.0
Effective Green, g (s)	7.0	19.7		9.6	22.3	22.3	3.1	20.5		9.6	27.0	34.0
Actuated g/C Ratio	0.09	0.26		0.13	0.30	0.30	0.04	0.27		0.13	0.36	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	319	470		225	551	468	73	905		225	1267	788
v/s Ratio Prot	0.06	c0.24		c0.10	c0.23		0.02	c0.16		c0.10	0.15	0.02
v/s Ratio Perm						0.02						0.07
v/c Ratio	0.67	0.91		0.81	0.79	0.07	0.44	0.58		0.80	0.42	0.17
Uniform Delay, d1	33.1	27.0		32.0	24.4	19.1	35.3	23.7		32.0	18.3	12.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.5	21.6		18.9	7.7	0.1	4.2	2.7		18.1	1.0	0.1
Delay (s)	38.6	48.6		50.9	32.1	19.1	39.5	26.4		50.1	19.3	12.4
Level of Service	D	D		D	C	B	D	C		D	B	B
Approach Delay (s)		45.3			34.9			27.1			22.8	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM Average Control Delay	31.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	70.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley 1/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1807		1770	1863	1561	1770	3394		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1807		1770	1863	1561	1770	3394		1770	3539	1583
Volume (vph)	352	418	92	303	350	201	165	798	241	236	508	175
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	363	431	95	312	361	207	170	823	248	243	524	180
RTOR Reduction (vph)	0	7	0	0	0	145	0	26	0	0	0	105
Lane Group Flow (vph)	363	519	0	312	361	62	170	1045	0	243	524	75
Confl. Peds. (#/hr)	1		2	2		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	13.8	29.0		18.0	33.2	33.2	14.8	33.0		14.0	32.2	46.0
Effective Green, g (s)	13.8	29.0		18.0	33.2	33.2	14.8	33.0		14.0	32.2	46.0
Actuated g/C Ratio	0.13	0.26		0.16	0.30	0.30	0.13	0.30		0.13	0.29	0.42
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	431	476		290	562	471	238	1018		225	1036	720
v/s Ratio Prot	0.11	c0.29		c0.18	0.19		0.10	c0.31		c0.14	0.15	0.01
v/s Ratio Perm						0.04						0.03
v/c Ratio	0.84	1.09		1.08	0.64	0.13	0.71	1.03		1.08	0.51	0.10
Uniform Delay, d1	47.0	40.5		46.0	33.3	27.9	45.6	38.5		48.0	32.3	19.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.9	67.7		74.5	2.5	0.1	9.7	35.2		82.9	1.8	0.1
Delay (s)	60.9	108.2		120.5	35.8	28.1	55.3	73.7		130.9	34.1	19.5
Level of Service	E	F		F	D	C	E	E		F	C	B
Approach Delay (s)		88.9			64.0			71.2			56.1	
Approach LOS		F			E			E			E	

Intersection Summary				
HCM Average Control Delay	70.0	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	100.6%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & S Green Valley 12/11/2008

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.93	1.00	1.00	0.97	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1559	3433	3539	1471	3433	3539	1534	3433	1863	1557
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1559	3433	3539	1471	3433	3539	1534	3433	1863	1557
Volume (vph)	304	1172	767	311	1516	298	480	577	438	368	432	247
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	342	1317	862	349	1703	335	539	648	492	413	485	278
RTOR Reduction (vph)	0	0	0	0	0	7	0	0	19	0	0	7
Lane Group Flow (vph)	342	1317	862	349	1703	328	539	648	473	413	485	271
Confl. Peds. (#/hr)	61		11	11		61	8		23	23		8
Confl. Bikes (#/hr)						3						1
Turn Type	Prot		Free	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases			Free			2			4			8
Actuated Green, G (s)	15.8	52.1	146.9	15.8	52.1	76.0	26.9	35.7	51.5	23.9	32.7	48.5
Effective Green, g (s)	16.0	53.8	146.9	16.0	53.8	79.0	27.1	35.9	51.9	25.2	34.0	50.0
Actuated g/C Ratio	0.11	0.37	1.00	0.11	0.37	0.54	0.18	0.24	0.35	0.17	0.23	0.34
Clearance Time (s)	4.2	5.7		4.2	5.7	5.3	4.2	4.2	4.2	5.3	5.3	4.2
Vehicle Extension (s)	3.0	5.0		3.0	5.0	3.5	3.0	3.0	3.0	3.5	3.5	3.0
Lane Grp Cap (vph)	374	1296	1559	374	1296	831	633	865	584	589	431	572
v/s Ratio Prot	0.10	0.37		0.10	c0.48	0.07	c0.16	0.18	c0.09	0.12	c0.26	0.05
v/s Ratio Perm			c0.55			0.16			0.22			0.12
v/c Ratio	0.91	1.02	0.55	0.93	1.31	0.39	0.85	0.75	0.81	0.70	1.13	0.47
Uniform Delay, d1	64.8	46.6	0.0	64.9	46.6	19.9	58.0	51.3	43.0	57.3	56.4	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.2	29.1	1.4	29.9	146.9	0.4	10.7	3.6	8.1	3.9	82.1	0.6
Delay (s)	91.0	75.7	1.4	94.8	193.5	20.3	68.6	54.9	51.1	61.2	138.6	38.7
Level of Service	F	E	A	F	F	C	E	D	D	E	F	D
Approach Delay (s)		52.4			154.7			58.2			87.8	
Approach LOS		D			F			E			F	

Intersection Summary				
HCM Average Control Delay	90.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.09			
Actuated Cycle Length (s)	146.9	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	100.7%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Main & Harkins Slough 12/11/2008

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.97
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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1562	3433	3539	1564	3433	3539	1551	3433	1863	1539
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1562	3433	3539	1564	3433	3539	1551	3433	1863	1539
Volume (vph)	532	1520	227	401	1300	362	788	489	423	284	352	263
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	566	1617	241	427	1383	385	838	520	450	302	374	280
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	36	0	0	3
Lane Group Flow (vph)	566	1617	241	427	1383	372	838	520	414	302	374	277
Confl. Peds. (#/hr)	3		6	6		3	23		11	11		23
Confl. Bikes (#/hr)						1						1
Turn Type	Prot		Free	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases			Free			2			4			8
Actuated Green, G (s)	20.8	53.0	150.0	15.8	48.0	68.1	32.8	41.7	57.5	20.1	29.0	49.8
Effective Green, g (s)	21.0	54.7	150.0	16.0	49.7	71.1	33.0	41.9	57.9	21.4	30.3	51.3
Actuated g/C Ratio	0.14	0.36	1.00	0.11	0.33	0.47	0.22	0.28	0.39	0.14	0.20	0.34
Clearance Time (s)	4.2	5.7		4.2	5.7	5.3	4.2	4.2	4.2	5.3	5.3	4.2
Vehicle Extension (s)	3.0	5.0		3.0	5.0	3.5	3.0	3.0	3.0	3.5	3.5	3.0
Lane Grp Cap (vph)	481	1291	1562	366	1173	741	755	989	640	490	376	526
v/s Ratio Prot	0.16	c0.46		0.12	c0.39	0.07	c0.24	0.15	0.07	0.09	c0.20	0.07
v/s Ratio Perm			0.15			0.17			0.20			0.11
v/c Ratio	1.18	1.25	0.15	1.17	1.18	0.50	1.11	0.53	0.65	0.62	0.99	0.53
Uniform Delay, d1	64.5	47.6	0.0	67.0	50.1	27.2	58.5	45.7	37.7	60.4	59.8	39.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	99.4	120.2	0.2	100.7	89.6	0.6	67.2	0.5	2.3	2.4	44.8	1.0
Delay (s)	163.9	167.8	0.2	167.7	139.8	27.9	125.7	46.2	39.9	62.9	104.6	40.6
Level of Service	F	F	A	F	F	C	F	D	D	E	F	D
Approach Delay (s)		150.3			125.6			81.5			72.6	
Approach LOS		F			F			F			E	

Intersection Summary				
HCM Average Control Delay	116.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.16			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	110.8%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	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	1.00	1.00			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				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770		1583	1770	1863			1863	1583
Flt Permitted				0.95		1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)				1770		1583	178	1863			1863	1583
Volume (vph)	0	0	0	213	0	368	100	626	0	0	825	482
Peak-hour factor, PHF	0.92	0.92	0.92	0.79	0.92	0.79	0.92	0.79	0.79	0.79	0.79	0.92
Adj. Flow (vph)	0	0	0	270	0	466	109	792	0	0	1044	524
RTOR Reduction (vph)	0	0	0	0	0	175	0	0	0	0	0	188
Lane Group Flow (vph)	0	0	0	270	0	291	109	792	0	0	1044	336
Confl. Peds. (#/hr)						1						
Turn Type				custom		custom	Perm					Perm
Protected Phases						2		4			8	
Permitted Phases				2			4					8
Actuated Green, G (s)				15.3		15.3	41.8	41.8			41.8	41.8
Effective Green, g (s)				15.3		15.3	41.8	41.8			41.8	41.8
Actuated g/C Ratio				0.24		0.24	0.64	0.64			0.64	0.64
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)				416		372	114	1196			1196	1016
v/s Ratio Prot						c0.18		0.43			0.56	
v/s Ratio Perm				0.15			c0.61					0.21
v/c Ratio				0.65		0.78	0.96	0.66			0.87	0.33
Uniform Delay, d1				22.5		23.3	10.8	7.3			9.5	5.3
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				3.5		10.2	69.8	1.4			7.3	0.2
Delay (s)				26.0		33.6	80.6	8.6			16.8	5.5
Level of Service				C		C	F	A			B	A
Approach Delay (s)		0.0			30.8			17.4			13.0	
Approach LOS		A			C			B			B	

Intersection Summary				
HCM Average Control Delay	18.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	65.1	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	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	1.00	1.00			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				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1768		1583	1770	1863			1863	1583
Flt Permitted				0.95		1.00	0.19	1.00			1.00	1.00
Satd. Flow (perm)				1768		1583	345	1863			1863	1583
Volume (vph)	0	0	0	43	0	521	35	314	0	0	767	296
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	47	0	566	38	341	0	0	834	322
RTOR Reduction (vph)	0	0	0	0	0	385	0	0	0	0	0	137
Lane Group Flow (vph)	0	0	0	47	0	181	38	341	0	0	834	185
Confl. Peds. (#/hr)				1		3						
Turn Type				custom		custom	Perm					Perm
Protected Phases						2		4			8	
Permitted Phases				2			4					8
Actuated Green, G (s)				9.8		9.8	24.0	24.0			24.0	24.0
Effective Green, g (s)				9.8		9.8	24.0	24.0			24.0	24.0
Actuated g/C Ratio				0.23		0.23	0.57	0.57			0.57	0.57
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)				415		371	198	1070			1070	909
v/s Ratio Prot						c0.11		0.18			c0.45	
v/s Ratio Perm				0.03			0.11					0.12
v/c Ratio				0.11		0.49	0.19	0.32			0.78	0.20
Uniform Delay, d1				12.6		13.8	4.3	4.6			6.9	4.3
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.1		1.0	0.5	0.2			3.7	0.1
Delay (s)				12.7		14.8	4.7	4.8			10.5	4.4
Level of Service				B		B	A	A			B	A
Approach Delay (s)		0.0			14.7			4.8			8.8	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.8	HCM Level of Service		A
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	41.8	Sum of lost time (s)		8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough 12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	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					1.00		1.00	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1770		1583					1839		1770	1863	
Flt Permitted	0.95		1.00					1.00		0.30	1.00	
Satd. Flow (perm)	1770		1583					1839		560	1863	
Volume (vph)	330	0	40	0	0	0	0	496	51	219	883	0
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	402	0	49	0	0	0	0	605	62	267	1077	0
RTOR Reduction (vph)	0	0	36	0	0	0	0	5	0	0	0	0
Lane Group Flow (vph)	402	0	13	0	0	0	0	662	0	267	1077	0
Turn Type	custom		custom							Perm		
Protected Phases								4			8	
Permitted Phases	6		6							8		
Actuated Green, G (s)	18.1		18.1					42.2		42.2	42.2	
Effective Green, g (s)	18.1		18.1					42.2		42.2	42.2	
Actuated g/C Ratio	0.27		0.27					0.62		0.62	0.62	
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)	469		420					1136		346	1151	
v/s Ratio Prot								0.36			c0.58	
v/s Ratio Perm	c0.23		0.01							0.48		
v/c Ratio	0.86		0.03					0.58		0.77	0.94	
Uniform Delay, d1	23.9		18.6					7.8		9.5	11.8	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	14.3		0.0					0.8		10.2	13.7	
Delay (s)	38.2		18.6					8.6		19.7	25.5	
Level of Service	D		B					A		B	C	
Approach Delay (s)		36.1			0.0			8.6			24.4	
Approach LOS		D			A			A			C	

Intersection Summary				
HCM Average Control Delay	22.2	HCM Level of Service		C
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	68.3	Sum of lost time (s)		8.0
Intersection Capacity Utilization	71.4%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: SR-1 SB On Ramp & Harkins Slough

12/8/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	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					1.00		1.00	1.00	
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)	1770		1583					1826		1770	1863	
Flt Permitted	0.95		1.00					1.00		0.65	1.00	
Satd. Flow (perm)	1770		1583					1826		1211	1863	
Volume (vph)	221	0	23	0	0	0	0	128	22	414	404	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Adj. Flow (vph)	240	0	25	0	0	0	0	144	25	465	454	0
RTOR Reduction (vph)	0	0	18	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	240	0	7	0	0	0	0	157	0	465	454	0
Turn Type	custom		custom							Perm		
Protected Phases								4			8	
Permitted Phases	6		6							8		
Actuated Green, G (s)	10.9		10.9					20.8		20.8	20.8	
Effective Green, g (s)	10.9		10.9					20.8		20.8	20.8	
Actuated g/C Ratio	0.27		0.27					0.52		0.52	0.52	
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)	486		435					957		634	976	
v/s Ratio Prot								0.09			0.24	
v/s Ratio Perm	c0.14		0.00							c0.38		
v/c Ratio	0.49		0.02					0.16		0.73	0.47	
Uniform Delay, d1	12.1		10.5					4.9		7.3	5.9	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.8		0.0					0.1		4.4	0.4	
Delay (s)	12.9		10.5					5.0		11.7	6.3	
Level of Service	B		B					A		B	A	
Approach Delay (s)		12.7			0.0			5.0			9.0	
Approach LOS		B			A			A			A	

Intersection Summary				
HCM Average Control Delay	9.2	HCM Level of Service		A
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	39.7	Sum of lost time (s)		8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/11/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3417		1770	3539	1583	1770	3347		3433	3503	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3417		1770	3539	1583	1770	3347		3433	3503	
Volume (vph)	234	621	163	53	558	196	292	564	264	347	482	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	690	181	59	620	218	324	627	293	386	536	31
RTOR Reduction (vph)	0	24	0	0	0	71	0	58	0	0	4	0
Lane Group Flow (vph)	260	847	0	59	620	147	324	862	0	386	563	0
Confl. Peds. (#/hr)			3	3			4		4	4		4
Confl. Bikes (#/hr)									3			4
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	12.3	23.0		16.0	26.7	26.7	22.0	25.0		16.0	19.0	
Effective Green, g (s)	12.3	23.0		16.0	26.7	26.7	22.0	25.0		16.0	19.0	
Actuated g/C Ratio	0.13	0.24		0.17	0.28	0.28	0.23	0.26		0.17	0.20	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	440	819		295	984	440	406	872		572	693	
v/s Ratio Prot	0.08	c0.25		0.03	c0.18		c0.18	c0.26		0.11	0.16	
v/s Ratio Perm						0.09						
v/c Ratio	0.59	1.03		0.20	0.63	0.33	0.80	0.99		0.67	0.81	
Uniform Delay, d1	39.5	36.5		34.5	30.3	27.6	34.9	35.4		37.6	36.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	40.5		1.5	1.3	0.4	15.0	27.4		6.3	7.2	
Delay (s)	41.6	77.0		36.0	31.7	28.0	49.9	62.8		43.8	44.0	
Level of Service	D	E		D	C	C	D	E		D	D	
Approach Delay (s)		68.8			31.1			59.4			43.9	
Approach LOS		E			C			E			D	

Intersection Summary				
HCM Average Control Delay	52.4	HCM Level of Service		D
HCM Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	96.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	73.2%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

12/11/2008

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	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	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3328		1770	3539	1556	1770	3404		3433	3382	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3328		1770	3539	1556	1770	3404		3433	3382	
Volume (vph)	343	583	288	116	479	167	269	566	162	357	476	146
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	354	601	297	120	494	172	277	584	167	368	491	151
RTOR Reduction (vph)	0	67	0	0	0	77	0	30	0	0	33	0
Lane Group Flow (vph)	354	831	0	120	494	95	277	721	0	368	609	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	13.8	22.0		16.0	24.2	24.2	16.0	20.0		16.0	20.0	
Effective Green, g (s)	13.8	22.0		16.0	24.2	24.2	16.0	20.0		16.0	20.0	
Actuated g/C Ratio	0.15	0.24		0.18	0.27	0.27	0.18	0.22		0.18	0.22	
Clearance Time (s)	4.0	4.0		4.0	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	3.0		3.0	3.0	
Lane Grp Cap (vph)	526	814		315	952	418	315	756		610	752	
v/s Ratio Prot	0.10	c0.25		0.07	c0.14		c0.16	c0.21		0.11	0.18	
v/s Ratio Perm						0.06						
v/c Ratio	0.67	1.02		0.38	0.52	0.23	0.88	0.95		0.60	0.81	
Uniform Delay, d1	36.0	34.0		32.6	28.0	25.6	36.1	34.5		34.1	33.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	36.8		3.5	0.5	0.3	27.6	22.1		4.4	6.6	
Delay (s)	39.4	70.8		36.1	28.4	25.9	63.7	56.6		38.5	39.8	
Level of Service	D	E		D	C	C	E	E		D	D	
Approach Delay (s)		61.9			29.1			58.5			39.3	
Approach LOS		E			C			E			D	

Intersection Summary				
HCM Average Control Delay	49.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	78.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & S Green Valley

12/11/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	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	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1557	1770	3539	1553	3433	3345		3433	3424	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1557	1770	3539	1553	3433	3345		3433	3424	
Volume (vph)	92	523	139	326	544	265	182	530	252	283	416	91
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	111	630	167	393	655	319	219	639	304	341	501	110
RTOR Reduction (vph)	0	0	90	0	0	208	0	72	0	0	23	0
Lane Group Flow (vph)	111	630	77	393	655	111	219	871	0	341	588	0
Confl. Peds. (#/hr)	4		3	3		4	13		6	6		13
Confl. Bikes (#/hr)						2						
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						
Actuated Green, G (s)	7.7	17.8	17.8	18.0	28.1	28.1	8.7	21.0		8.0	20.3	
Effective Green, g (s)	7.7	17.8	17.8	18.0	28.1	28.1	8.7	21.0		8.0	20.3	
Actuated g/C Ratio	0.10	0.22	0.22	0.22	0.35	0.35	0.11	0.26		0.10	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	169	780	343	394	1231	540	370	869		340	860	
v/s Ratio Prot	0.06	c0.18		c0.22	0.19		0.06	c0.26		c0.10	0.17	
v/s Ratio Perm			0.05			0.07						
v/c Ratio	0.66	0.81	0.23	1.00	0.53	0.21	0.59	1.00		1.00	0.68	
Uniform Delay, d1	35.3	29.9	25.8	31.4	21.1	18.5	34.4	29.9		36.4	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.9	8.8	1.5	44.4	1.6	0.9	2.5	31.1		49.5	2.3	
Delay (s)	44.1	38.7	27.4	75.7	22.7	19.4	36.9	61.0		85.9	29.6	
Level of Service	D	D	C	E	C	B	D	E		F	C	
Approach Delay (s)		37.3			37.2			56.5			49.8	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM Average Control Delay	45.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	76.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Freedom & Harkins Slough 12/11/2008

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1548	1770	3539	1513	3433	3298		3433	3426	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1548	1770	3539	1513	3433	3298		3433	3426	
Volume (vph)	169	761	167	398	357	362	238	711	382	397	478	106
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)	178	801	176	419	376	381	251	748	402	418	503	112
RTOR Reduction (vph)	0	0	55	0	0	202	0	65	0	0	17	0
Lane Group Flow (vph)	178	801	121	419	376	179	251	1085	0	418	598	0
Confl. Peds. (#/hr)	16		5	5		16	7		17	17		7
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						
Actuated Green, G (s)	13.4	24.0	24.0	24.0	34.6	34.6	12.0	33.0		13.0	34.0	
Effective Green, g (s)	13.4	24.0	24.0	24.0	34.6	34.6	12.0	33.0		13.0	34.0	
Actuated g/C Ratio	0.12	0.22	0.22	0.22	0.31	0.31	0.11	0.30		0.12	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	216	772	338	386	1113	476	375	989		406	1059	
v/s Ratio Prot	0.10	c0.23		c0.24	0.11		0.07	c0.33		c0.12	0.17	
v/s Ratio Perm			0.08			0.12						
v/c Ratio	0.82	1.04	0.36	1.09	0.34	0.38	0.67	1.10		1.03	0.56	
Uniform Delay, d1	47.1	43.0	36.5	43.0	28.9	29.3	47.1	38.5		48.5	31.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.8	42.5	2.9	70.7	0.8	2.3	4.5	58.9		52.5	0.7	
Delay (s)	68.9	85.5	39.4	113.7	29.7	31.6	51.6	97.4		101.0	32.5	
Level of Service	E	F	D	F	C	C	D	F		F	C	
Approach Delay (s)		75.9			60.2			89.2			60.2	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM Average Control Delay	72.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #17 AM CUM + PROJ HWY 1 / LARKIN VALLEY RD

Average Delay (sec/veh): 6.4 Level Of Service: A

Street Name:	HWY 1 NB RAMPS						LARKIN VALLY ROAD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	45	0	277	0	0	0	0	289	96	603	36	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:	45	0	277	0	0	0	0	289	96	603	36	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:	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 Volume:	45	0	277	0	0	0	0	289	96	603	36	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	45	0	277	0	0	0	0	289	96	603	36	0
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:	45	0	277	0	0	0	0	289	96	603	36	0
PCE Module:												
AutoPCE:	45	0	277	0	0	0	0	289	96	603	36	0
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	45	0	277	0	0	0	0	289	96	603	36	0

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	289	684	603	45
MaxVolume:	1044	xxxxxx	874	1176
PedVolume:	0	0	0	0
AdjMaxVol:	1044	xxxxxx	874	1176
ApproachVol:	322	xxxxxx	385	639
ApproachDel:	5.0	xxxxxx	7.3	6.6
Queue:	1.3	xxxx	2.3	3.4

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #17 PM CUM + PROJ HWY 1 NB RAMPS LARKIN V RD

Average Delay (sec/veh): 7.4 Level Of Service: A

Street Name:	HWY 1 NB RAMPS						LARKIN VALLEY ROAD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	70	0	218	0	0	0	0	236	98	691	58	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:	70	0	218	0	0	0	0	236	98	691	58	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:	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 Volume:	70	0	218	0	0	0	0	236	98	691	58	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	70	0	218	0	0	0	0	236	98	691	58	0
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:	70	0	218	0	0	0	0	236	98	691	58	0
PCE Module:												
AutoPCE:	70	0	218	0	0	0	0	236	98	691	58	0
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	70	0	218	0	0	0	0	236	98	691	58	0

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	236	819	691	70
MaxVolume:	1073	xxxxxx	827	1162
PedVolume:	0	0	0	0
AdjMaxVol:	1073	xxxxxx	827	1162
ApproachVol:	288	xxxxxx	334	749
ApproachDel:	4.6	xxxxxx	7.3	8.5
Queue:	1.1	xxxx	2.0	5.0

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #18 AM CUM + PROJ AIRPORT BLVD LARKIN V RD

Average Delay (sec/veh): 14.8 Level Of Service: B

Street Name:	AIRPORT BLVD						LARKIN VALLEY ROAD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	14	496	99	37	378	623	391	124	52	20	9	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:	14	496	99	37	378	623	391	124	52	20	9	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:	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 Volume:	14	496	99	37	378	623	391	124	52	20	9	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	14	496	99	37	378	623	391	124	52	20	9	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:	14	496	99	37	378	623	391	124	52	20	9	26
PCE Module:												
AutoPCE:	14	496	99	37	378	623	391	124	52	20	9	26
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	14	496	99	37	378	623	391	124	52	20	9	26

Delay Module: >> Time Period: 0.25 hours <<

CircVolume:	552	43	435	901
MaxVolume:	902	1177	965	713
PedVolume:	0	0	0	0
AdjMaxVol:	902	1177	965	713
ApproachVol:	609	1038	567	55
ApproachDel:	11.9	20.3	8.9	5.5
Queue:	5.4	12.9	4.0	0.2

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #18 PM CUM + PROJ AIRPORT BLVD / LARKIN V ROAD

Average Delay (sec/veh): 13.6 Level Of Service: B

Street Name:	AIRPORT BLVD						LARKIN VALLEY RD					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	1			1			1			1		
Volume Module:												
Base Vol:	37	506	23	30	299	627	316	69	69	66	104	57
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:	37	506	23	30	299	627	316	69	69	66	104	57
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:	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 Volume:	37	506	23	30	299	627	316	69	69	66	104	57
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	506	23	30	299	627	316	69	69	66	104	57
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:	37	506	23	30	299	627	316	69	69	66	104	57
PCE Module:												
AutoPCE:	37	506	23	30	299	627	316	69	69	66	104	57
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	37	506	23	30	299	627	316	69	69	66	104	57

Delay Module: >> Time Period: 0.25 hours <<				
CircVolume:	415	207	395	859
MaxVolume:	976	1088	987	736
PedVolume:	0	0	0	0
AdjMaxVol:	976	1088	987	736
ApproachVol:	566	956	454	227
ApproachDel:	8.7	21.3	6.7	7.1
Queue:	3.9	12.4	2.5	1.3

APPENDIX H

Traffic Infusion on Residential Environments Index (TIRE) Index

Description of Traffic Infusion on Residential Environments (TIRE) Index

A method of analyzing impacts of additional traffic on the surrounding residential area is called the Traffic Infusion on Residential Environments (TIRE) analysis. The analysis was pioneered by Donald Appleyard at the University of California, Berkeley as a way to measure and express neighborhood traffic impacts that does not rely on level of service results, but rather, on more qualitative perceptions on the effect of changes in traffic volumes on neighborhood streets.

The TIRE analysis is based on a logarithmic association between traffic volumes and the residential environment, and indicates that a given change in traffic volume causes greater impacts on residential environments with lover pre-existing traffic volumes than on environments with higher pre-existing traffic volumes. Residential streets are given a TIRE index ranging from 0.0 to 5.0 based on their volume. Streets with TIRE indices greater than 3.0 are referred to as " traffic-dominated." A traffic volume change that causes an Index change of 0/1 or more would be noticeable to street residents. Table 1 presents the TIRE index table, showing the TIRE indices for various daily volumes and the quantity of volume change that would cause a 0.1 and 0.2 TIRE index change for each TIRE index.

TIRE Index Table

		Minimum Daily Volume Increase to Produce	
Existing Voume Range (Vehicles Per Day)	**TIRE Index**	**A 0.1 Change in the TIRE Index**	**A 0.2 Change in the TIRE Index**
29-35	1.5	+6	+15
36-44	1.6	+8	+20
45-56	1.7	+10	+25
57-70	1.8	+13	+32
71-89	1.9	+17	+41
90-110	2.0	+22	+52
111-140	2.1	+29	+65
141-180	2.2	+40	+80
181-220	2.3	+52	+100
221-280	2.4	+65	+125
281-350	2.5	+79	+160
351-450	2.6	+94	+205
451-560	2.7	+114	+260
561-710	2.8	+140	+330
711-890	2.9	+170	+415
891-1,100	3.0	+220	+520
1,101-1,400	3.1	+290	+650
1,401-1,800	3.2	+380	+800
1,801-2,200	3.3	+500	+1000
2,201-2,800	3.4	+650	+1300
2,801-3,500	3.5	+825	+1700
3,501-4,500	3.6	+1025	+2200
4,501-5,600	3.7	+1250	+2800
5,601-7,100	3.8	+1500	+3500
7,101-8,900	3.9	+1800	+4300
8901-11000	4.0	+2300	+5300
11001-14000	4.1	+3000	+6500
14001-18000	4.2	+4000	+8000
18001-22000	4.3	+5200	+10000
22001-28000	4.4	+6600	+13000
28001-35000	4.5	+8200	+17000
35001-45000	4.6	+10000	+22000
45001-56000	4.7	+12200	+28000
56001-71000	4.8	+14800	+35000
71001-89000	4.9	+18000	+43000

APPENDIX I

Peak Hour Warrants

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT
(URBAN CONDITIONS)

General Information

Description **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name **East Lake**
Minor Approach Street Name **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1142
Minor Approach Volume (One Direction Only)	192
Total Entering Volume	1344
Minor Approach Delay per Vehicle	49.3

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND**

YES ☐ NO ☑

Total Delay (Vehicle Hours) 2.63

2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND**

YES ☑ NO ☐

Total Minor Approach Volume 192

3. The total entering volume serviced during the hour equals or exceeds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches.

YES ☑ NO ☐

Total Entering Volume 1344

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1142
Higher Approach - Minor Street		✓	192

The plotted point falls above the curve in Figure 4C-3. YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

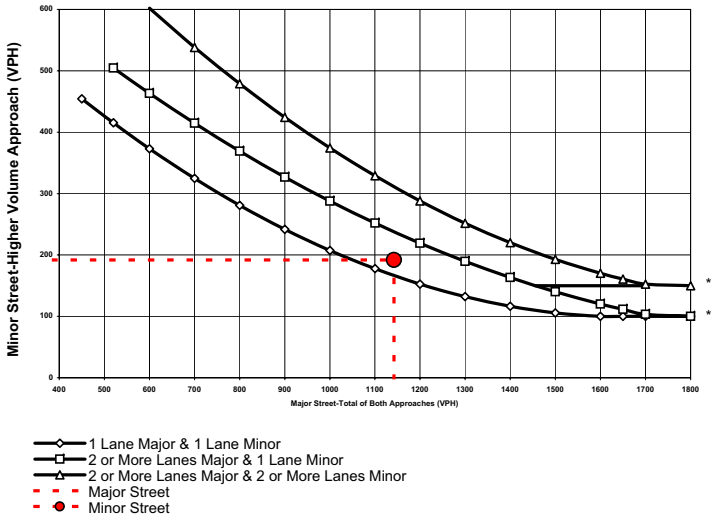
EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre East Lake		**Minor** Wagner Ave	
Total of Both Approaches (VPH):	1142	Higher Volume Approach (VPH):	192
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name: **East Lake**
Minor Approach Street Name: **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1357
Minor Approach Volume (One Direction Only)	92
Total Entering Volume	1466
Minor Approach Delay per Vehicle	33.0

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 0.84
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 92
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1466

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1357
Higher Approach - Minor Street		✓	92

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

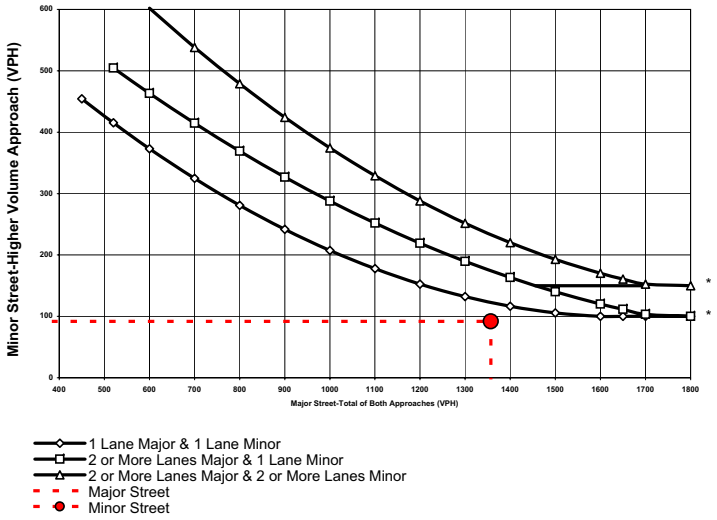
EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

Major Stre East Lake		**Minor** Wagner Ave	
Total of Both Approaches (VPH):	1357	Higher Volume Approach (VPH):	92
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 9: Hwy 1 NB Off / Harkins Slough**

Major Approach Street Name: **Harkins Slough Road**
Minor Approach Street Name: **Hwy 1 NB Off Ramp**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1369
Minor Approach Volume (One Direction Only)	475
Total Entering Volume	1844
Minor Approach Delay per Vehicle	420.0

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 55.42
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 475
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1844

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		1369
Higher Approach - Minor Street		✓	475

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

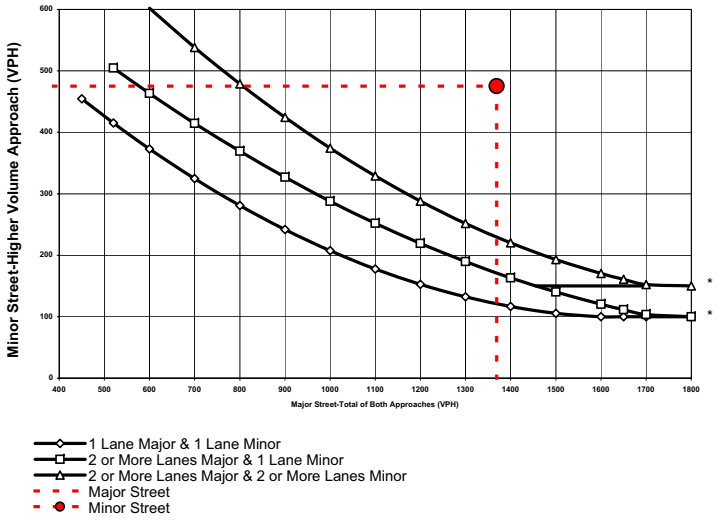
EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre Harkins Slough Road		**Minor** Hwy 1 NB Off Ramp	
Total of Both Approaches (VPH):	1369	Higher Volume Approach (VPH):	475
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 9: Hwy 1 NB Off / Harkins Slough**

Major Approach Street Name: **Harkins Slough Road**
Minor Approach Street Name: **Hwy 1 NB Off Ramp**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	555
Minor Approach Volume (One Direction Only)	492
Total Entering Volume	1047
Minor Approach Delay per Vehicle	13.6

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.86
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 492
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1047

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		555
Higher Approach - Minor Street		✓	492

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

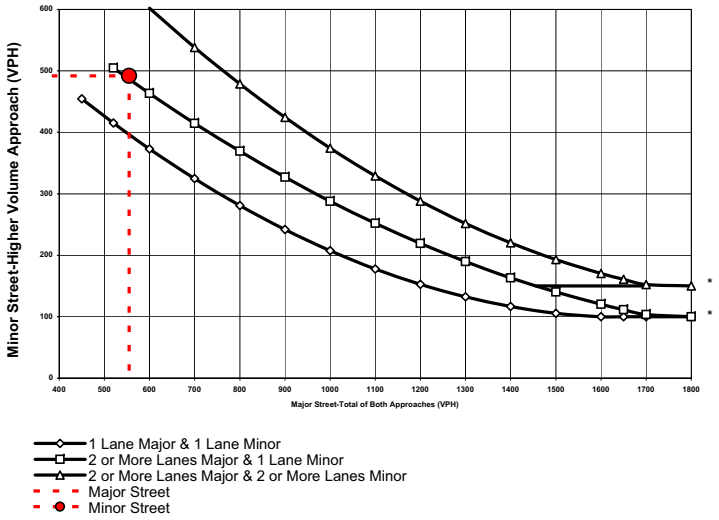
Peak Hour PM

Major Stre Harkins Slough Road — **Minor** Hwy 1 NB Off Ramp

Total of Both Approaches (VPH):	555	Higher Volume Approach (VPH):	492
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 14: Hwy 1 NB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	1

Volumes and Delay

Major Approach Volumes (Both Directions)	879
Minor Approach Volume (One Direction Only)	96
Total Entering Volume	975
Minor Approach Delay per Vehicle	39.2

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.05
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 96
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 975

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	879
Higher Approach - Minor Street	✓		96

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

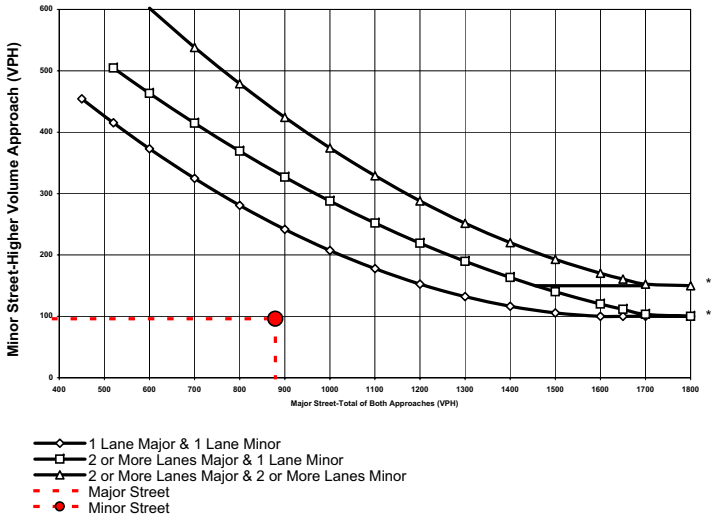
Major Stre Riverside Dr

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	879	Higher Volume Approach (VPH):	96
Number of Approach Lanes:	2	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 14: Hwy 1 NB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	1

Volumes and Delay

Major Approach Volumes (Both Directions)	1021
Minor Approach Volume (One Direction Only)	100
Total Entering Volume	1121
Minor Approach Delay per Vehicle	87.9

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 2.44
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 100
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1121

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1021
Higher Approach - Minor Street	✓		100

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

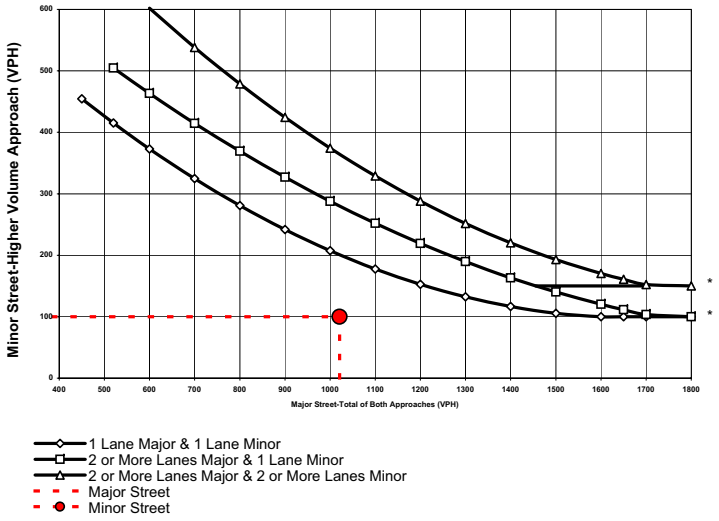
Major Stre Riverside Dr

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	1021	Higher Volume Approach (VPH):	100
Number of Approach Lanes:	2	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 15: Hwy 1 SB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 SB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	509
Minor Approach Volume (One Direction Only)	653
Total Entering Volume	1162
Minor Approach Delay per Vehicle	38.9

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 7.06
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 653
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1162

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	509
Higher Approach - Minor Street		✓	653

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

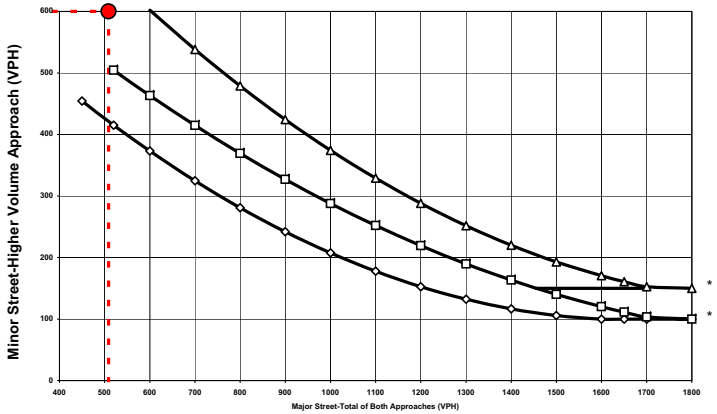
Major Stre Riverside Dr

Minor Hwy 1 SB Ramps

Total of Both Approaches (VPH):	509	Higher Volume Approach (VPH):	653
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 15: Hwy 1 SB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 SB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	487
Minor Approach Volume (One Direction Only)	543
Total Entering Volume	1030
Minor Approach Delay per Vehicle	43.8

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 6.61
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 543
3. The total entering volume serviced during the hour equals or exceeds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1030

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	487
Higher Approach - Minor Street		✓	543

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

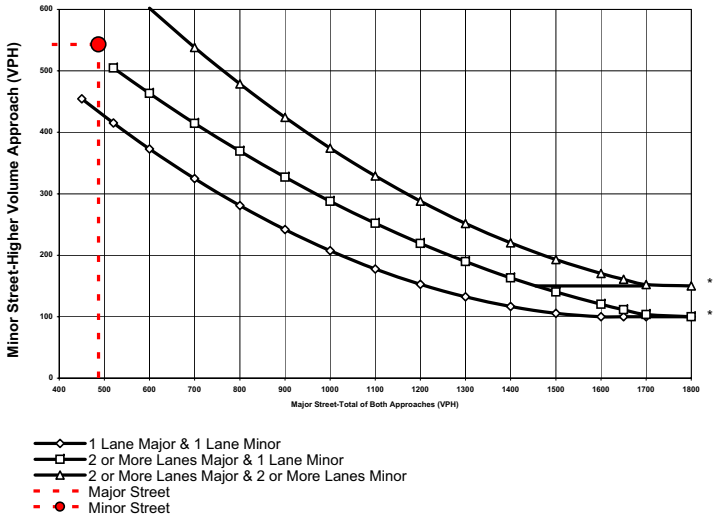
EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

Major Stre Riverside Dr		**Minor** Hwy 1 SB Ramps	
Total of Both Approaches (VPH):	487	Higher Volume Approach (VPH):	543
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description **Intersection 16: Airport Blvd / Ranport Rd**

Major Approach Street Name **Ranport Rd**
Minor Approach Street Name **Aiport Blvd**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	768
Minor Approach Volume (One Direction Only)	297
Total Entering Volume	1065
Minor Approach Delay per Vehicle	10.8

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 0.89
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 297
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1065

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	768
Higher Approach - Minor Street		✓	297

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

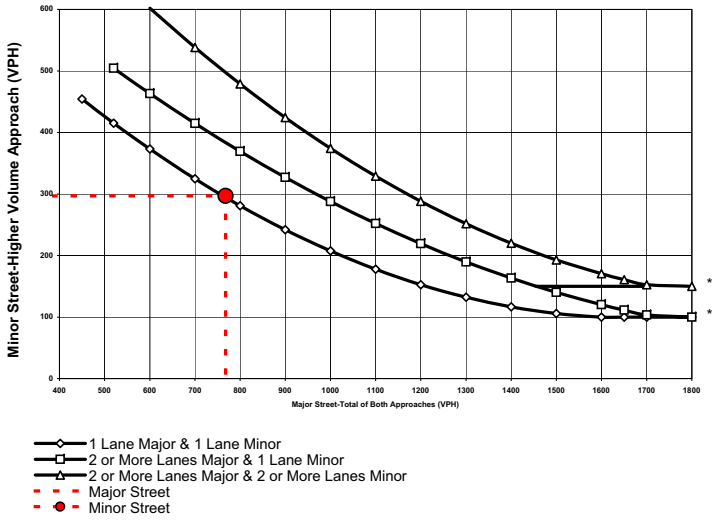
EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre Ranport Rd		**Minor** Aiport Blvd	
Total of Both Approaches (VPH):	768	Higher Volume Approach (VPH):	297
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 16: Airport Blvd / Ranport Rd**

Major Approach Street Name: **Ranport Rd**
Minor Approach Street Name: **Aiport Blvd**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	671
Minor Approach Volume (One Direction Only)	337
Total Entering Volume	1008
Minor Approach Delay per Vehicle	11.4

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.07
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 337
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1008

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	671
Higher Approach - Minor Street		✓	337

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

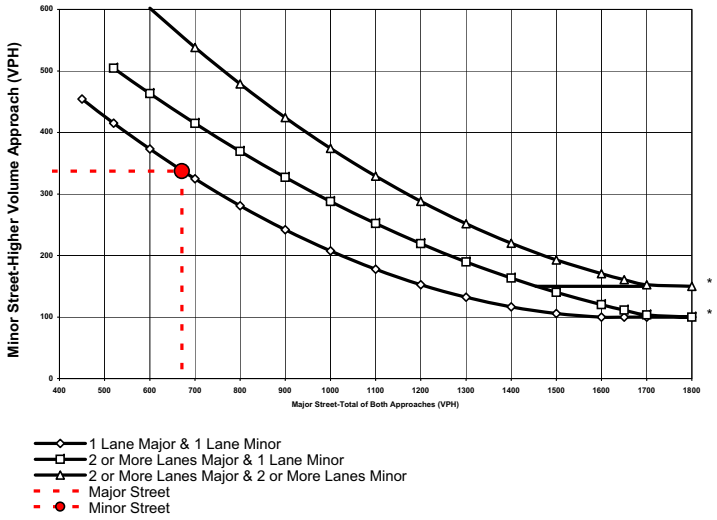
EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

Major Stre Ranport Rd		**Minor** Aiport Blvd	
Total of Both Approaches (VPH):	671	Higher Volume Approach (VPH):	337
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 17: Hwy 1 NB Ramps / Larkin Valley Rd**

Major Approach Street Name: **Larkin Valley Rd**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	660
Minor Approach Volume (One Direction Only)	347
Total Entering Volume	1007
Minor Approach Delay per Vehicle	317.8

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 30.63
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 347
3. The total entering volume serviced during the hour equals or exceeds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1007

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		660
Higher Approach - Minor Street		✓	347

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

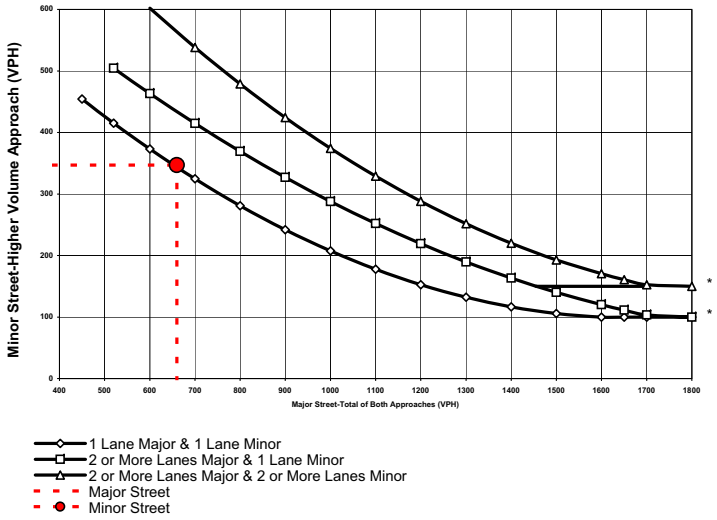
Major Stre Larkin Valley Rd

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	660	Higher Volume Approach (VPH):	347
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 17: Hwy 1 NB Ramps / Larkin Valley Rd**

Major Approach Street Name: **Larkin Valley Rd**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	791
Minor Approach Volume (One Direction Only)	250
Total Entering Volume	1041
Minor Approach Delay per Vehicle	1093.2

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 75.92
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 250
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1041

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		791
Higher Approach - Minor Street		✓	250

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

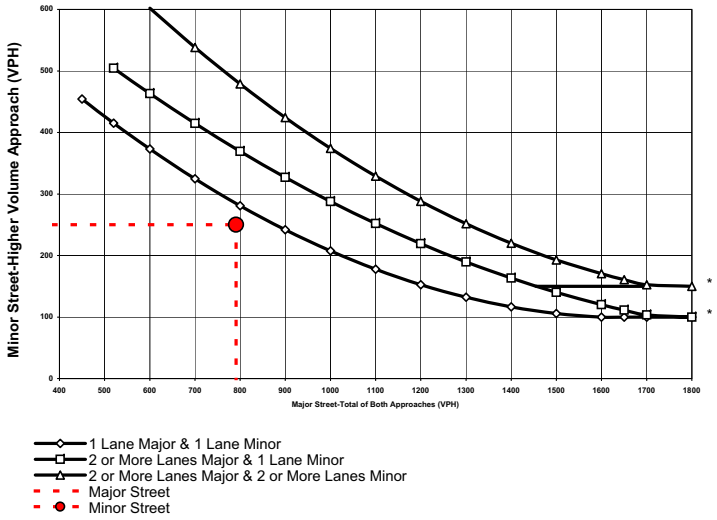
Major Stre Larkin Valley Rd

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	791	Higher Volume Approach (VPH):	250
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name **East Lake**
Minor Approach Street Name **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	957
Minor Approach Volume (One Direction Only)	192
Total Entering Volume	1159
Minor Approach Delay per Vehicle	51.2

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 2.73
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 192
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1159

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	957
Higher Approach - Minor Street		✓	192

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

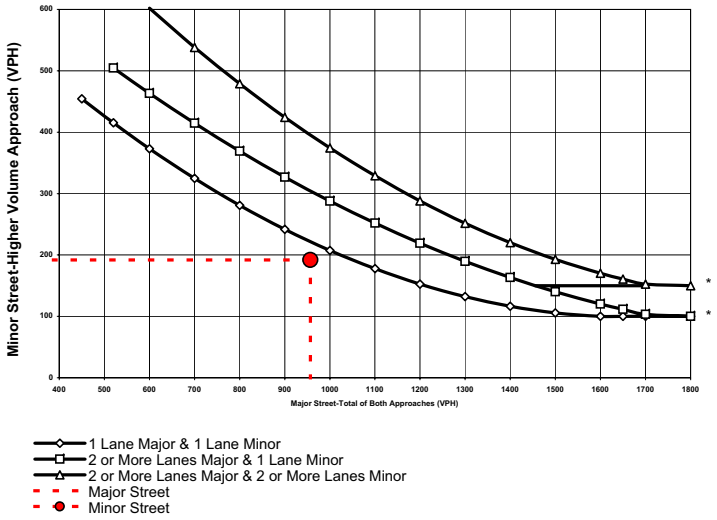
EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre East Lake		**Minor** Wagner Ave	
Total of Both Approaches (VPH):	957	Higher Volume Approach (VPH):	192
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name: **East Lake**
Minor Approach Street Name: **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1381
Minor Approach Volume (One Direction Only)	92
Total Entering Volume	1490
Minor Approach Delay per Vehicle	34

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 0.87
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 92
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1490

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1381
Higher Approach - Minor Street		✓	92

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

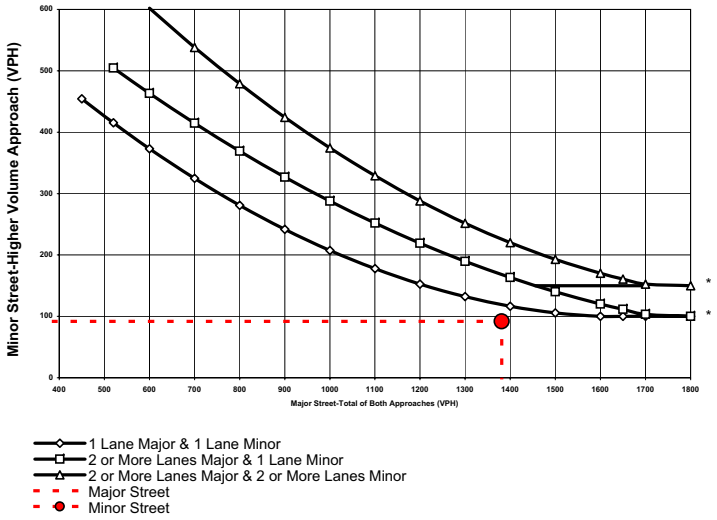
Major Stre East Lake

Minor Wagner Ave

Total of Both Approaches (VPH):	1381	Higher Volume Approach (VPH):	92
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 9: Hwy 1 NB Off / Harkins Slough**

Major Approach Street Name: **Harkins Slough Road**
Minor Approach Street Name: **Hwy 1 NB Off Ramp**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1369
Minor Approach Volume (One Direction Only)	476
Total Entering Volume	1845
Minor Approach Delay per Vehicle	420.0

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 55.53
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 476
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1845

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		1369
Higher Approach - Minor Street		✓	476

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

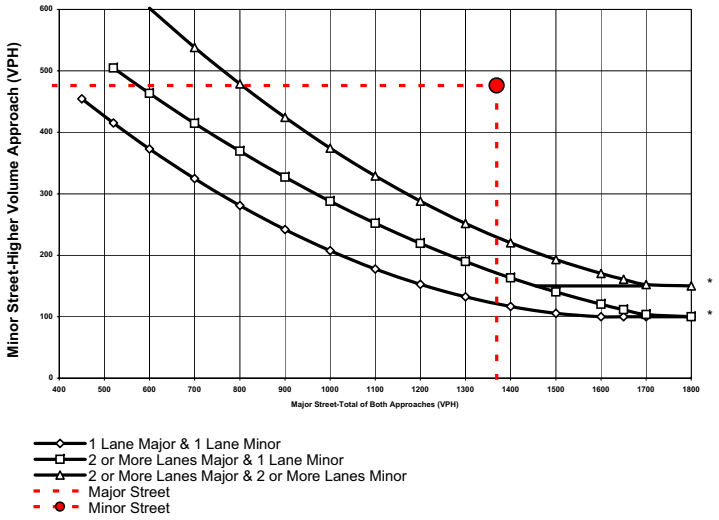
EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre Harkins Slough Road		**Minor** Hwy 1 NB Off Ramp	
Total of Both Approaches (VPH):	1369	Higher Volume Approach (VPH):	476
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 9: Hwy 1 NB Off / Harkins Slough**

Major Approach Street Name: **Harkins Slough Road**
Minor Approach Street Name: **Hwy 1 NB Off Ramp**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	556
Minor Approach Volume (One Direction Only)	494
Total Entering Volume	1050
Minor Approach Delay per Vehicle	13.6

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.87
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 494
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1050

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		556
Higher Approach - Minor Street		✓	494

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

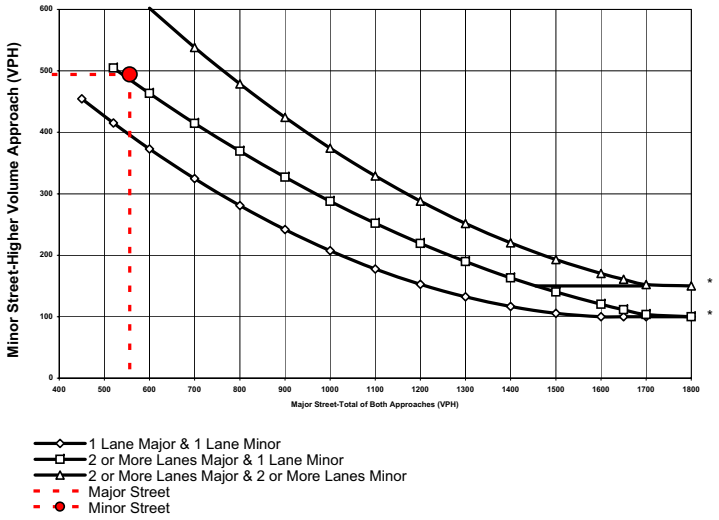
EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

Major Stre Harkins Slough Road		**Minor** Hwy 1 NB Off Ramp	
Total of Both Approaches (VPH):	556	Higher Volume Approach (VPH):	494
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 14: Hwy 1 NB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	1

Volumes and Delay

Major Approach Volumes (Both Directions)	902
Minor Approach Volume (One Direction Only)	103
Total Entering Volume	1005
Minor Approach Delay per Vehicle	43.9

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.26
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 103
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1005

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	902
Higher Approach - Minor Street	✓		103

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

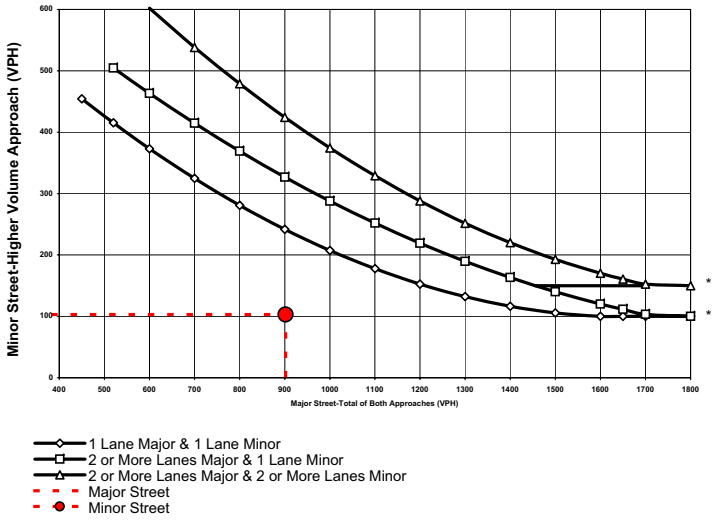
Major Stre Riverside Dr

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	902	Higher Volume Approach (VPH):	103
Number of Approach Lanes:	2	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 14: Hwy 1 NB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	1

Volumes and Delay

Major Approach Volumes (Both Directions)	1056
Minor Approach Volume (One Direction Only)	103
Total Entering Volume	1159
Minor Approach Delay per Vehicle	106.6

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 3.05
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 103
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1159

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1056
Higher Approach - Minor Street	✓		103

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

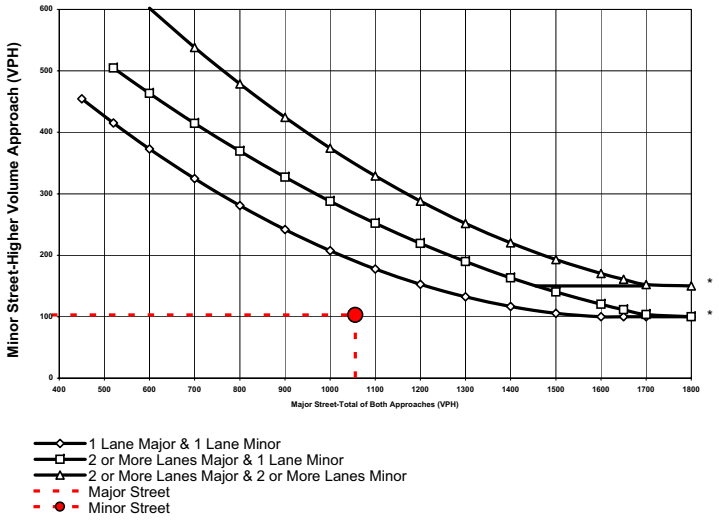
Major Stre Riverside Dr

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	1056	Higher Volume Approach (VPH):	103
Number of Approach Lanes:	2	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 15: Hwy 1 SB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 SB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	518
Minor Approach Volume (One Direction Only)	668
Total Entering Volume	1186
Minor Approach Delay per Vehicle	46.2

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** — YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 8.57
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 668
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1186

PART B — **SATISFIED** — YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	518
Higher Approach - Minor Street		✓	668

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

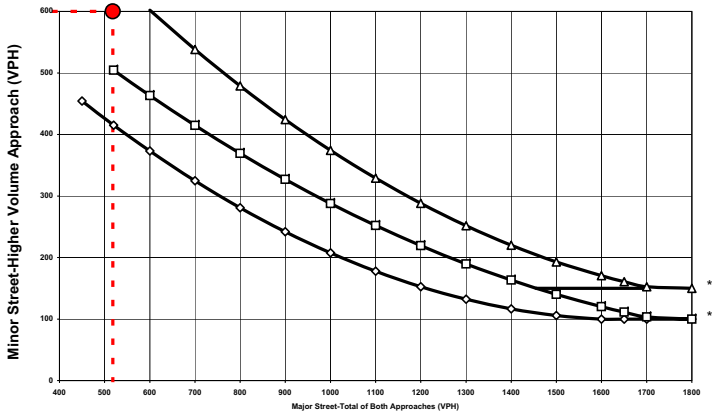
Major Stre Riverside Dr

Minor Hwy 1 SB Ramps

Total of Both Approaches (VPH):	518	Higher Volume Approach (VPH):	668
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 15: Hwy 1 SB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 SB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	596
Minor Approach Volume (One Direction Only)	545
Total Entering Volume	1141
Minor Approach Delay per Vehicle	46

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 6.96
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 545
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1141

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	596
Higher Approach - Minor Street		✓	545

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

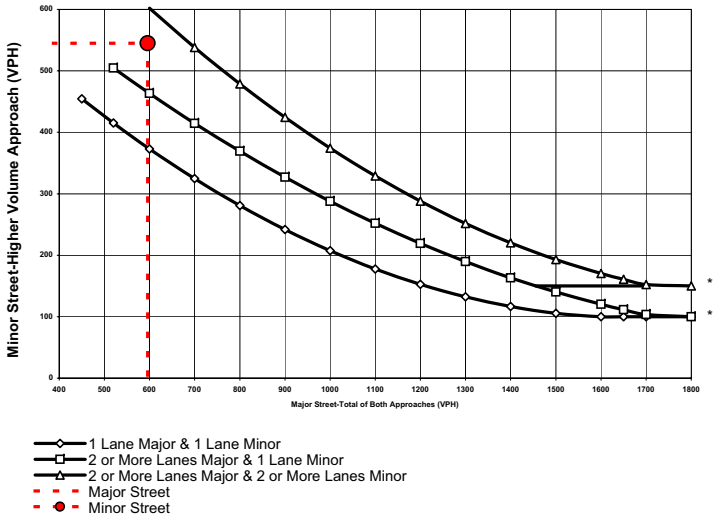
Major Stre Riverside Dr

Minor Hwy 1 SB Ramps

Total of Both Approaches (VPH):	596	Higher Volume Approach (VPH):	545
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description **Intersection 16: Airport Blvd / Ranport Rd**

Major Approach Street Name **Ranport Rd**
Minor Approach Street Name **Aiport Blvd**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	785
Minor Approach Volume (One Direction Only)	299
Total Entering Volume	1084
Minor Approach Delay per Vehicle	10.9

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 0.91
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 299
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1084

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	785
Higher Approach - Minor Street		✓	299

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

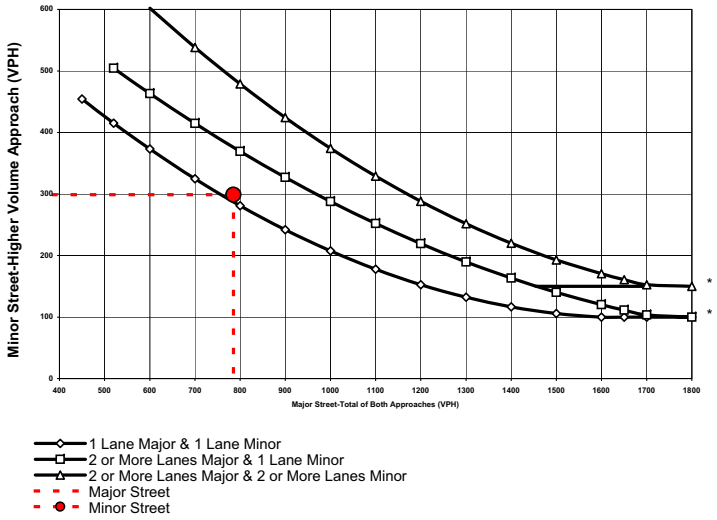
EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre Ranport Rd		**Minor** Aiport Blvd	
Total of Both Approaches (VPH):	785	Higher Volume Approach (VPH):	299
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 16: Airport Blvd / Ranport Rd**

Major Approach Street Name: **Ranport Rd**
Minor Approach Street Name: **Aiport Blvd**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	683
Minor Approach Volume (One Direction Only)	338
Total Entering Volume	1021
Minor Approach Delay per Vehicle	11.5

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.08
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 338
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1021

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	683
Higher Approach - Minor Street		✓	338

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

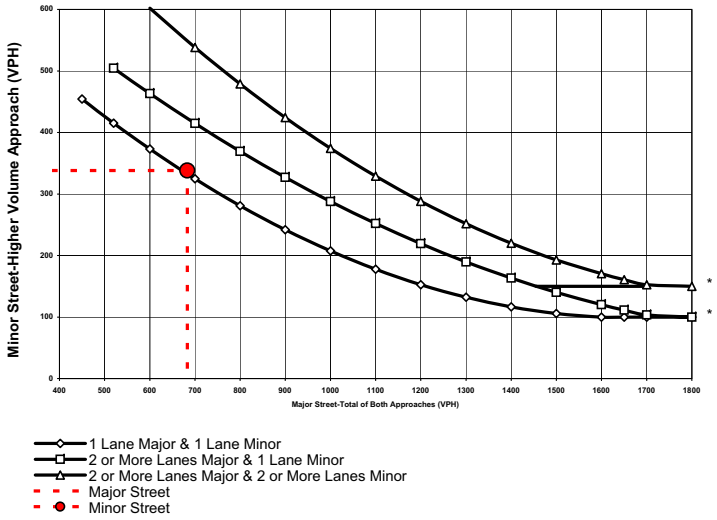
Major Stre Ranport Rd

Minor Aiport Blvd

Total of Both Approaches (VPH):	683	Higher Volume Approach (VPH):	338
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 17: Hwy 1 NB Ramps / Larkin Valley Rd**

Major Approach Street Name: **Larkin Valley Rd**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	668
Minor Approach Volume (One Direction Only)	356
Total Entering Volume	1024
Minor Approach Delay per Vehicle	350.4

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 34.65
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 356
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1024

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		668
Higher Approach - Minor Street		✓	356

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

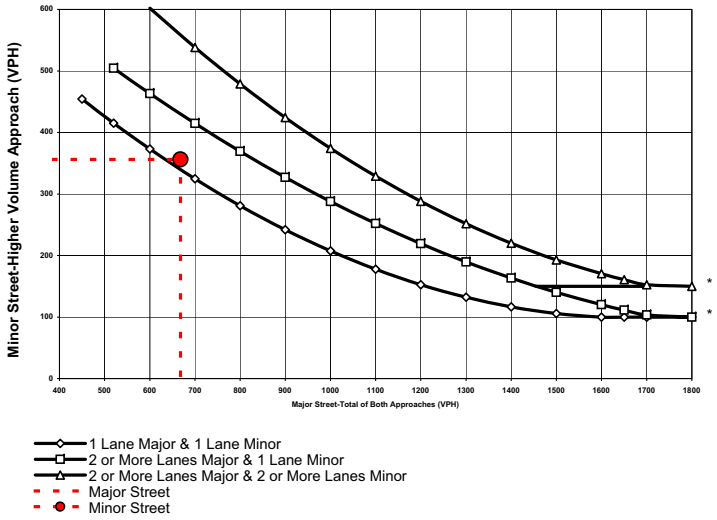
Major Stre Larkin Valley Rd

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	668	Higher Volume Approach (VPH):	356
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 17: Hwy 1 NB Ramps / Larkin Valley Rd**

Major Approach Street Name: **Larkin Valley Rd**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	809
Minor Approach Volume (One Direction Only)	252
Total Entering Volume	1061
Minor Approach Delay per Vehicle	1093.2

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 76.52
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 252
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1061

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		809
Higher Approach - Minor Street		✓	252

The plotted point falls above the curve in Figure 4C-3. YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

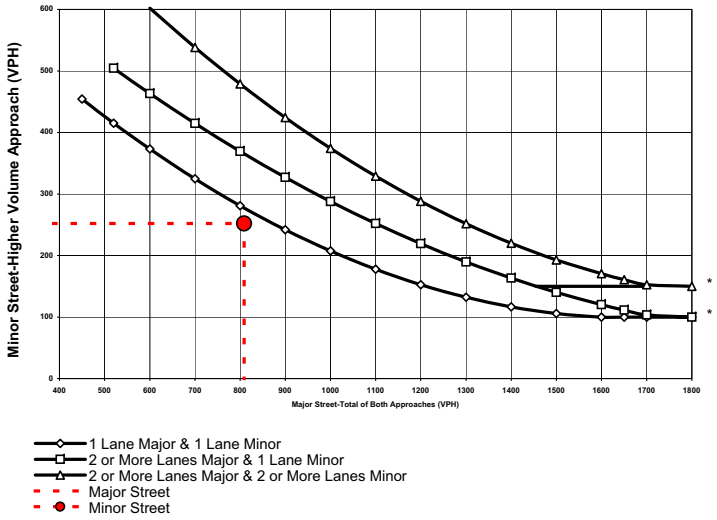
Major Stre Larkin Valley Rd

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	809	Higher Volume Approach (VPH):	252
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name: **East Lake**
Minor Approach Street Name: **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1162
Minor Approach Volume (One Direction Only)	192
Total Entering Volume	1380
Minor Approach Delay per Vehicle	52.3

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 2.79
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 192
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1380

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1162
Higher Approach - Minor Street		✓	192

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

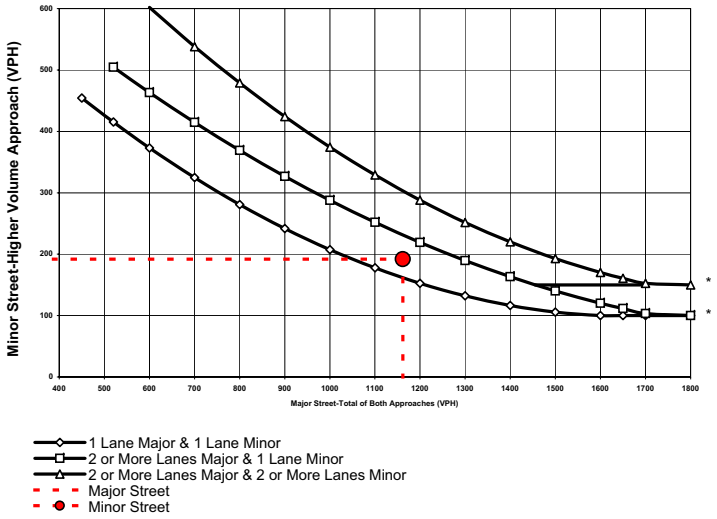
Peak Hour AM

Major Stre East Lake | **Minor** Wagner Ave

Total of Both Approaches (VPH):	1162	Higher Volume Approach (VPH):	192
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name: **East Lake**
Minor Approach Street Name: **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1397
Minor Approach Volume (One Direction Only)	92
Total Entering Volume	1515
Minor Approach Delay per Vehicle	34.4

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 0.88
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 92
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1515

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1397
Higher Approach - Minor Street		✓	92

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

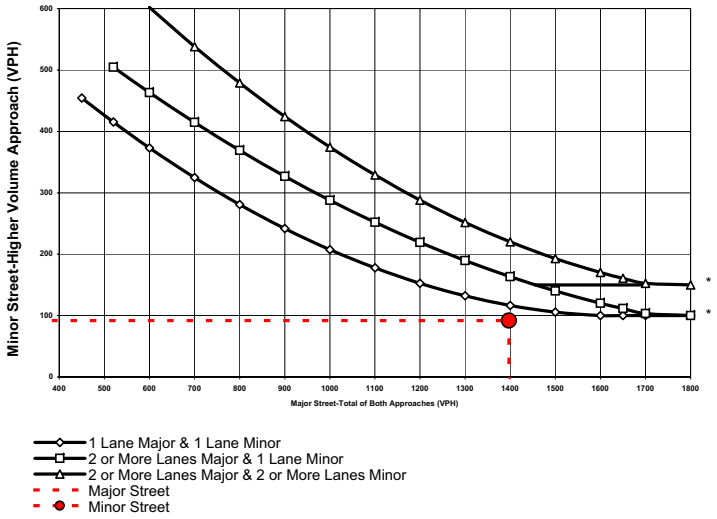
Peak Hour PM

Major Stre East Lake **Minor** Wagner Ave

Total of Both Approaches (VPH):	1397	Higher Volume Approach (VPH):	92
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description **Intersection 9: Hwy 1 NB Off / Harkins Slough**

Major Approach Street Name **Harkins Slough Road**
Minor Approach Street Name **Hwy 1 NB Off Ramp**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1384
Minor Approach Volume (One Direction Only)	480
Total Entering Volume	1864
Minor Approach Delay per Vehicle	432.4

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 57.65
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 480
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1864

PART B **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		1384
Higher Approach - Minor Street		✓	480

The plotted point falls above the curve in Figure 4C-3. YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

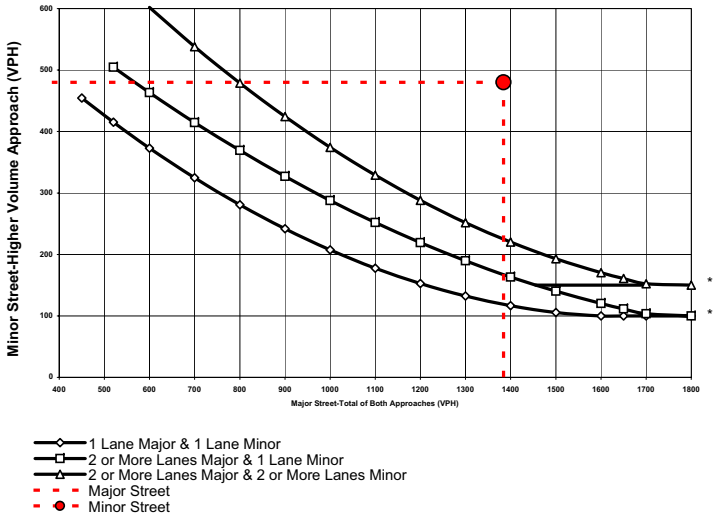
EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre Harkins Slough Road		**Minor** Hwy 1 NB Off Ramp	
Total of Both Approaches (VPH):	1384	Higher Volume Approach (VPH):	480
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 9: Hwy 1 NB Off / Harkins Slough**

Major Approach Street Name: **Harkins Slough Road**
Minor Approach Street Name: **Hwy 1 NB Off Ramp**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	564
Minor Approach Volume (One Direction Only)	508
Total Entering Volume	1072
Minor Approach Delay per Vehicle	13.9

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.96
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 508
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1072

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		564
Higher Approach - Minor Street		✓	508

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

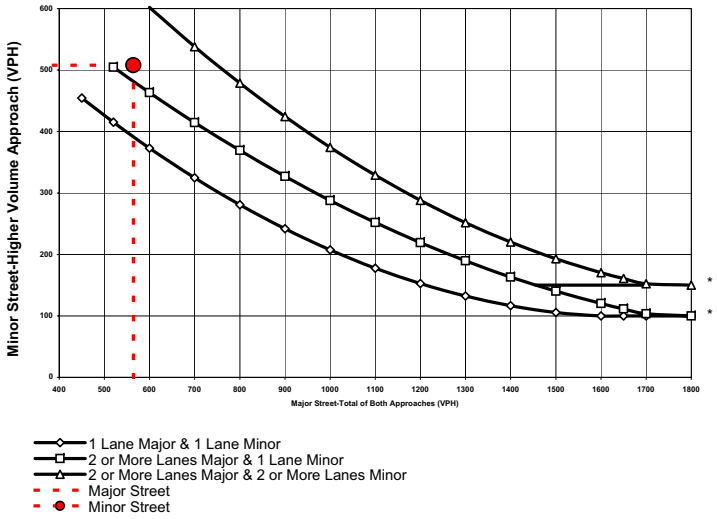
Major Stre Harkins Slough Road

Minor Hwy 1 NB Off Ramp

Total of Both Approaches (VPH):	564	Higher Volume Approach (VPH):	508
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 14: Hwy 1 NB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	1

Volumes and Delay

Major Approach Volumes (Both Directions)	903
Minor Approach Volume (One Direction Only)	103
Total Entering Volume	1006
Minor Approach Delay per Vehicle	44.2

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.26
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 103
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1006

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	903
Higher Approach - Minor Street	✓		103

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

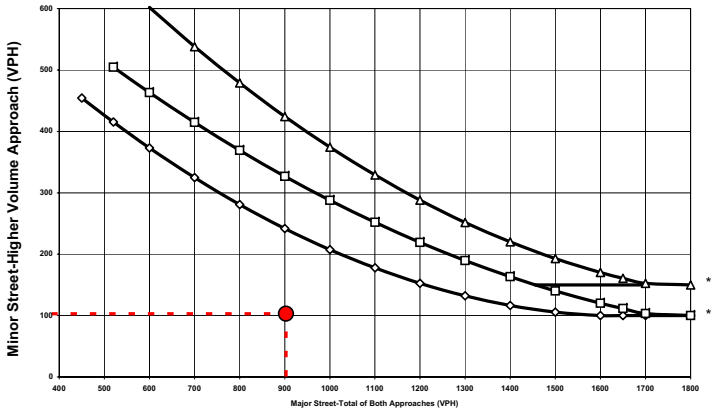
Major Stre Riverside Dr

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	903	Higher Volume Approach (VPH):	103
Number of Approach Lanes:	2	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 14: Hwy 1 NB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	1

Volumes and Delay

Major Approach Volumes (Both Directions)	1058
Minor Approach Volume (One Direction Only)	103
Total Entering Volume	1161
Minor Approach Delay per Vehicle	108.7

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 3.11
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☐ NO ☑
   Total Minor Approach Volume 103
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1161

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1058
Higher Approach - Minor Street	✓		103

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

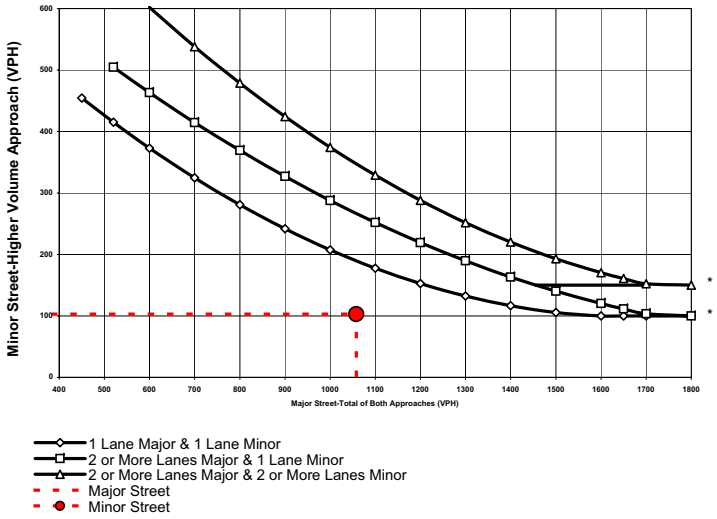
Major Stre Riverside Dr

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	1058	Higher Volume Approach (VPH):	103
Number of Approach Lanes:	2	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 15: Hwy 1 SB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 SB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	519
Minor Approach Volume (One Direction Only)	670
Total Entering Volume	1189
Minor Approach Delay per Vehicle	46.4

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 8.64
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 670
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1189

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	519
Higher Approach - Minor Street		✓	670

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

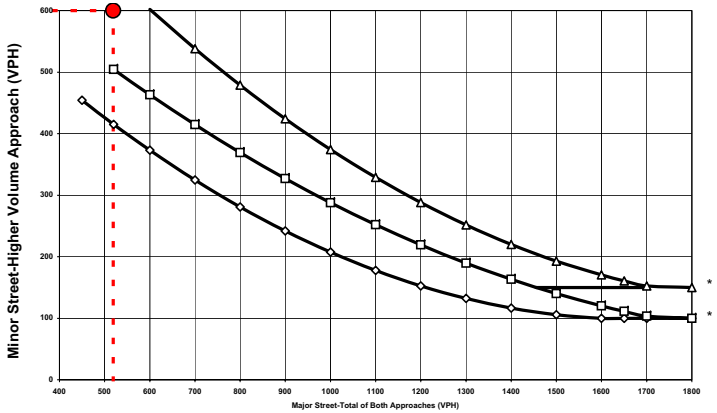
Major Stre Riverside Dr

Minor Hwy 1 SB Ramps

Total of Both Approaches (VPH):	519	Higher Volume Approach (VPH):	670
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 15: Hwy 1 SB Ramps / Riverside Dr**

Major Approach Street Name: **Riverside Dr**
Minor Approach Street Name: **Hwy 1 SB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	598
Minor Approach Volume (One Direction Only)	546
Total Entering Volume	1144
Minor Approach Delay per Vehicle	46.5

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 7.05
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 546
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1144

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	598
Higher Approach - Minor Street		✓	546

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

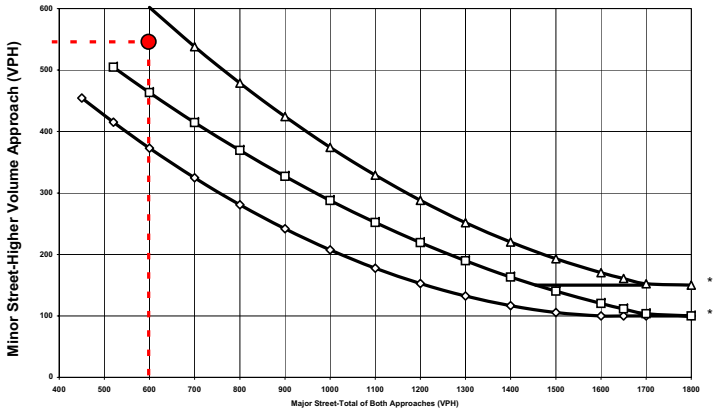
Major Stre Riverside Dr

Minor Hwy 1 SB Ramps

Total of Both Approaches (VPH):	598	Higher Volume Approach (VPH):	546
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 16: Airport Blvd / Ranport Rd**

Major Approach Street Name: **Ranport Rd**
Minor Approach Street Name: **Aiport Blvd**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	794
Minor Approach Volume (One Direction Only)	299
Total Entering Volume	1093
Minor Approach Delay per Vehicle	10.9

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 0.91
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 299
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1093

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	794
Higher Approach - Minor Street		✓	299

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

RBF CONSULTING

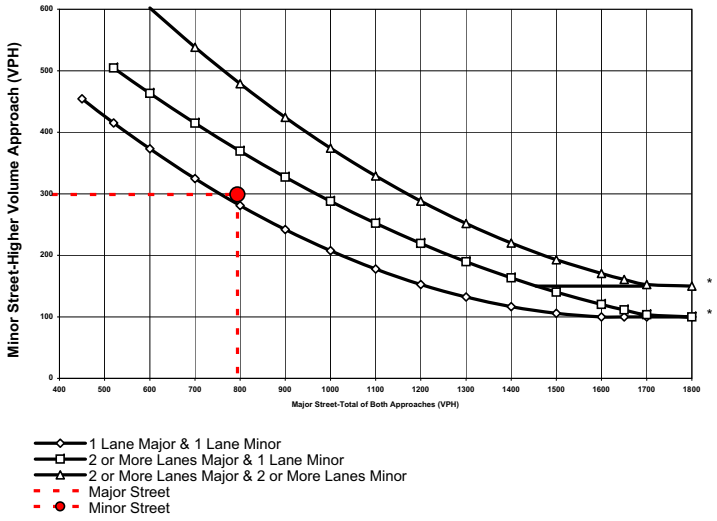
EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre Ranport Rd		**Minor** Aiport Blvd	
Total of Both Approaches (VPH):	794	Higher Volume Approach (VPH):	299
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

RBF CONSULTING

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 16: Airport Blvd / Ranport Rd**

Major Approach Street Name: **Ranport Rd**
Minor Approach Street Name: **Aiport Blvd**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	2
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	719
Minor Approach Volume (One Direction Only)	338
Total Entering Volume	1057
Minor Approach Delay per Vehicle	11.8

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.11
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 338
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1057

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	719
Higher Approach - Minor Street		✓	338

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

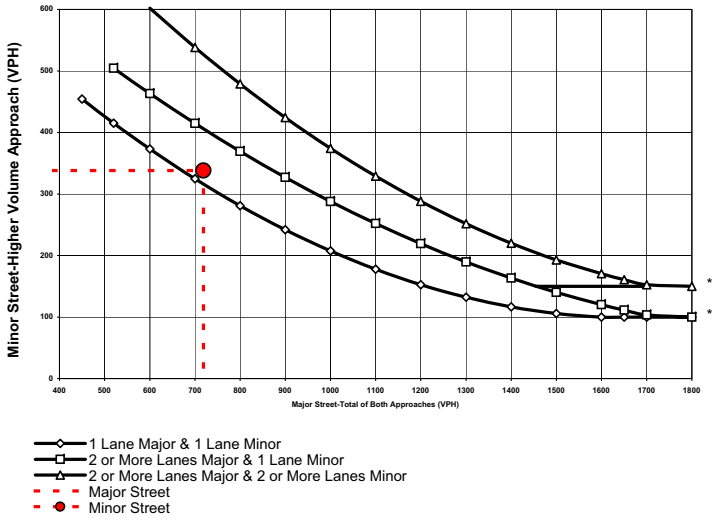
Major Stre Ranport Rd

Minor Aiport Blvd

Total of Both Approaches (VPH):	719	Higher Volume Approach (VPH):	338
Number of Approach Lanes:	2	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 17: Hwy 1 NB Ramps / Larkin Valley Rd**

Major Approach Street Name: **Larkin Valley Rd**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	703
Minor Approach Volume (One Direction Only)	356
Total Entering Volume	1059
Minor Approach Delay per Vehicle	484.8

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 47.94
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 356
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1059

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		703
Higher Approach - Minor Street		✓	356

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

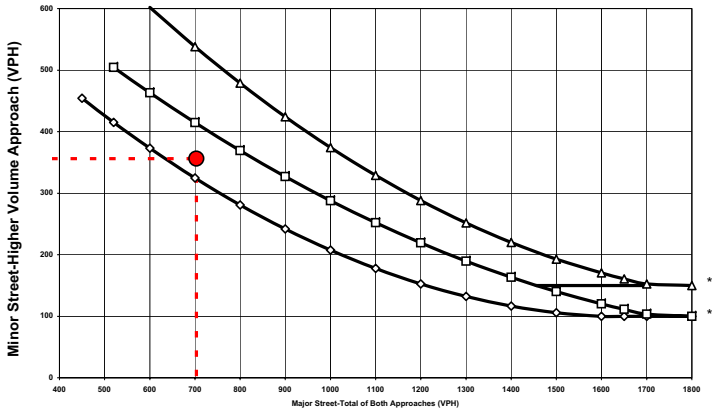
Major Stre Larkin Valley Rd

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	703	Higher Volume Approach (VPH):	356
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 17: Hwy 1 NB Ramps / Larkin Valley Rd**

Major Approach Street Name: **Larkin Valley Rd**
Minor Approach Street Name: **Hwy 1 NB Ramps**

Geometry

Number of Approach Legs	3
Number of Major Approach Lanes	1
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	829
Minor Approach Volume (One Direction Only)	252
Total Entering Volume	1081
Minor Approach Delay per Vehicle	1093.2

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☑ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☑ NO ☐
   Total Delay (Vehicle Hours) 76.52
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 252
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1081

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	✓		829
Higher Approach - Minor Street		✓	252

The plotted point falls above the curve in Figure 4C-3. — YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

EXISTING + BACKGROUND + PROJECT CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

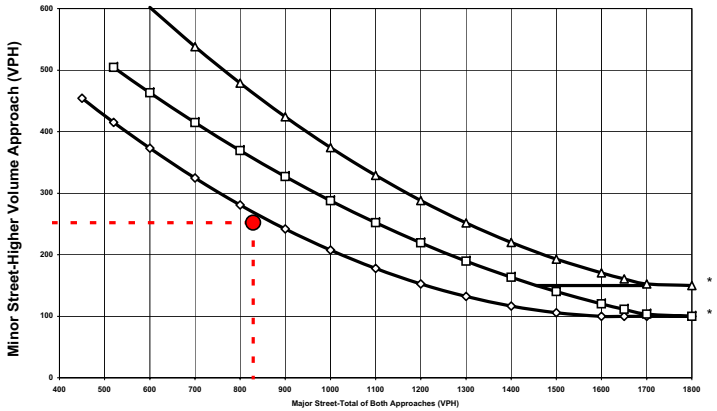
Major Stre Larkin Valley Rd

Minor Hwy 1 NB Ramps

Total of Both Approaches (VPH):	829	Higher Volume Approach (VPH):	252
Number of Approach Lanes:	1	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

CUMULATIVE CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name **East Lake**
Minor Approach Street Name **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1363
Minor Approach Volume (One Direction Only)	204
Total Entering Volume	1651
Minor Approach Delay per Vehicle	49.3

SIGNAL WARRANT NOT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 2.79
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 204
3. The total entering volume serviced during the hour equals or excceds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 1651

PART B — **SATISFIED** YES ☐ NO ☑

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1363
Higher Approach - Minor Street		✓	204

The plotted point falls above the curve in Figure 4C-3. YES ☐ NO ☑

OR. The plotted point falls above the curve in Figure 4C-4. YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

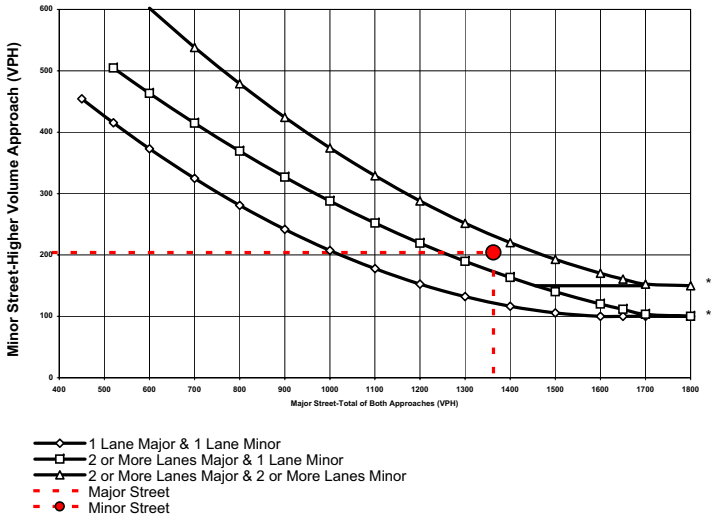
CUMULATIVE CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour AM

Major Stre East Lake		**Minor** Wagner Ave	
Total of Both Approaches (VPH):	1363	Higher Volume Approach (VPH):	204
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

CUMULATIVE CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

General Information

Description: **Intersection 5: East Lake Ave / Wagner Ave**

Major Approach Street Name: **East Lake**
Minor Approach Street Name: **Wagner Ave**

Geometry

Number of Approach Legs	4
Number of Major Approach Lanes	3
Number of Minor Approach Lanes	2

Volumes and Delay

Major Approach Volumes (Both Directions)	1691
Minor Approach Volume (One Direction Only)	208
Total Entering Volume	2025
Minor Approach Delay per Vehicle	33.0

SIGNAL WARRANT SATISFIED

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied)

PART A — **SATISFIED** YES ☐ NO ☑

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced for traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; **AND** — YES ☐ NO ☑
   Total Delay (Vehicle Hours) 1.91
2. The volume on the same minor street approach (one direction only equal or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; **AND** — YES ☑ NO ☐
   Total Minor Approach Volume 208
3. The total entering volume serviced during the hour equals or exceeds 800 vph for inersections with four or more approaches or 650 vph for intersections with three approaches. — YES ☑ NO ☐
   Total Entering Volume 2025

PART B — **SATISFIED** YES ☑ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street		✓	1691
Higher Approach - Minor Street		✓	208

The plotted point falls above the curve in Figure 4C-3. — YES ☑ NO ☐

OR. The plotted point falls above the curve in Figure 4C-4. — YES ☐ NO ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

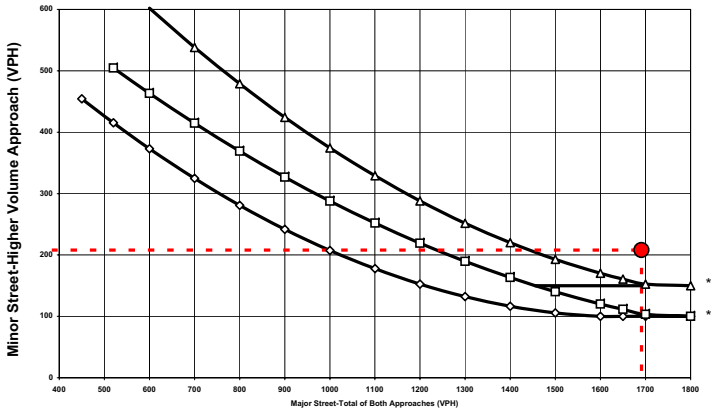
CUMULATIVE CONDITIONS - PEAK HOUR VOLUME WARRANT (URBAN CONDITIONS)

Peak Hour PM

Major Stre East Lake		**Minor** Wagner Ave	
Total of Both Approaches (VPH):	1691	Higher Volume Approach (VPH):	208
Number of Approach Lanes:	3	Number of Approach Lanes:	2

SIGNAL WARRANT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2003 Revision 1, as amended for use in California (September 26, 2006).

APPENDIX J

Transit Maps

Santa Cruz Metropolitan Transit District — Effective / Vigente 6/12/2008

71 Santa Cruz to Watsonville

Bus Leaves from Santa Cruz Metro Lane 4 (A)	Bus Leaves from Soquel Ave & Hageman (B)	Bus Leaves from Soquel Drive & Dominican Hospital (C)	Bus Leaves from Soquel Drive & Daubenbiss (D)	Bus Leaves from Cabrillo College (E)	Bus Leaves from Soquel & Rancho Del Mar (F)	Bus Leaves from Freedom Blvd. & Soquel Drive (G)	Bus Leaves from Airport Blvd. & Freedom Centre (H)	Bus Leaves from Crestview Center (I)	Bus Leaves from Clifford & Pennsylvania (J)	Bus Leaves from Pennsylvania & Main (K)	Bus Leaves from Alta Vista & Arthur Road (L)	Bus Arrives at Watsonville Transit Center (M)
MON-FRI												
6:10am	6:16	6:21	6:26	6:33	6:36	6:42	6:54	7:01	—	—	—	7:13
6:45	6:54	7:00	7:06	7:15	7:18	7:25	7:39	—	7:47	7:52	—	8:00
7:15	7:24	7:30	7:36	7:45	7:48	7:55	8:10	8:17	—	—	—	8:30
7:45	7:54	8:00	8:06	8:15	8:18	8:25	8:39	—	8:47	8:52	—	9:00
8:15	8:24	8:30	8:36	8:45	8:48	8:55	9:10	9:17	—	—	—	9:30
8:45	8:54	9:00	9:06	9:15	9:18	9:25	9:39	—	9:47	9:52	—	10:00
9:15	9:24	9:30	9:36	9:45	9:48	9:55	10:10	10:17	—	—	—	10:30
9:45	9:54	10:00	10:06	10:15	10:18	10:25	10:39	—	10:47	10:52	—	11:00
10:15	10:24	10:30	10:36	10:45	10:48	10:55	11:10	11:17	—	—	—	11:30
10:45	10:54	11:00	11:06	11:15	11:18	11:25	11:39	—	11:47	11:52	—	**12:00**
11:15	11:26	11:32	11:38	11:47	11:50	11:57	**12:12**	**12:20**	—	—	—	**12:35**
11:45	11:56	**12:02**	**12:08**	**12:17**	**12:20**	**12:27**	**12:42**	—	**12:50**	**12:55**	—	**1:05**
12:15pm	**12:26**	**12:32**	**12:38**	**12:47**	**12:50**	**12:57**	**1:12**	**1:20**	—	—	—	**1:35**
12:45	**12:56**	**1:02**	**1:08**	**1:17**	**1:20**	**1:27**	**1:41**	—	**1:49**	**1:53**	—	**2:00**
1:15	**1:26**	**1:32**	**1:38**	**1:47**	**1:50**	**1:57**	**2:11**	**2:18**	—	—	—	**2:30**
1:45	**1:56**	**2:02**	**2:08**	**2:17**	**2:20**	**2:27**	**2:41**	—	**2:49**	**2:53**	—	**3:00**
2:00	**2:11**	**2:17**	**2:23**	**2:32**	**2:35**	**2:42**	**2:58**	—	—	**3:06**	—	**3:15**
2:15	**2:26**	**2:32**	**2:38**	**2:47**	**2:50**	**2:57**	**3:11**	**3:18**	—	—	—	**3:30**
2:30	**2:41**	**2:47**	**2:53**	**3:02**	**3:05**	**3:12**	**3:28**	—	—	—	**3:35**	**3:50**
2:45	**2:56**	**3:02**	**3:08**	**3:17**	**3:20**	**3:27**	**3:43**	—	**3:51**	**3:56**	—	**4:05**
3:00	**3:11**	**3:17**	**3:23**	**3:32**	**3:35**	**3:42**	**3:58**	—	—	**4:06**	—	**4:15**
3:15	**3:26**	**3:32**	**3:38**	**3:47**	**3:50**	**3:57**	**4:11**	**4:18**	—	—	—	**4:30**
3:30	**3:41**	**3:47**	**3:53**	**4:02**	**4:05**	**4:12**	**4:28**	—	—	—	**4:35**	**4:45**
3:45	**3:56**	**4:02**	**4:08**	**4:17**	**4:20**	**4:27**	**4:43**	—	**4:51**	**4:56**	—	**5:05**
4:00	**4:11**	**4:17**	**4:23**	**4:32**	**4:36**	**4:43**	**4:59**	—	—	**5:07**	—	**5:20**
4:15	**4:26**	**4:32**	**4:38**	**4:47**	**4:50**	**4:57**	**5:13**	**5:21**	—	—	—	**5:35**
4:30	**4:41**	**4:47**	**4:53**	**5:02**	**5:05**	**5:12**	**5:28**	—	—	—	**5:35**	**5:50**
4:45	**4:56**	**5:02**	**5:08**	**5:17**	**5:20**	**5:27**	**5:43**	—	**5:51**	**5:56**	—	**6:05**
5:00	**5:11**	**5:17**	**5:23**	**5:32**	**5:36**	**5:43**	**5:59**	—	—	**6:07**	—	**6:20**
5:15	**5:26**	**5:32**	**5:38**	**5:47**	**5:50**	**5:57**	**6:13**	**6:21**	—	—	—	**6:35**
5:30	**5:41**	**5:47**	**5:53**	**6:02**	**6:05**	**6:12**	**6:28**	—	—	—	**6:35**	**6:50**
5:45	**5:54**	**6:00**	**6:06**	**6:15**	**6:18**	**6:25**	**6:38**	—	**6:46**	**6:49**	—	**6:55**
6:00	**6:09**	**6:15**	**6:21**	**6:30**	**6:33**	**6:40**	**6:51**	—	—	**6:59**	—	**7:10**
6:15	**6:24**	**6:30**	**6:36**	**6:45**	**6:48**	**6:55**	**7:08**	**7:15**	—	—	—	**7:25**
6:45	**6:54**	**7:00**	**7:06**	**7:15**	**7:18**	**7:25**	**7:38**	—	**7:46**	**7:49**	—	**7:55**
7:15	**7:22**	**7:27**	**7:33**	**7:40**	**7:43**	**7:49**	**8:00**	**8:06**	—	—	—	**8:15**
7:45	**7:53**	**7:58**	**8:03**	**8:11**	**8:13**	**8:18**	**8:29**	—	**8:36**	**8:39**	—	**8:45**
8:15	**8:22**	**8:27**	**8:33**	**8:40**	**8:43**	**8:49**	**9:00**	**9:06**	—	—	—	**9:15**
8:45	**8:53**	**8:58**	**9:03**	**9:11**	**9:13**	**9:18**	**9:29**	—	**9:36**	**9:39**	—	**9:45**
9:15	**9:22**	**9:27**	**9:33**	**9:40**	**9:43**	**9:49**	**10:00**	**10:06**	—	—	—	**10:15**
9:45	**9:53**	**9:58**	**10:03**	**10:11**	**10:13**	**10:18**	**10:29**	—	**10:36**	**10:39**	—	**10:45**
10:45	**10:53**	**10:58**	**11:03**	**11:11**	**11:13**	**11:18**	**11:29**	—	**11:36**	**11:39**	—	**11:45**
❶ **11:45**	**11:53**	**11:58**	12:03	12:11	12:13	12:18	12:29	—	12:36	12:39	—	12:45

All Metro buses are wheelchair accessible, while some stops on this route may not be.

❶ During Summer Service (through 09-17-2008), this trip begins 10 minutes earlier at 11:35pm, from Cliff & Beach at the Boardwalk, then departs as shown at 11:45pm.
Durante el Servicio de Verano (hasta 09-17-2008), este viaje comenzará 10 minutos más temprano a las 11:35pm, de Cliff & Beach en el Boardwalk, y sale como indicado a las 11:45pm.

71 Santa Cruz to Watsonville Monday - Friday

Santa Cruz Metropolitan Transit District — Effective / Vigente 6/12/2008

72 Corralitos

Bus Leaves from Watsonville TC Lane 1 (A)	Bus Leaves from Green Valley & Main (B)	Bus Leaves from Airport Blvd. & Freedom Centre (C)	Bus Leaves from Browns Valley & Corralitos (D)	Bus Leaves from Green Valley & Kliewer (E)	Bus Leaves from Airport Blvd. & Freedom Centre (C)	Bus Leaves from Green Valley & Main (B)	Bus Arrives at Watsonville Transit Center (A)
MON-FRI							
5:40am	5:47	5:51	6:04	6:09	6:18	6:24	6:31
6:40	6:47	6:51	7:04	7:09	7:18	7:24	7:31
7:40	7:47	7:51	8:04	8:09	8:18	8:24	8:31
8:40	8:47	8:51	9:04	9:09	9:18	9:24	9:31
9:40	9:47	9:51	10:04	10:09	10:18	10:24	10:31
10:40	10:47	10:51	11:04	11:09	11:18	11:24	11:31
11:40	11:47	11:51	**12:04**	**12:09**	**12:18**	**12:24**	**12:31**
12:40pm	**12:47**	**12:54**	**1:07**	**1:12**	**1:25**	**1:31**	**1:38**
1:40	**1:47**	**1:54**	**2:07**	**2:12**	**2:25**	**2:31**	**2:38**
2:40	**2:47**	**2:54**	**3:07**	**3:12**	**3:25**	**3:31**	**3:38**
3:40	**3:47**	**3:54**	**4:07**	**4:12**	**4:25**	**4:31**	**4:38**
4:40	**4:47**	**4:54**	**5:07**	**5:12**	**5:25**	**5:31**	**5:38**
5:40	**5:47**	**5:54**	**6:07**	**6:12**	**6:25**	**6:31**	**6:38**
6:40	**6:47**	**6:54**	**7:07**	**7:12**	**7:25**	**7:31**	**7:38**

All Metro buses are wheelchair accessible, while some stops on this route may not be.

72 Corralitos

Santa Cruz Metropolitan Transit District

Effective / Vigente 6/12/2008

74 Ohlone Parkway/Rolling Hills

Bus Leaves from Watsonville TC Lane 2	Bus Leaves from Pajaro Valley High School	Bus Leaves from Green Valley & Main	Bus Leaves from Westgate & Tech Dr. (Social Sec.)	Bus Leaves from Airport Blvd. & Freedom Centre	Bus Leaves from Buena Vista & Manfre	Bus Leaves from Green Valley & Main	Bus Leaves from Pajaro Valley High School	Bus Arrives at Watsonville Transit Center
A	B	C	D	E	F	C	B	A
MON-FRI								
6:50am	—	6:58	—	7:08	7:13	7:23	7:28	7:40
7:50	—	7:58	—	8:08	8:13	8:23	8:28	8:40
8:50	—	8:58	9:00	9:08	9:13	9:23	—	9:35
9:50	—	9:58	10:00	10:08	10:13	10:23	—	10:35
10:50	—	10:58	11:00	11:08	11:13	11:23	—	11:35
11:50	—	11:58	**12:00**	**12:08**	**12:13**	**12:23**	—	**12:35**
12:50pm	—	**12:58**	—	**1:08**	**1:13**	**1:23**	—	**1:35**
1:50	—	**1:58**	—	**2:08**	**2:13**	**2:23**	**2:28**	**2:40**
2:50	—	**2:58**	**3:00**	**3:08**	**3:13**	**3:23**	—	**3:40**
3:50	**3:58**	**4:03**	—	**4:13**	**4:18**	**4:28**	—	**4:40**
4:50	—	**4:58**	—	**5:08**	**5:13**	**5:23**	—	**5:35**
5:50	—	**5:58**	—	**6:08**	**6:13**	**6:23**	—	**6:35**

All Metro buses are wheelchair accessible, while some stops on this route may not be.

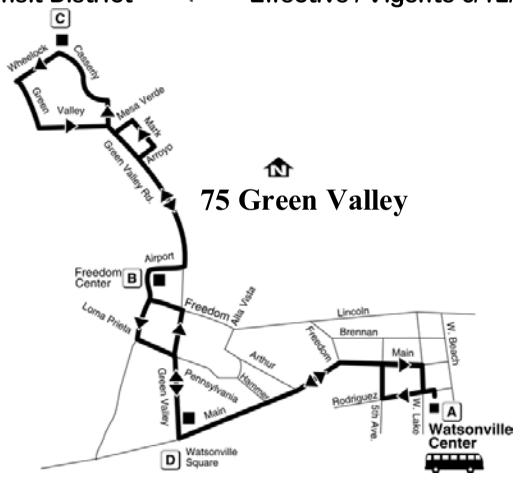
Santa Cruz Metropolitan Transit District

Effective / Vigente 6/12/2008

75 Green Valley

Bus Leaves from Watsonville TC Lane 2	Bus Leaves from Airport Blvd. & Freedom Centre	Bus Leaves from Wheelock & Monte Vista School	Bus Leaves from Airport Blvd. & Freedom Centre	Bus Leaves from Green Valley & Main	Bus Arrives at Watsonville Transit Center
A	B	C	B	D	A
DAILY					
6:09am	6:22	6:34	6:47	6:53	7:02
7:09	7:22	7:34	7:47	7:53	8:02
8:09	8:22	8:34	8:47	8:53	9:02
9:09	9:22	9:34	9:47	9:53	10:02
10:09	10:22	10:34	10:47	10:53	11:02
11:09	11:22	11:34	11:47	11:53	**12:02**
12:09pm	**12:22**	**12:34**	**12:47**	**12:53**	**1:02**
1:09	**1:22**	**1:34**	**1:47**	**1:53**	**2:02**
2:09	**2:22**	**2:34**	**2:47**	**2:53**	**3:02**
3:09	**3:22**	**3:34**	**3:47**	**3:53**	**4:02**
4:09	**4:22**	**4:34**	**4:47**	**4:53**	**5:02**
5:09	**5:22**	**5:34**	**5:47**	**5:53**	**6:02**
6:09	**6:22**	**6:34**	**6:47**	**6:53**	**7:02**
7:09	**7:22**	**7:34**	**7:47**	**7:53**	**8:02**
8:09	**8:22**	**8:34**	**8:47**	**8:53**	**9:02**

All Metro buses are wheelchair accessible, while some stops on this route may not be.



76 Corralitos/Buena Vista

Bus Leaves from Watsonville TC Lane 1	Bus Leaves from Green Valley & Main	Bus Leaves from Airport Blvd. & Freedom Centre	Bus Leaves from Browns Valley & Corralitos	Bus Leaves from Buena Vista & Manfre	Bus Leaves from Green Valley & Main	Bus Arrives at Watsonville Transit Center
A	B	C	D	E	B	A
SAT-SUN						
6:40 am	6:45	6:50	7:00	7:07	7:25	7:35
7:40	7:47	7:52	8:05	—	8:25	8:35
8:40	8:47	8:52	—	9:10	9:25	9:35
9:40	9:47	9:52	10:05	—	10:25	10:35
10:40	10:47	10:52	—	11:10	11:25	11:35
11:40	11:47	11:52	**12:05**	—	**12:25**	**12:35**
12:40 pm	**12:47**	**12:52**	—	**1:10**	**1:25**	**1:35**
1:40	**1:47**	**1:52**	**2:05**	—	**2:25**	**2:35**
2:40	**2:47**	**2:52**	—	**3:10**	**3:25**	**3:35**
3:40	**3:47**	**3:52**	**4:05**	—	**4:25**	**4:35**
4:40	**4:47**	**4:52**	—	**5:10**	**5:25**	**5:35**
5:40	**5:47**	**5:52**	**6:05**	**6:12**	**6:30**	**6:40**

All Metro buses are wheelchair accessible, while some stops on this route may not be.

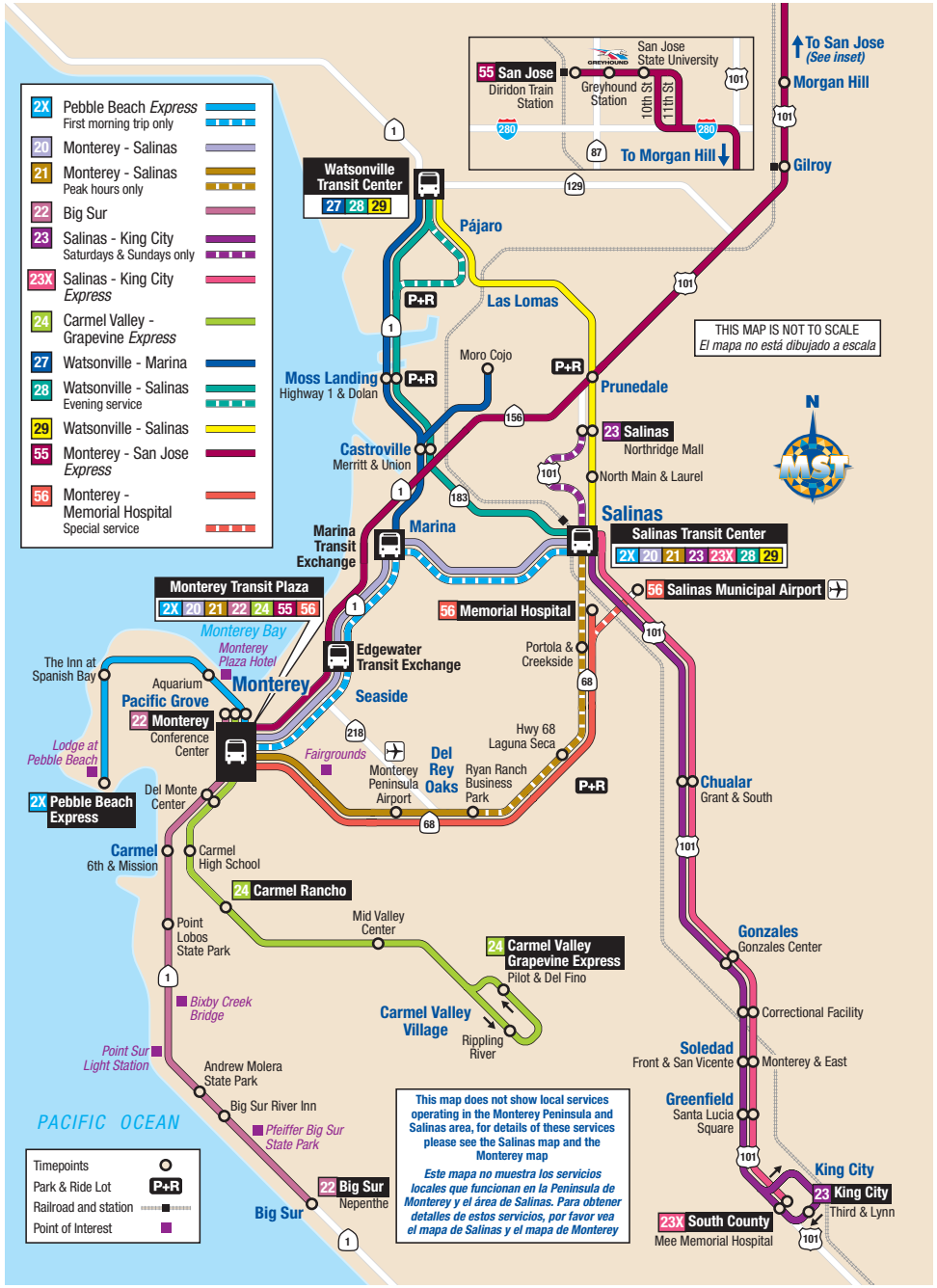
Santa Cruz Metropolitan Transit District Effective / Vigente 6/12/2008

79 East Lake

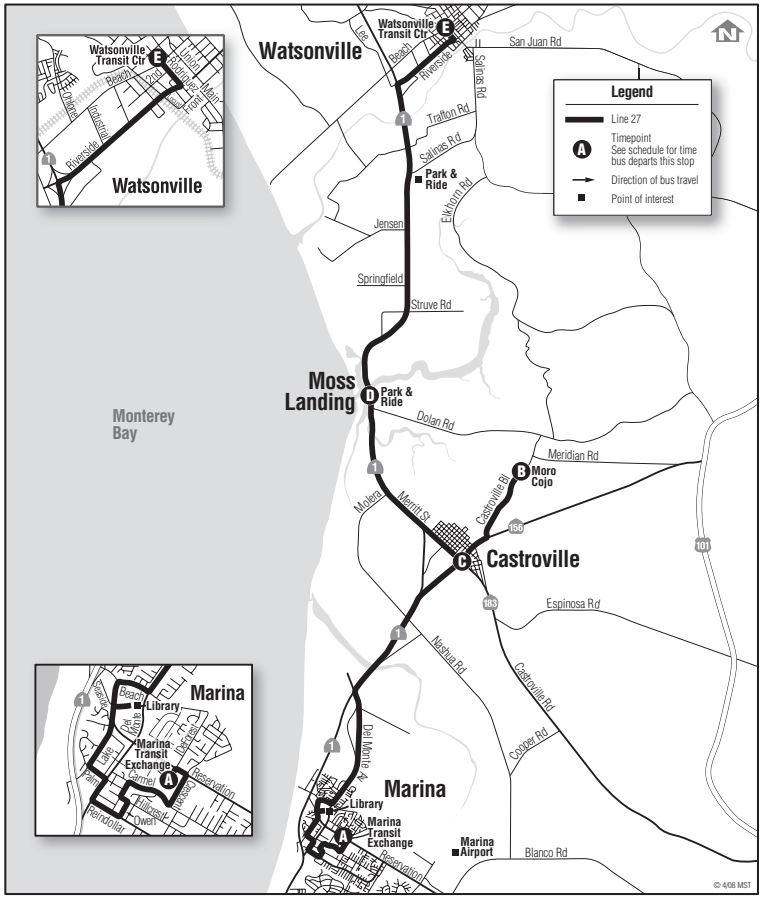
Bus Leaves from Watsonville TC Lane 2	Bus Leaves from College & Lakeview	Bus Leaves from Bronte & Hushbeck	Bus Arrives at Watsonville Transit Center
A	B	C	A
MON-FRI			
7:10 am	7:20	7:25	7:35
8:10	8:20	8:25	8:35
9:10	9:20	9:25	9:35
10:10	10:20	10:25	10:35
11:10	11:20	11:25	11:35
12:10 pm	**12:20**	**12:25**	**12:35**
1:10	**1:20**	**1:25**	**1:35**
2:10	**2:20**	**2:25**	**2:35**
3:10	**3:20**	**3:25**	**3:35**
4:10	**4:20**	**4:25**	**4:35**
5:10	**5:20**	**5:25**	**5:35**

All Metro buses are wheelchair accessible, while some stops on this route may not be.

79 East Lake



27 Marina-Watsonville



Continued on next page

27 Watsonville

Weekdays*

Notes	Marina Transit Exchange Ⓐ	Moro Cojo Esperanza & Vista de Tierra Ⓑ	Castroville Merritt & Pajaro Ⓒ	Moss Landing Hwy 1 & Dolan Rd Ⓓ	Watsonville Transit Center Ⓔ
	7:18	7:42	7:49	7:54	8:09
	9:18	9:42	9:49	9:54	10:09
	11:18	11:42	11:49	11:54	**12:09**
	1:18	**1:42**	**1:49**	**1:54**	**2:09**
	3:18	**3:42**	**3:49**	**3:54**	**4:09**
	5:18	**5:42**	**5:49**	**5:54**	**6:09**
	7:18	**7:42**	**7:49**	**7:54**	**8:09**

27 Marina

Weekdays*

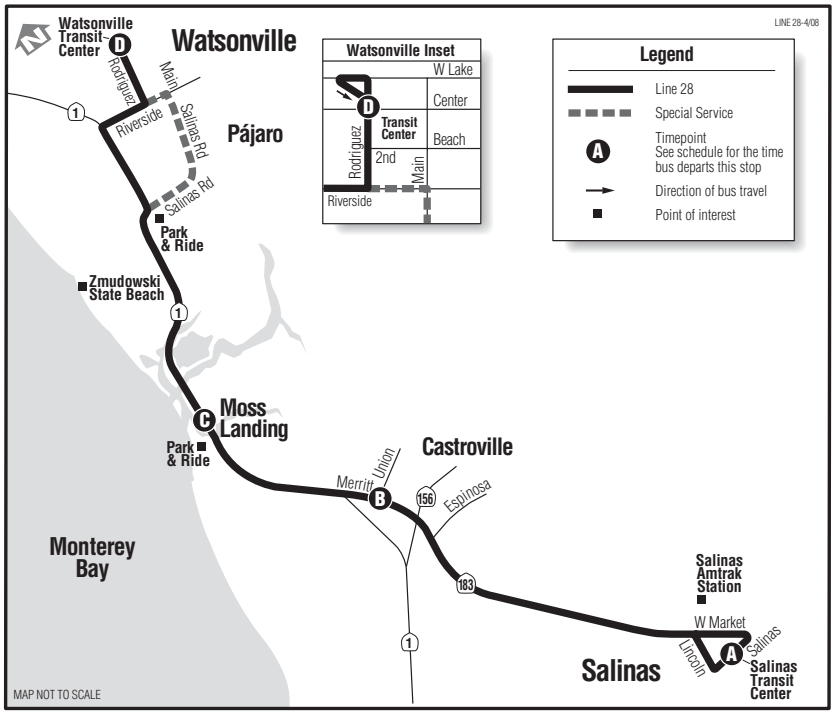
Notes	Watsonville Transit Center Ⓔ	Moss Landing Hwy 1 & Dolan Rd Ⓓ	Castroville Merritt & Pajaro Ⓒ	Moro Cojo Esperanza & Vista de Tierra Ⓑ	Marina Transit Exchange Ⓐ
	6:10	6:23	6:31	6:37	7:05
	8:10	8:23	8:31	8:37	9:05
	10:10	10:23	10:31	10:37	11:05
	12:10	**12:23**	**12:31**	**12:37**	**1:05**
	2:10	**2:23**	**2:31**	**2:37**	**3:05**
	4:12	**4:25**	**4:33**	**4:39**	**5:07**
	6:12	**6:25**	**6:33**	**6:39**	**7:07**

Note: *Line 27 does not operate Thanksgiving, Christmas or New Year's Day.

TRANSIT TIP – Timed transfers in Marina to Line 20 to travel to Edgewater, Seaside and Monterey.

TRANSIT TIP – Easy connection to the Santa Cruz METRO in Watsonville. See page 100/101 for details.

28 Watsonville via Castroville



TRANSIT TIP – Line 28 operates on Salinas Road weekday and Saturday nights.

28 Watsonville

Weekdays & Saturdays*

Notes	Salinas Transit Center Ⓐ	Castroville Merritt & Union Ⓑ	Moss Landing Hwy. 1 & Dolan Rd Ⓒ	Watsonville Transit Center Ⓓ
A	6:45	7:02	7:10	7:28
	7:45	8:02	8:10	8:28
	8:45	9:02	9:10	9:28
	9:45	10:02	10:10	10:28
	10:45	11:02	11:10	11:28
	11:45	**12:02**	**12:10**	**12:28**
	12:45	**1:02**	**1:10**	**1:28**
	1:45	**2:02**	**2:10**	**2:28**
	2:45	**3:02**	**3:10**	**3:28**
	3:45	**4:02**	**4:10**	**4:28**
	4:45	**5:02**	**5:10**	**5:28**
	5:45	**6:02**	**6:10**	**6:28**
B	**6:45**	**7:02**	**7:10**	**7:28**
B	**7:15**	**7:32**	**7:40**	**7:58**
B	**8:15**	**8:32**	**8:40**	**8:58**
B	**9:15**	**9:32**	**9:40**	**9:58**

Sundays*

6:45	7:02	7:10	7:28
7:45	8:02	8:10	8:28
8:45	9:02	9:10	9:28
9:45	10:02	10:10	10:28
10:45	11:02	11:10	11:28
11:45	**12:02**	**12:10**	**12:28**
12:45	**1:02**	**1:10**	**1:28**
1:45	**2:02**	**2:10**	**2:28**
2:45	**3:02**	**3:10**	**3:28**
3:45	**4:02**	**4:10**	**4:28**
4:45	**5:02**	**5:10**	**5:28**
5:45	**6:02**	**6:10**	**6:28**

28 Salinas

Weekdays & Saturdays*

Notes	Watsonville Transit Center Ⓓ	Moss Landing Hwy. 1 & Dolan Rd Ⓒ	Castroville Merritt & Pajaro Ⓑ	Salinas Transit Center Ⓐ
A	6:00	6:13	6:21	6:40
	7:00	7:13	7:21	7:40
	8:00	8:13	8:21	8:40
	9:00	9:13	9:21	9:40
	10:00	10:13	10:21	10:40
	11:00	11:13	11:21	11:40
	12:00	**12:13**	**12:21**	**12:40**
	1:00	**1:13**	**1:21**	**1:40**
	2:00	**2:13**	**2:21**	**2:40**
	3:00	**3:13**	**3:21**	**3:40**
	4:00	**4:13**	**4:21**	**4:40**
	5:00	**5:13**	**5:21**	**5:40**
	6:00	**6:13**	**6:21**	**6:40**
B	**7:00**	**7:13**	**7:21**	**7:40**
B	**8:00**	**8:13**	**8:21**	**8:40**
B	**9:00**	**9:13**	**9:21**	**9:40**
B	**10:00**	**10:13**	**10:21**	**10:40**

Sundays*

7:00	7:13	7:21	7:40
8:00	8:13	8:21	8:40
9:00	9:13	9:21	9:40
10:00	10:13	10:21	10:40
11:00	11:13	11:21	11:40
12:00	**12:13**	**12:21**	**12:40**
1:00	**1:13**	**1:21**	**1:40**
2:00	**2:13**	**2:21**	**2:40**
3:00	**3:13**	**3:21**	**3:40**
4:00	**4:13**	**4:21**	**4:40**
5:00	**5:13**	**5:21**	**5:40**
6:00	**6:13**	**6:21**	**6:40**

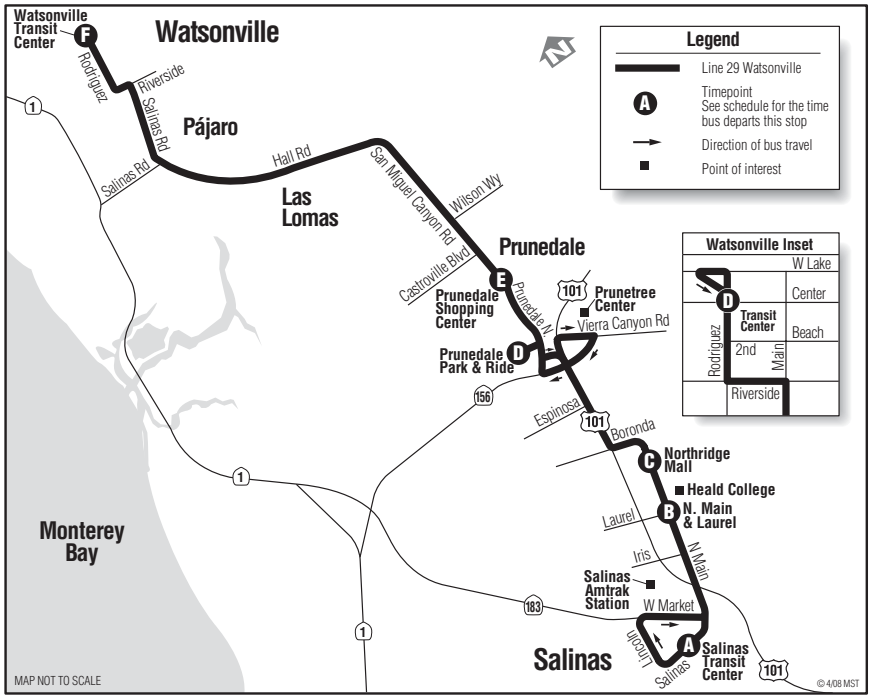
Notes:

A Not on Saturdays.

B Via Salinas Road.

* Line 28 does not operate on Thanksgiving, Christmas, or New Year's Day.

29 Watsonville via Prunedale



Continued on next page

TRANSIT TIP – Easy connections to Santa Cruz METRO in Watsonville.

29 Watsonville

Weekdays & Saturdays*

Notes	Salinas Transit Center Ⓐ	North Main & Laurel Ⓑ	Northridge Mall Ⓒ	Prunedale Park & Ride Ⓓ	Prunedale Center Ⓔ	Watsonville Transit Center Ⓕ
	6:45	6:53	7:03	7:13	7:19	7:50
	7:45	7:53	8:03	8:13	8:19	8:50
	8:45	8:53	9:03	9:13	9:19	9:50
	9:45	9:53	10:03	10:13	10:19	10:50
	10:45	10:53	11:03	11:13	11:19	11:50
	11:45	11:53	**12:03**	**12:13**	**12:19**	**12:50**
	12:45	**12:53**	**1:03**	**1:13**	**1:19**	**1:50**
	1:45	**1:53**	**2:03**	**2:13**	**2:19**	**2:50**
	2:45	**2:53**	**3:03**	**3:13**	**3:19**	**3:50**
	3:45	**3:53**	**4:03**	**4:13**	**4:19**	**4:50**
	4:45	**4:53**	**5:03**	**5:13**	**5:19**	**5:50**
	5:45	**5:53**	**6:03**	**6:13**	**6:19**	**6:50**

Sundays*

	6:45	6:53	7:03	7:13	7:19	7:50
	7:45	7:53	8:03	8:13	8:19	8:50
	8:45	8:53	9:03	9:13	9:19	9:50
	9:45	9:53	10:03	10:13	10:19	10:50
	10:45	10:53	11:03	11:13	11:19	11:50
	11:45	11:53	**12:03**	**12:13**	**12:19**	**12:50**
	12:45	**12:53**	**1:03**	**1:13**	**1:19**	**1:50**
	1:45	**1:53**	**2:03**	**2:13**	**2:19**	**2:50**
	2:45	**2:53**	**3:03**	**3:13**	**3:19**	**3:50**
	3:45	**3:53**	**4:03**	**4:13**	**4:19**	**4:50**
	4:45	**4:53**	**5:03**	**5:13**	**5:19**	**5:50**
	5:45	**5:53**	**6:03**	**6:13**	**6:19**	**6:50**

Notes:

A Not on Saturdays.

B Serves Salinas Amtrak station. Other trips serve Salinas Amtrak on request.

* Line 29 does not operate on Thanksgiving, Christmas, or New Years's Day.

29 Salinas

Weekdays & Saturdays*

Notes	Watsonville Transit Center Ⓕ	Prunedale Center Ⓔ	Prunedale Park & Ride Ⓓ	Northridge Mall Ⓒ	North Main & Laurel Ⓑ	Salinas Transit Center Ⓐ
A	6:30	6:56	7:02	7:15	7:20	7:35
	7:30	7:56	8:02	8:15	8:20	8:35
	8:30	8:56	9:02	9:15	9:20	9:35
	9:30	9:56	10:02	10:15	10:20	10:35
	10:30	10:56	11:02	11:15	11:20	11:35
	11:30	11:56	**12:02**	**12:15**	**12:20**	**12:35**
	12:30	**12:56**	**1:02**	**1:15**	**1:20**	**1:35**
	1:30	**1:56**	**2:02**	**2:15**	**2:20**	**2:35**
	2:30	**2:56**	**3:02**	**3:15**	**3:20**	**3:35**
	3:30	**3:56**	**4:02**	**4:15**	**4:20**	**4:35**
	4:30	**4:56**	**5:02**	**5:15**	**5:20**	**5:35**
B	**5:30**	**5:56**	**6:02**	**6:15**	**6:20**	**6:35**
	6:30	**6:56**	**7:02**	**7:15**	**7:20**	**7:35**

Sundays*

	7:30	7:56	8:02	8:15	8:20	8:35
	8:30	8:56	9:02	9:15	9:20	9:35
	9:30	9:56	10:02	10:15	10:20	10:35
	10:30	10:56	11:02	11:15	11:20	11:35
	11:30	11:56	**12:02**	**12:15**	**12:20**	**12:35**
	12:30	**12:56**	**1:02**	**1:15**	**1:20**	**1:35**
	1:30	**1:56**	**2:02**	**2:15**	**2:20**	**2:35**
	2:30	**2:56**	**3:02**	**3:15**	**3:20**	**3:35**
	3:30	**3:56**	**4:02**	**4:15**	**4:20**	**4:35**
	4:30	**4:56**	**5:02**	**5:15**	**5:20**	**5:35**
	5:30	**5:56**	**6:02**	**6:15**	**6:20**	**6:35**
	6:30	**6:56**	**7:02**	**7:15**	**7:20**	**7:35**
	7:00	**7:23**	**7:28**	**7:38**	**7:43**	**7:55**

APPENDIX K

Phasing LOS Worksheets

HCM Unsignalized Intersection Capacity Analysis
5: Wagner & East Lake

1/4/2009

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)	5	0	9	116	7	69	3	501	138	26	486	4
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	11	147	9	87	4	634	175	33	615	5
Pedestrians		2			9			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			1			0				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1419	1511	626	1349	1339	643	622			818		
vC1, stage 1 conf vol	686	686		651	651							
vC2, stage 2 conf vol	734	825		698	688							
vCu, unblocked vol	1419	1511	626	1349	1339	643	622			818		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	98	20	96	81	100			96		
cM capacity (veh/h)	146	169	481	184	199	470	957			804		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	18	147	96	4	634	175	33	620
Volume Left	6	147	0	4	0	0	33	0
Volume Right	11	0	87	0	0	175	0	5
cSH	264	184	417	957	1700	1700	804	1700
Volume to Capacity	0.07	0.80	0.23	0.00	0.37	0.10	0.04	0.36
Queue Length 95th (ft)	5	137	22	0	0	0	3	0
Control Delay (s)	19.6	74.7	16.2	8.8	0.0	0.0	9.7	0.0
Lane LOS	C	F	C	A			A	
Approach Delay (s)	19.6	51.5		0.0			0.5	
Approach LOS	C	F						

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	46.1%	ICU Level of Service	A	
Analysis Period (min)	15			

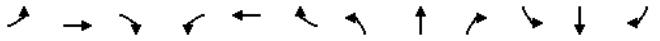
HCM Signalized Intersection Capacity Analysis
7: Airport & Green Valley

1/4/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1793		1770	1863	1559	1770	3539	1560	1770	3382	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1793		1770	1863	1559	1770	3539	1560	1770	3382	
Volume (vph)	276	376	109	249	405	185	147	252	183	209	663	240
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	297	404	117	268	435	199	158	271	197	225	713	258
RTOR Reduction (vph)	0	11	0	0	0	146	0	0	109	0	40	0
Lane Group Flow (vph)	297	510	0	268	435	53	158	271	88	225	931	0
Confl. Peds. (#/hr)			3			2			2			2
Confl. Bikes (#/hr)			1									3
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	16.0	26.0		14.0	24.0	24.0	9.0	19.9	33.9	14.1	25.0	
Effective Green, g (s)	16.0	26.0		14.0	24.0	24.0	9.0	19.9	33.9	14.1	25.0	
Actuated g/C Ratio	0.18	0.29		0.16	0.27	0.27	0.10	0.22	0.38	0.16	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	315	518		275	497	416	177	783	657	277	939	
v/s Ratio Prot	c0.17	c0.28		0.15	0.23		0.09	0.08	0.02	c0.13	c0.28	
v/s Ratio Perm						0.03			0.04			
v/c Ratio	0.94	0.98		0.97	0.88	0.13	0.89	0.35	0.13	0.81	0.99	
Uniform Delay, d1	36.5	31.8		37.8	31.6	25.1	40.0	29.6	18.4	36.7	32.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	35.7	35.1		46.9	15.7	0.1	38.7	1.2	0.1	16.4	27.3	
Delay (s)	72.2	66.9		84.7	47.3	25.2	78.7	30.8	18.5	53.1	59.7	
Level of Service	E	E		F	D	C	E	C	B	D	E	
Approach Delay (s)		68.8			53.5			39.0			58.4	
Approach LOS		E			D			D			E	

Intersection Summary				
HCM Average Control Delay	56.2	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Holohan & East Lake 1/4/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	0.99		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
Frt	1.00	0.90		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1656		1770	1831		1770	1733		1770	1863	1561
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1656		1770	1831		1770	1733		1770	1863	1561
Volume (vph)	175	170	315	100	165	16	289	168	109	14	288	295
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	185	342	109	179	17	314	183	118	15	313	321
RTOR Reduction (vph)	0	74	0	0	4	0	0	21	0	0	0	123
Lane Group Flow (vph)	190	453	0	109	192	0	314	280	0	15	313	198
Confl. Peds. (#/hr)	8					8	1		2	2		1
Confl. Bikes (#/hr)			2			3			5			3
Turn Type	Split			Split			Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases												6
Actuated Green, G (s)	19.0	19.0		13.8	13.8		15.0	37.9		1.5	24.4	43.4
Effective Green, g (s)	19.0	19.0		13.8	13.8		15.0	37.9		1.5	24.4	43.4
Actuated g/C Ratio	0.22	0.22		0.16	0.16		0.17	0.43		0.02	0.28	0.49
Clearance Time (s)	4.0	4.0		4.0	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		3.0	3.0	3.0
Lane Grp Cap (vph)	381	357		277	286		301	745		30	515	839
v/s Ratio Prot	0.11	c0.27		0.06	c0.10		c0.18	0.16		0.01	c0.17	0.05
v/s Ratio Perm												0.08
v/c Ratio	0.50	1.27		0.39	0.67		1.04	0.38		0.50	0.61	0.24
Uniform Delay, d1	30.4	34.6		33.4	35.1		36.6	17.1		43.0	27.7	12.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	141.7		0.9	6.1		63.6	1.4		12.5	5.3	0.1
Delay (s)	31.4	176.3		34.4	41.1		100.2	18.6		55.5	33.0	13.0
Level of Service	C	F		C	D		F	B		E	C	B
Approach Delay (s)		137.9			38.7			60.2			23.6	
Approach LOS		F			D			E			C	

Intersection Summary				
HCM Average Control Delay	71.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	78.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: SR-1 NB Off Ramp & Harkins Slough 1/4/2009

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	43	454	128	0	0	150
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	493	139	0	0	163
Pedestrians			1			3
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			0			0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	303	142			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	303	142			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	45			100	
cM capacity (veh/h)	688	903			1444	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	47	493	139	163
Volume Left	47	0	0	0
Volume Right	0	493	0	0
cSH	688	903	1700	1700
Volume to Capacity	0.07	0.55	0.08	0.10
Queue Length 95th (ft)	5	85	0	0
Control Delay (s)	10.6	13.7	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.4		0.0	0.0
Approach LOS	B			

Intersection Summary				
Average Delay	8.6			
Intersection Capacity Utilization	41.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
11: Airport & Freedom

1/4/2009

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1863	1533	1770	3539	1556	1770	3399		1770	3345	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	1863	1533	1770	3539	1556	1770	3399		1770	3345	
Volume (vph)	304	592	231	100	431	147	256	497	148	287	408	141
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	313	610	238	103	444	152	264	512	153	296	421	145
RTOR Reduction (vph)	0	0	72	0	0	75	0	31	0	0	38	0
Lane Group Flow (vph)	313	610	166	103	444	77	264	634	0	296	528	0
Confl. Peds. (#/hr)	3		12	12		3	17		5	5		17
Confl. Bikes (#/hr)									2			
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	7		8	4		5	2		1	6	
Permitted Phases			7			4						
Actuated Green, G (s)	13.0	26.0	26.0	16.0	29.0	29.0	16.0	16.0		16.0	16.0	
Effective Green, g (s)	13.0	26.0	26.0	16.0	29.0	29.0	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.14	0.29	0.29	0.18	0.32	0.32	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	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	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	496	538	443	315	1140	501	315	604		315	595	
v/s Ratio Prot	0.09	c0.33		0.06	c0.13		0.15	c0.19		c0.17	0.16	
v/s Ratio Perm			0.11			0.05						
v/c Ratio	0.63	1.13	0.38	0.33	0.39	0.15	0.84	1.05		0.94	0.89	
Uniform Delay, d1	36.2	32.0	25.5	32.3	23.6	21.8	35.7	37.0		36.5	36.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	81.2	0.5	2.8	0.2	0.1	22.6	50.2		37.4	14.9	
Delay (s)	38.9	113.2	26.1	35.1	23.9	21.9	58.3	87.2		73.9	51.0	
Level of Service	D	F	C	D	C	C	E	F		E	D	
Approach Delay (s)		75.3			25.1			79.0			58.9	
Approach LOS		E			C			E			E	

Intersection Summary				
HCM Average Control Delay	62.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	84.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
16: Ranport & Airport

1/4/2009

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	690	2	0	2	4	344
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	750	2	0	2	4	374
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	0		1502	1500	1500	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1502	1500	1500	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	54		100	97	93	66
cM capacity (veh/h)	1623		40	66	66	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	750	2	2	378
Volume Left	750	0	0	0
Volume Right	0	2	0	374
cSH	1623	1700	66	921
Volume to Capacity	0.46	0.00	0.03	0.41
Queue Length 95th (ft)	63	0	3	51
Control Delay (s)	9.1	0.0	61.7	11.6
Lane LOS	A		F	B
Approach Delay (s)	9.1		61.7	11.6
Approach LOS			F	B

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Larkin Valley & HWY 1 NB Ramps 1/4/2009

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	690	58	43	209	55	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	750	63	47	227	60	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)	306					
pX, platoon unblocked						
vC, conflicting volume	0		1563	0	1555	1532
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1563	0	1555	1532
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	54		22	79	0	81
cM capacity (veh/h)	1623		60	1085	18	63

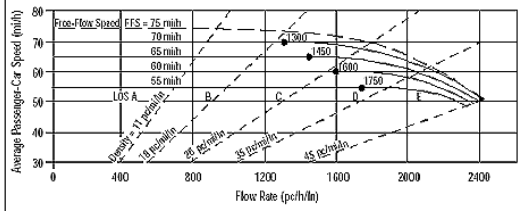
Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	813	47	227	72
Volume Left	750	0	0	60
Volume Right	63	0	227	0
cSH	1623	60	1085	20
Volume to Capacity	0.46	0.78	0.21	3.53
Queue Length 95th (ft)	63	86	20	Err
Control Delay (s)	8.7	168.2	9.2	Err
Lane LOS	A	F	A	F
Approach Delay (s)	8.7	36.3		Err
Approach LOS		E		F

Intersection Summary			
Average Delay	633.8		
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

APPENDIX L

Freeway Segment Level of Service Calculations

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*2772*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*63000*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2772*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

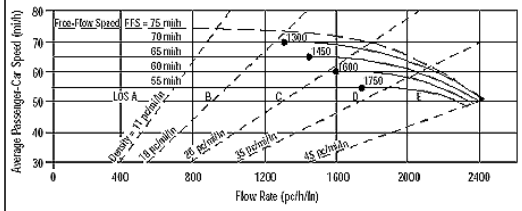
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1602*	pc/h/ln	Design LOS		
S	*64.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*24.7*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*3119*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*63000*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3119*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

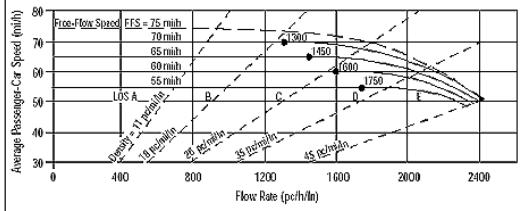
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1802*	pc/h/ln	Design LOS		
S	*63.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*28.2*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs				
Volume, V	*2833*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*64388*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2833*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

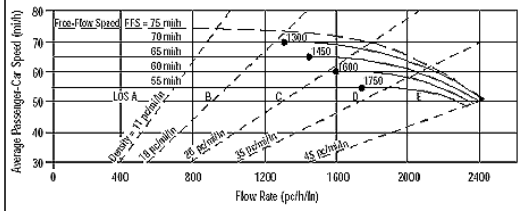
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1637*	pc/h/ln	Design LOS		
S	*64.8*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*25.3*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs				
Volume, V	*3198*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*64600*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3198*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

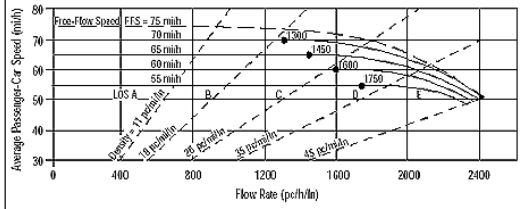
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1848*	pc/h/ln	Design LOS		
S	*63.5*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*29.1*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*2869*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*65200*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2869*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

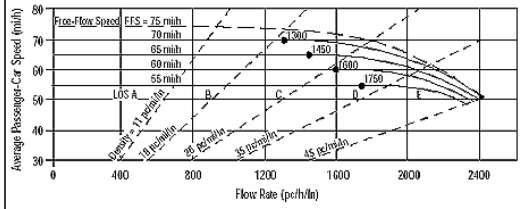
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1658*	pc/h/ln	Design LOS		
S	*64.7*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*25.6*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*3242*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*65500*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3242*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

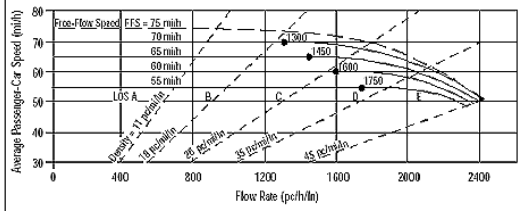
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1873*	pc/h/ln	Design LOS		
S	*63.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*29.6*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs				
Volume, V	*4477*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*101751*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*4477*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

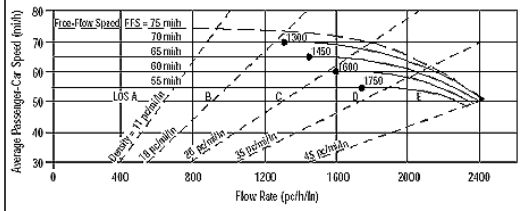
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2587*	pc/h/ln	Design LOS		
S		mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S		pc/mi/ln	S		mi/h
LOS	*F*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs				
Volume, V	*5037*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*101751*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*5037*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

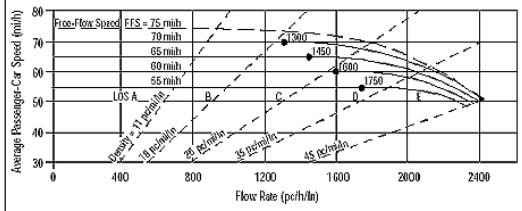
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2910*	pc/h/ln	Design LOS		
S		mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S		pc/mi/ln	S		mi/h
LOS	*F*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs				
Volume, V	*4513*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*102564*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*4513*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

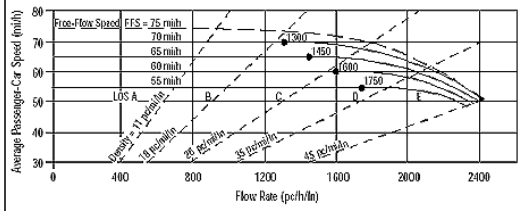
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2608*	pc/h/ln	Design LOS		
S		mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S		pc/mi/ln	S		mi/h
LOS	*F*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*North of Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs				
Volume, V	*5081*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*102651*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*5081*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

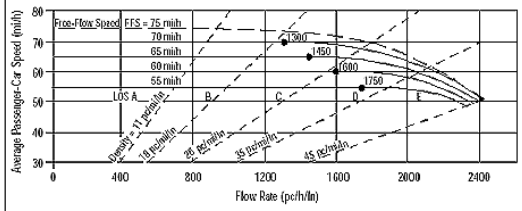
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2936*	pc/h/ln	Design LOS		
S		mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S		pc/mi/ln	S		mi/h
LOS	*F*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*2684*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*61000*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2684*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

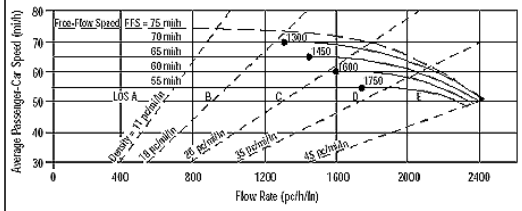
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1551*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*65.0*	mi/h	S		mi/h
D = v_p / S	*23.9*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*C*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*3020*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*61000*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3020*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

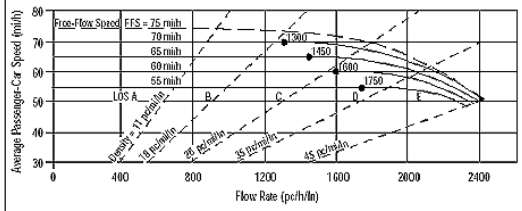
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1745*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*64.3*	mi/h	S		mi/h
D = v_p / S	*27.1*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*D*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs					
Volume, V	*2736*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*62188*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*2736*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

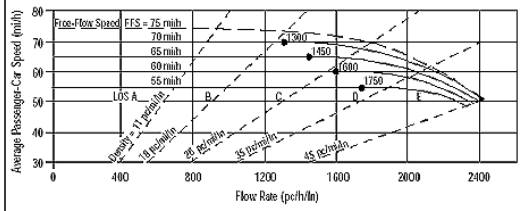
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1581*	pc/h/ln	Design LOS		
S	*64.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*24.4*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs					
Volume, V	*3090*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*62434*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*3090*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

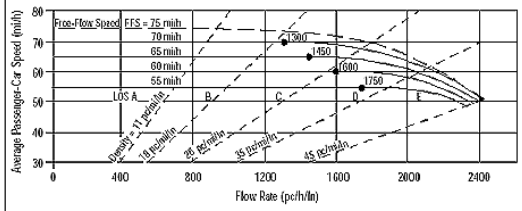
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1785*	pc/h/ln	Design LOS		
S	*64.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*27.9*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*2748*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*62450*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2748*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

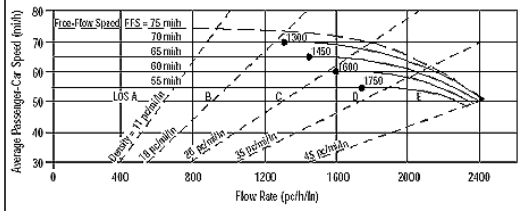
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1588*	pc/h/ln	Design LOS		
S	*64.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*24.5*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*3104*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*62712*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3104*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

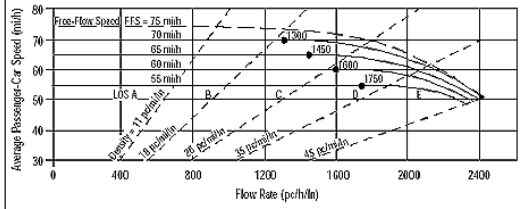
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1793*	pc/h/ln	Design LOS		
S	*64.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*28.0*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs				
Volume, V	*3242*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*73672*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3242*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

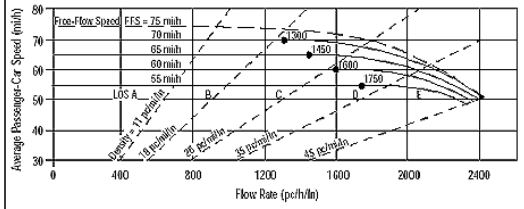
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1873*	pc/h/ln	Design LOS		
S	*63.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*29.6*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs				
Volume, V	*3647*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*73672*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3647*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

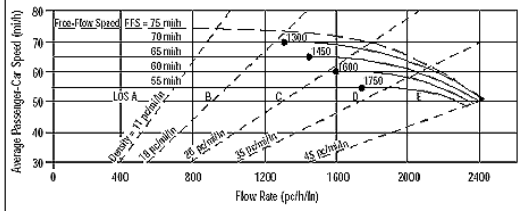
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2107*	pc/h/ln	Design LOS		
S	*59.4*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*35.5*	pc/mi/ln	S		mi/h
LOS	*E*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs

Volume, V	*3253*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*73935*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*3253*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*	
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*	

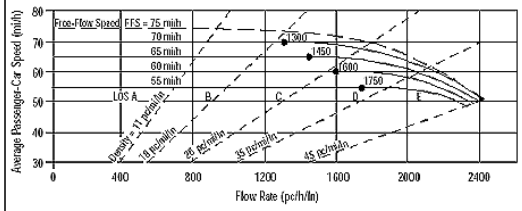
Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1880*	pc/h/ln	Design LOS		
S	*63.1*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*29.8*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY WORKSHEET Page 1 of 1

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Main Street / Larkin Valley*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs

Volume, V	*3661*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*73950*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*3661*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

Calculate Flow Adjustments

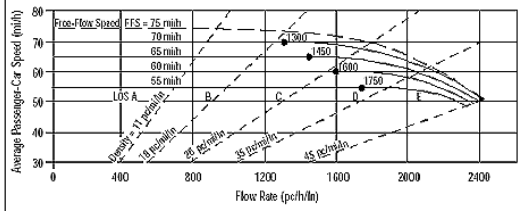
f_p	*1.00*	E_R	*1.2*	
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*	

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2115*	pc/h/ln	Design LOS		
S	*59.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*35.7*	pc/mi/ln	S		mi/h
LOS	*E*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*1694*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*38500*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1694*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

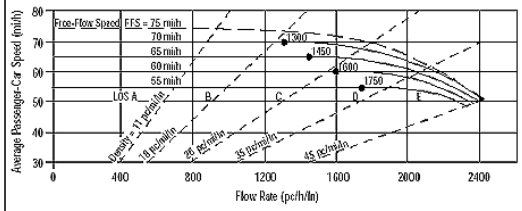
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*979*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*15.1*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*1906*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*38500*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1906*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

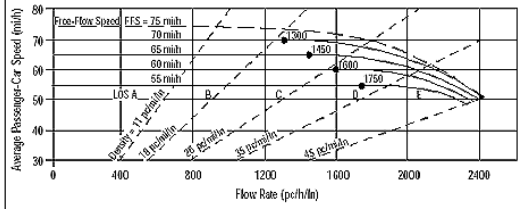
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1101*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*16.9*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*
Project Description	*Atkinson Lane Project - EX + Back*		

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

Flow Inputs				
Volume, V	*1702*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*38688*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1702*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

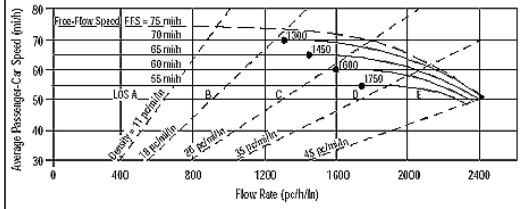
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*983*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*65.0*	mi/h	S		mi/h
D = v_p / S	*15.1*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*B*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*
Project Description			

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

Flow Inputs				
Volume, V	*1910*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*38589*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1910*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

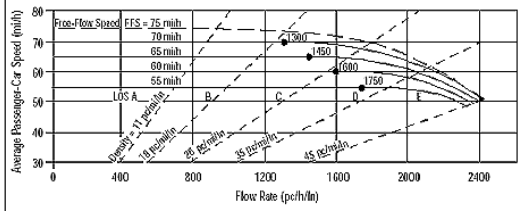
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1104*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*65.0*	mi/h	S		mi/h
D = v_p / S	*17.0*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*B*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*1704*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*38725*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1704*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

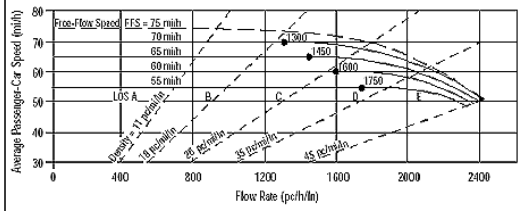
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*985*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*15.2*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*1912*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*38623*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1912*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

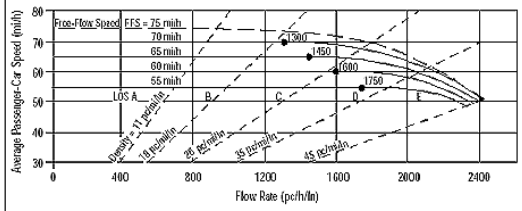
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1105*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*17.0*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs				
Volume, V	*2350*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*53409*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2350*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

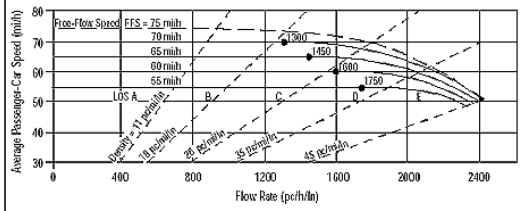
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1358*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*20.9*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs				
Volume, V	*2644*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*53409*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2644*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

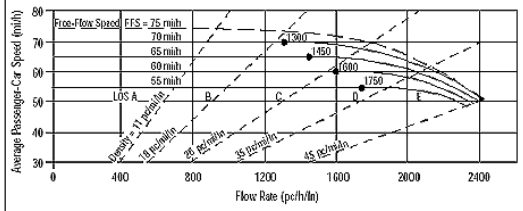
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1528*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*23.5*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs				
Volume, V	*2352*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*53447*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2352*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

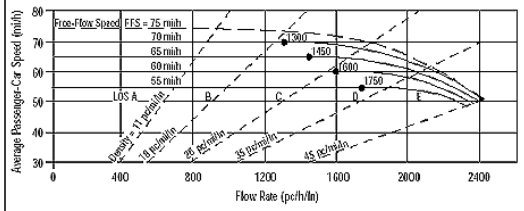
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1359*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*20.9*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Harkin / Main Street*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Proj*

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

Flow Inputs				
Volume, V	*2645*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*53443*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2645*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

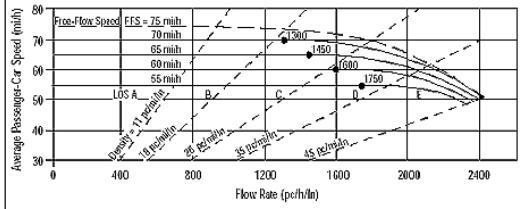
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1528*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*23.5*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*2178*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*49500*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2178*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1258*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*19.4*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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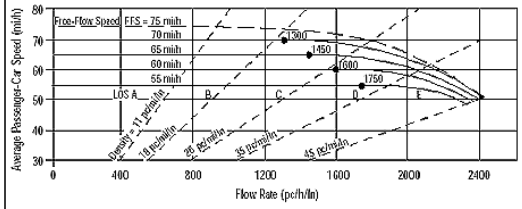
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*2450*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*49500*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2450*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1416*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*21.8*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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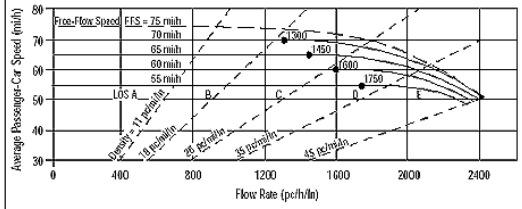


Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs				
Volume, V	*2187*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*49713*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2187*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

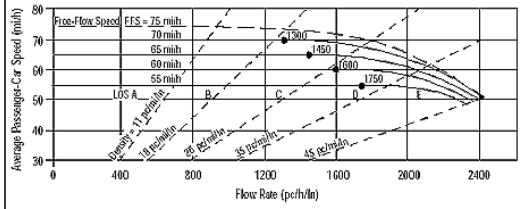
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1264*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*19.4*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs				
Volume, V	*2456*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*49612*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2456*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

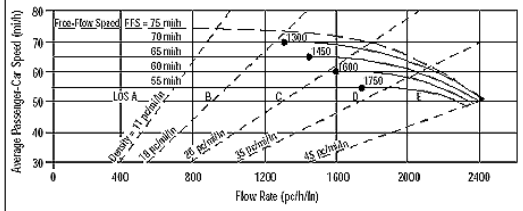
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1419*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*21.8*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs

Volume, V	*2199*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*49975*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2199*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1271*	pc/h/ln
S	*65.0*	mi/h
D = v_p / S	*19.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

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

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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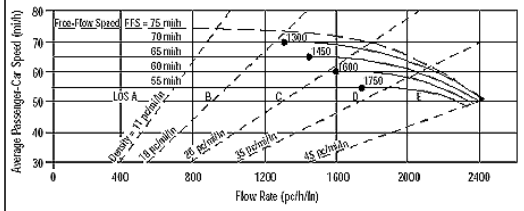
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs

Volume, V	*2470*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*49889*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2470*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1427*	pc/h/ln
S	*65.0*	mi/h
D = v_p / S	*22.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

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

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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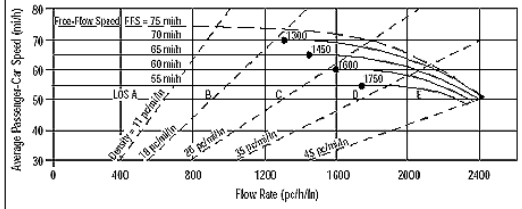
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs					
Volume, V	*2707*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*61529*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*2707*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

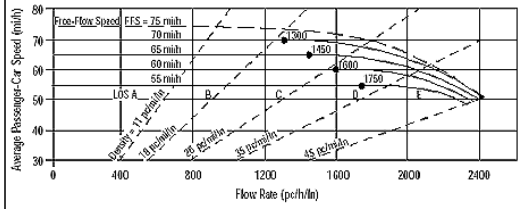
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1564*	pc/h/ln	Design LOS		
S	*64.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*24.1*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs					
Volume, V	*3046*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*61529*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*3046*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

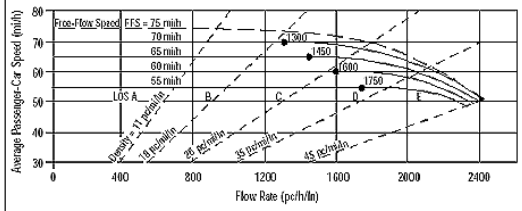
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1760*	pc/h/ln	Design LOS		
S	*64.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*27.4*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs

Volume, V	*2719*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*61792*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2719*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

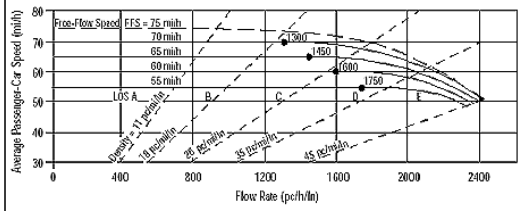
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1571*	pc/h/ln	Design LOS		
S	*64.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*24.2*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*Riverside / Harkin*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs

Volume, V	*3059*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*61807*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*3059*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

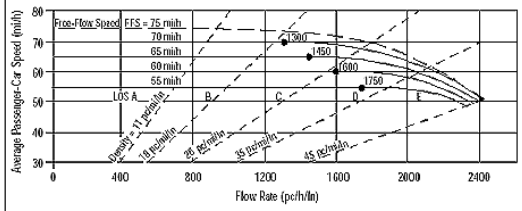
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1767*	pc/h/ln	Design LOS		
S	*64.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*27.5*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*1804*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*41000*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1804*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

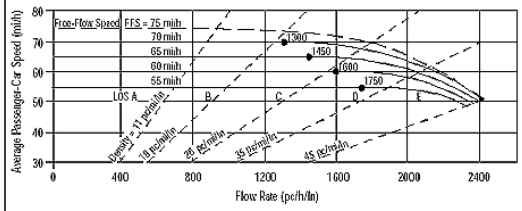
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1042*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*16.0*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX*

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

Flow Inputs				
Volume, V	*2030*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*41000*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2030*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

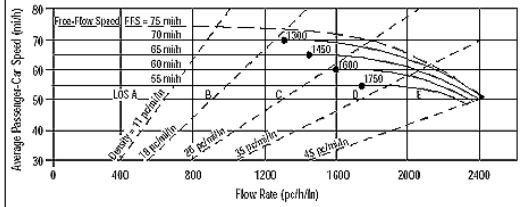
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1173*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*18.0*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs					
Volume, V	*1827*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*41513*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*1827*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

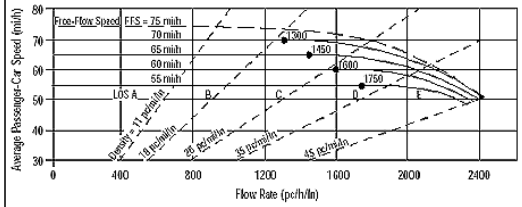
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1056*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*16.2*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back*

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

Flow Inputs					
Volume, V	*2040*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*41211*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*2040*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

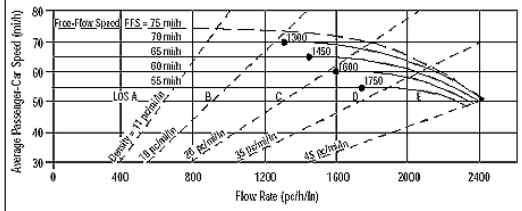
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1179*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*18.1*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*1837*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*41750*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*1837*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

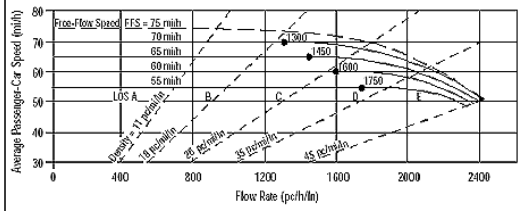
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1061*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*16.3*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - EX + Back + Proj*

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

Flow Inputs				
Volume, V	*2053*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*41478*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2053*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

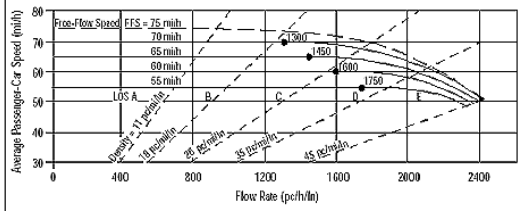
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1186*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*18.2*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs					
Volume, V	*2396*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*54462*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*2396*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

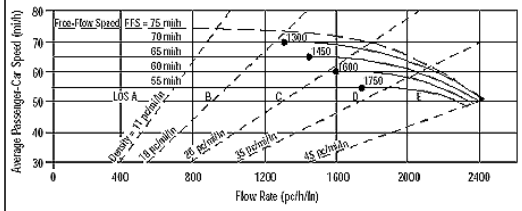
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
			Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1384*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*65.0*	mi/h	S		mi/h
D = v_p / S	*21.3*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*C*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative*

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

Flow Inputs					
Volume, V	*2696*	veh/h	Peak-Hour Factor, PHF	*0.90*	
AADT	*54462*	veh/day	%Trucks and Buses, P_T	*8*	
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*	
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*	
DDHV = AADT x K x D	*2696*	veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

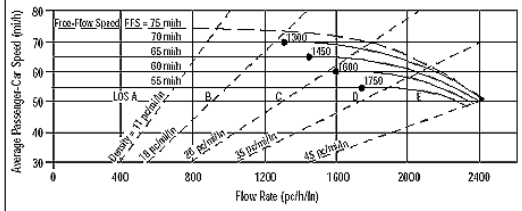
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
			Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1558*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*64.9*	mi/h	S		mi/h
D = v_p / S	*24.0*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*C*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs				
Volume, V	*2407*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*54700*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2407*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1391*	pc/h/ln	Design LOS		
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*21.4*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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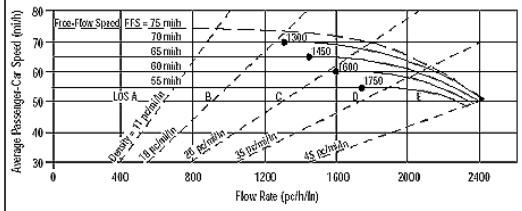
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*Craig Jordan*	Highway/Direction of Travel	*North / South*
Agency or Company	*City of Watsonville*	From/To	*South of 129*
Date Performed	*11/7/2008*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM*	Analysis Year	*2008*

Project Description *Atkinson Lane Project - Cumulative + Project*

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

Flow Inputs				
Volume, V	*2709*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT	*54729*	veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*2709*	veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1565*	pc/h/ln	Design LOS		
S	*64.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*24.1*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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