TRANSPORTATION STUDY

BRAR FARMS RESIDENTIAL DEVELOPMENT PROJECT

WEST SACRAMENTO, YOLO COUNTY, CALIFORNIA

This Transportation Study has been prepared under the supervision of
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LSA

July 2026

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WEST SACRAMENTO, YOLO COUNTY, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
City	City of West Sacramento
City BPTMP	*West Sacramento Bicycle, Pedestrian, and Trails Master Plan*
County	County of Yolo
General Plan	*City of West Sacramento General Plan*
GHG	greenhouse gas
GPA	General Plan Amendment
HCM	*Highway Capacity Manual*
HCM 7	*Highway Capacity Manual 7th Edition*
LLG	Linscott, Law & Greenspan, Engineers
LLG Study	*3425 Marshall Road Residential Project Transportation Study* prepared by LLG
LOS	level of service
LR	Low-Density Residential
mph	miles per hour
NCHRP	National Cooperative Highway Research Program
OPR	Governor's Office of Planning and Research
project	Brar Farms Residential Development Project
R-1-A	Residential One Family
RE	Rural Estates
RE	Residential Rural Estates

Requirement Memo	Brar Farms Cumulative Transportation Analysis Requirements Memorandum
SACOG	Sacramento Area Council of Governments
Safety Memo	*Marshall & Higgins Public Safety and Traffic Calming Project Memorandum*
TA	*Technical Advisory*
TAZ	Traffic Analysis Zone
TIF	Traffic Impact Fee
TPA	Transit Priority Area
TS	Transportation Study
VMT	vehicle miles traveled

1.0 INTRODUCTION

This Transportation Study (TS) has been prepared to assess the potential circulation impacts associated with the proposed Brar Farms Residential Development Project (project) in West Sacramento, Yolo County, California. The project site is located at 3425 Marshall Road, and it is currently undeveloped. The project is proposing to construct 259 single-family dwelling units. Figure 1-1 illustrates the regional and project location (figures and tables are provided at the end of each chapter.)

While level of service (LOS) is no longer a determinant of California Environmental Quality Act (CEQA) transportation impacts, the project must demonstrate consistency with the General Plan goals and policies of the City of West Sacramento (City), since project traffic will be affecting the surrounding roadway circulation network. Therefore, this TS includes a detailed intersection LOS analysis. The LOS analysis has been prepared in accordance with the requirements established by the goals and policies related to roadway operational efficiencies and other relevant criteria in the *City of West Sacramento General Plan* (General Plan) *Mobility Element*, dated January 2024.

In addition, pursuant to CEQA, a vehicle miles traveled (VMT) analysis was conducted for the project to determine the project's CEQA transportation impacts. The City is yet to adopt its own VMT guidelines. Therefore, the VMT analysis was prepared in accordance with the Governor's Office of Planning and Research (OPR), currently the Governor's Office of Land Use and Climate Innovation *Technical Advisory* (TA), dated December 2018.

Previously, the *3425 Marshall Road Residential Project Transportation Study*, dated April 2025, was prepared for the proposed project by Linscott, Law & Greenspan, Engineers (LLG) (herein referred to as the LLG Study). The LLG Study is provided in Appendix A of this TS. The LLG Study evaluated LOS operations for 9 intersections in the project vicinity, including the project driveways, for existing and existing plus project conditions. The LLG Study also included a VMT assessment using the Sacramento Area Council of Government's (SACOG) Regional VMT Project Screening Tool.

However, the LLG Study did not include any cumulative/long-term LOS operational analysis. Under the cumulative scenario, the project traffic pattern and regional traffic pattern within the vicinity may be different by virtue of the Enterprise Crossing/Enterprise Bridge project, connecting Southport Parkway with Enterprise Boulevard over the Sacrament River Deep Water Ship Channel. Given the uncertainty regarding the project timeline, City staff recommended conducting a cumulative transportation operational analysis for the proposed project, evaluating the LOS operations without and with the Enterprise Crossing/Enterprise Bridge project. Detailed requirements and methodology have been provided in the *Brar Farms Cumulative Transportation Analysis Requirements Memorandum* (herein referred to as the Requirement Memo), issued by the City's Community Development Department Transportation and Mobility Division on December 1, 2025. The City's Requirement Memo is provided in Appendix B of this TS. The City's Requirement Memo outlined the study area intersections, study area intersection control type and configuration that should be assumed in the cumulative scenarios, and study scenarios. As stated, given the uncertainty of the Enterprise Crossing/Enterprise Bridge project, the City also requested to include

the construction of the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard as an alternative analysis scenario under cumulative conditions.

In addition, given the project size, a detailed model-based VMT analysis is required for the project per OPR TA. As previously stated, the LLG Study included an analysis using the SACOG Residential VMT Screening tool (HEX map data), which was developed using an older version of SACSIM model. Therefore, per discussion with City staff, a detailed VMT analysis was prepared for the project using the most recent version of SACSIM model to determine if the proposed project would have a CEQA transportation impact. It should be noted that the City recently had prepared a more disaggregated version of the model to conduct analysis for the Enterprise Crossing/Enterprise Bridge project. Per direction from the City, this updated and disaggregated version of SACSIM has been used to prepare both the cumulative traffic analysis and the VMT analysis. This model has been referred to as the Enterprise Crossing model throughout this document.

As previously mentioned, the intersection LOS analysis under existing and existing plus project conditions has been completed as part of the LLG Study. As confirmed by City staff and as indicated in the City's Requirement Memo, the data and findings from the LLG Study for the existing and existing plus project conditions were summarized and reported in this TS. As such, no new analysis was conducted for existing scenarios. However, it should be noted that the LLG Study did not include 2 study intersections outlined in the City's Requirement Memo, namely Seymour Avenue/Marshall Road and Rivermont Street-Allan Drive/Marshall Road. Since these two study intersections were recently analyzed as part of *Marshall & Higgins Public Safety and Traffic Calming Project Memorandum* (herein referred to as the Safety Memo), prepared by the City on January 29, 2024, no new analysis was required and the data and finding for these two study intersections under the existing and existing plus project conditions were summarized and reported in this TS along with the data and findings from LLG Study. In addition, as confirmed with the City, the LOS analysis results for Jefferson Boulevard/Marshall Road, under existing and existing plus project conditions, were obtained from the City's Safety Memo, instead of the LLG Study. The City's Safety Memo is provided in Appendix C of this TS.

As previously stated, per the City's Requirement Memo, this study examines traffic operations in the vicinity of the proposed project under the following six (6) scenarios:

- Existing Conditions (data and results obtained from the LLG Study and City's Safety Memo)
- Existing Plus Project Conditions (data and results obtained from the LLG Study and City's Safety Memo)
- Cumulative No Enterprise Crossing Without Project Conditions
- Cumulative No Enterprise Crossing Plus Project Conditions
- Cumulative With Enterprise Crossing Without Project Conditions
- Cumulative With Enterprise Crossing Plus Project Conditions

Traffic conditions at study intersections were examined for weekday a.m. and p.m. peak-hour conditions. The a.m. peak hour is defined as the one (1) hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. The p.m. peak hour is the one (1) hour of highest traffic volumes occurring between 4:00 and 6:00 p.m.

1.1 PROJECT DESCRIPTION

The proposed project is located at 3425 Marshall Road. The project site is approximately 60 acres and currently undeveloped. It is bounded to the north by Marshall Road, to the east by Otis Avenue and a mix of residential and agricultural uses, to the south by single-family residential uses, and to the west by an existing retention pond that is part of the Bridgeway Lakes Community Park and the Bridgeway Lakes residential development. The project site is located within the S*outhwest Village Boundary of the Southport Framework Plan* (approved on May 10, 1995 and amended in 1998). The project site is currently designated as Rural Estates (RE) in both the City's General Plan and the Southport Framework Plan. The project site is currently zoned as Residential Rural Estates (RE).

The proposed project involves the development of 259 single-family dwelling units on a 60-acre property, which requires a General Plan Amendment (GPA) to the City's existing General Plan and an amendment to the Southport Framework Plan to change the General Plan and Framework Plan designations from Rural Estates (RE) to Low-Density Residential (LR). It also requires a Zoning Map/Code amendment to rezone the site from Residential Rural Estates (RE) to Residential One Family (R-1-A). It should be noted that approximately 34.78 out of 60 acres will be exclusively used for residential development (259 single-family dwelling units), which results in a residential development density of 7.45 dwelling units per acre.

Access to the proposed project will be provided via four full-access driveways, two driveways on Marshall Road and two driveways on Otis Avenue. Figure 1-2 illustrates the conceptual site plan for the proposed project.

As shown in Figure 1-2, an internal roundabout is proposed within the project site. Additionally, the proposed project includes several off-site improvements. These off-site improvements would include frontage improvements along the north side of the project site on Marshall Road, consisting of new sidewalk, curb, and gutter infrastructure, as well as undergrounding of all overhead utilities, construction of street lighting, and installation of landscaping. Similar frontage improvements would be constructed along the Otis Avenue frontage. A single-lane roundabout at the intersection of Otis Avenue and Marshall Road adjacent to the northeastern corner of the project site would also be constructed as part of the project.

1.2 STUDY AREA INTERSECTIONS

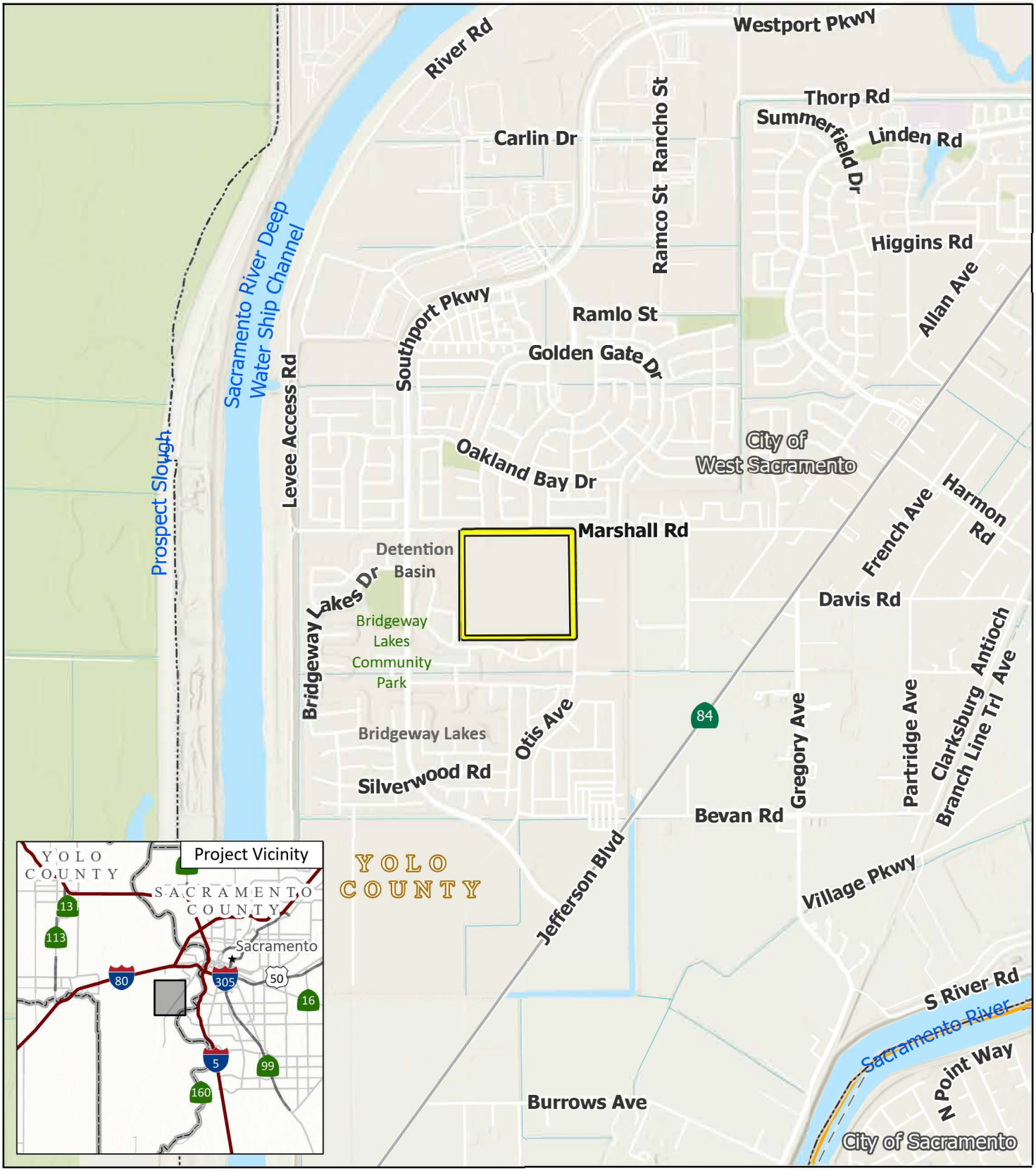
The following 10 intersections, outlined in the City's Requirement Memo, were analyzed in this study:

1. Southport Parkway/Marshall Road
2. Martinique Street-Project Driveway 1/Marshall Road
3. Jamaica Street-Project Driveway 2/Marshall Road
4. Otis Avenue/Marshall Road
5. Golden Gate Drive/Marshall Road
6. Seymour Avenue/Marshall Road
7. Rivermont Street-Allan Drive/Marshall Road
8. Jefferson Boulevard/Marshall Road
9. Otis Avenue/Project Driveway 3
10. Otis Avenue/Project Driveway 4

Figure 1-3 illustrates the study area intersections. All study intersections are under the jurisdictions of the City.

1.3 LIST OF CHAPTER 1.0 FIGURES

- Figure 1-1: Regional and Project Location
- Figure 1-2: Proposed Site Plan
- Figure 1-3: Study Area Intersections



LSA

FIGURE 1-1

Brar Farms Residential Development Project
Transportation Study

Regional and Project Location

SOURCE: USGS 7.5' Quad - *[Enter quad name] ([Enter quad year])*, CA

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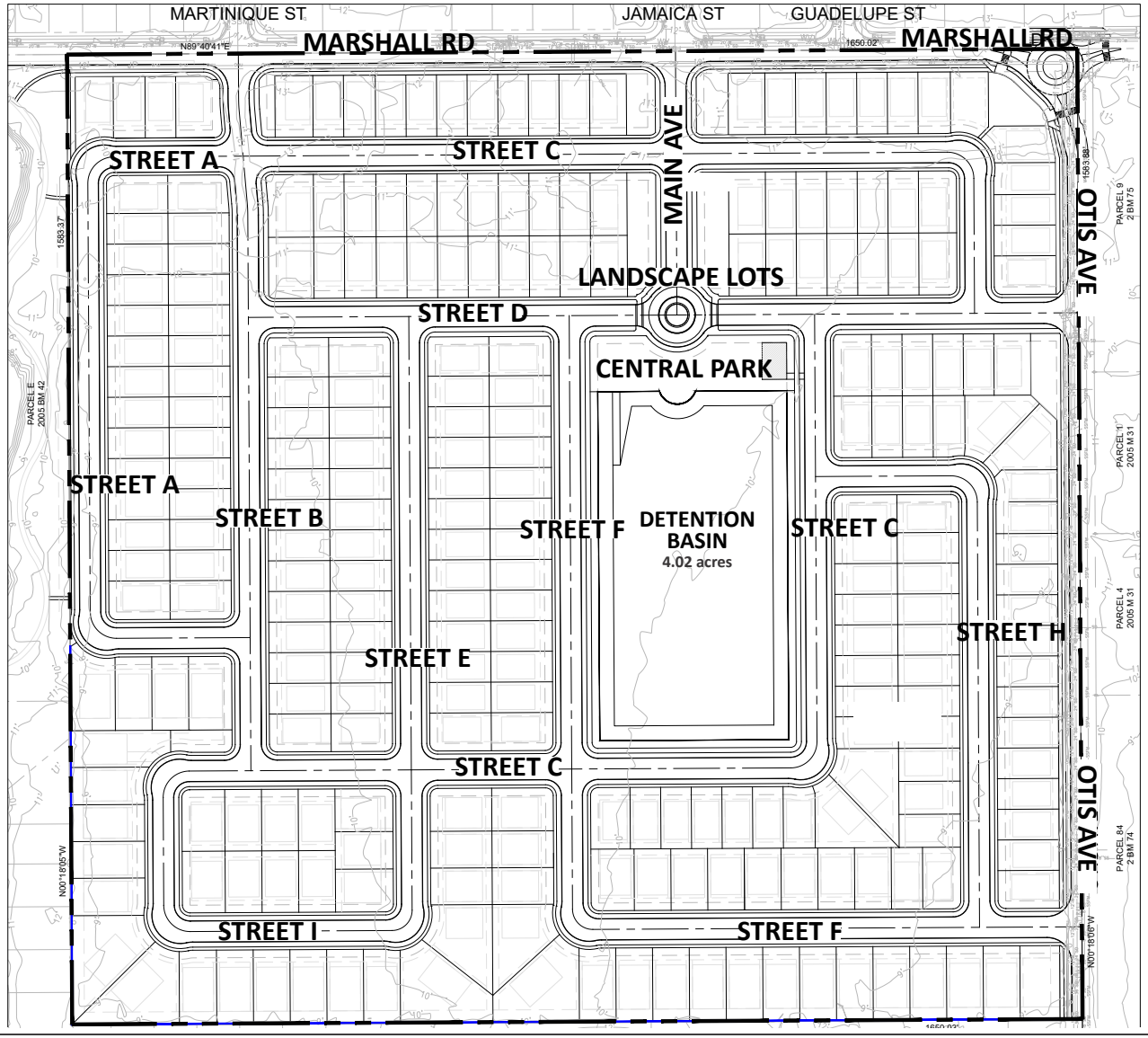


FIGURE 1-2

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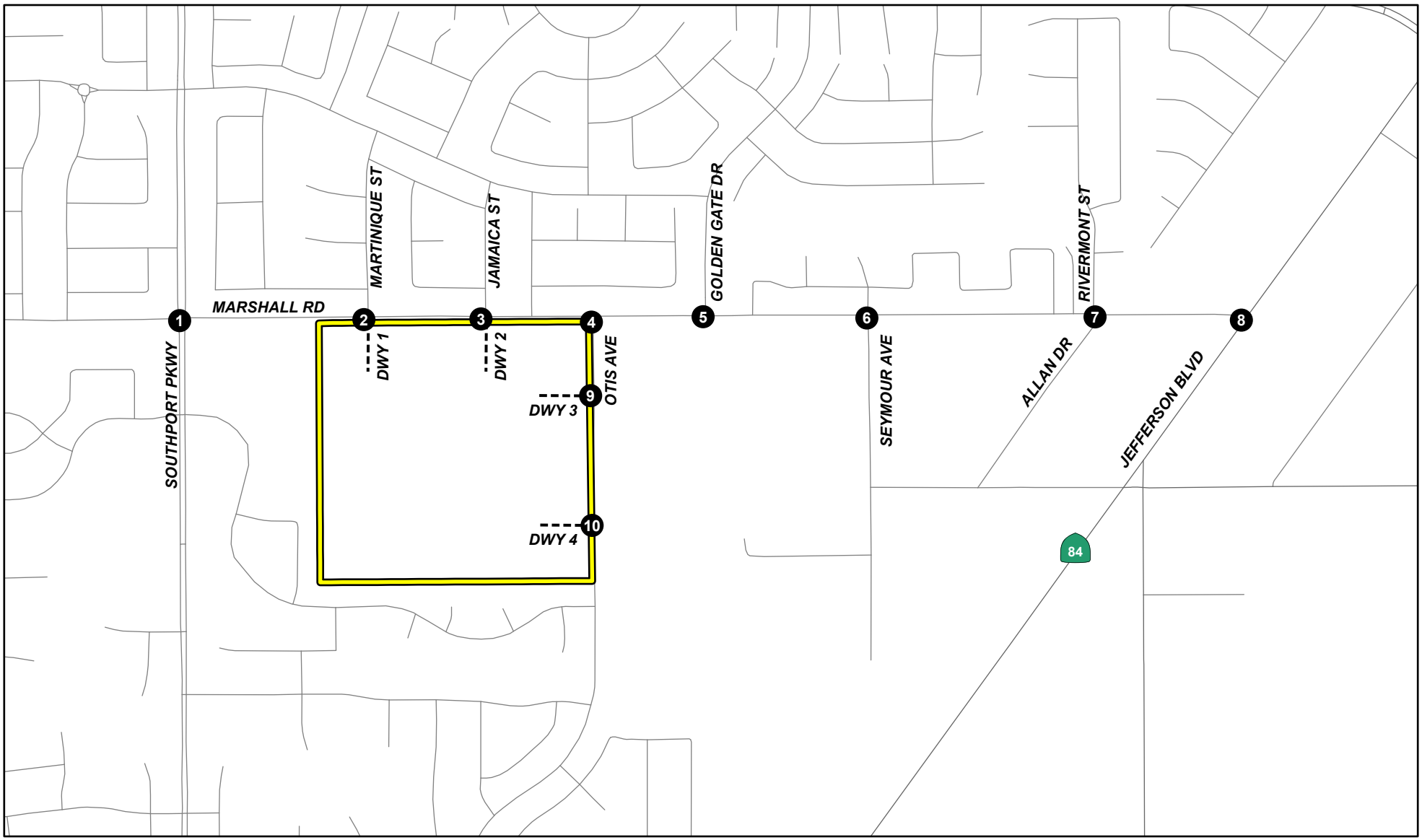
SOURCE: HLA Landscape Architects

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Brar Farms Residential Development Project

Transportation Study

Proposed Site Plan



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Project Location

Study Area Intersections

Project Driveway

FIGURE 1-3

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SOURCE: ESRI Streetmap, 2026

Brar Farms Residential Development Project
Transportation Study

Study Area Intersections

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2.0 ANALYSIS METHODOLOGY

2.1 LEVEL OF SERVICE DEFINITIONS

LOS can be characterized for the whole intersection, each intersection approach, and by each lane group. Control delay alone is used to characterize LOS for the entire intersection. Control delay quantifies the increase in travel time due to the traffic signal control and is a surrogate measure of driver discomfort and fuel consumption.

A complete description of the meaning of LOS can be found in the Transportation Research Board Special Report 209, *Highway Capacity Manual* (HCM). The HCM establishes LOS A through F for intersections. A description of LOS for signalized intersections, unsignalized intersections, and roundabouts is summarized in Table 2.A.

Table 2.B shows the LOS criteria for unsignalized/roundabout intersections and signalized intersections. For all study area intersections, the *Highway Capacity Manual 7th Edition* (HCM 7) analysis methodologies were used to determine intersection LOS. LOS for all unsignalized and signalized study intersections was calculated using the Synchro 12 software, which utilizes HCM 7 methodologies. For roundabout intersections, LOS was calculated using the SIDRA software, which utilizes latest HCM Roundabout methodologies.

2.2 LEVEL OF SERVICE PROCEDURES AND STANDARDS

Study intersections analyzed in this report are completely under the jurisdictions of the City. Per the City's *General Plan Mobility Element* (M-3.2 Vehicular Level of Service), dated January 2024, the City's goal is to maintain LOS C or better, except at intersections and on roadway segments within 0.25 mile of a freeway interchange or bridge crossing of the Deep Water Ship Channel, barge canal, or Sacramento River, where a LOS D shall be deemed acceptable, and within pedestrian oriented, high-density, mixed-use areas, such as the Pioneer Bluff and Stone Lock Reuse Master Plan area, Bridge District Specific Plan area, Washington District Specific Plan area, and Sacramento Avenue and West Capitol Avenue corridors east of Harbor Boulevard, where LOS E shall be deemed acceptable. As such, per the City's General Plan goals, all study intersections in this analysis have LOS C threshold for acceptable traffic operations.

The City's General Plan does not have any project related operational deficiency criteria for study area intersections. Therefore, an operational deficiency occurs when the project causes an unsatisfactory condition (deterioration from A through C to D through F) for intersections or when the project contributes to an existing or forecast deficiency. The project needs to identify feasible improvements to improve the intersection LOS to an acceptable level.

2.3 LIST OF CHAPTER 2.0 TABLES

- Table 2.A: Intersection Level of Service Definitions
- Table 2.B: Level of Service Criteria for Unsignalized/Roundabout and Signalized Intersections

Table 2.A: Intersection Level of Service Definitions

LOS	Description
A	Traffic operations with a control delay of 10 seconds per vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
B	Traffic operations with control delay between 10 seconds per vehicle and 20 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
C	Traffic operations with control delay between 20 and 35 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of the insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
D	Traffic operations with control delay between 35 and 55 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
E	Traffic operations with control delay between 55 and 80 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
F	Traffic operations with control delay exceeding 80 seconds per vehicle or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: *Highway Capacity Manual* (7th Edition) (2022).

Table 2.B: Level of Service Criteria for Unsignalized/Roundabout and Signalized Intersections

Level of Service	Unsignalized/Roundabout Intersection Average Delay per Vehicle (sec.)	Signalized Intersection Average Delay per Vehicle (sec.)
A	$\leq$ 10	$\leq$ 10
B	> 10 and $\leq$ 15	> 10 and $\leq$ 20
C	> 15 and $\leq$ 25	> 20 and $\leq$ 35
D	> 25 and $\leq$ 35	> 35 and $\leq$ 55
E	> 35 and $\leq$ 50	> 55 and $\leq$ 80
F	> 50	> 80

Source: *Highway Capacity Manual* (7th Edition) (2022).

3.0 CIRCULATION NETWORK SETTINGS

3.1 STUDY AREA CIRCULATION NETWORK

The project study area includes the following major roadways based on the roadway classification provided in the City's *General Plan Mobility Element*, dated January 2024. Figure 3-1 illustrates the roadway classifications from the City's *General Plan Mobility Element*. Following is a brief description of major roadways within the study area:

- **Marshall Road:** Marshall Road is designated as a Collector in the City's General Plan. Within the study area, Marshall Road is a two-lane, undivided roadway with a posted speed limit of 35 miles per hour (mph). On-street parking is not permitted along the street segment. It should be noted that per the City's Safety Memo, the observed speed along Marshall Road is 40 to 45 mph. Therefore, for cumulative scenario analysis purposes, the observed speeds were used.

- **Southport Parkway:** Within the study area, Southport Parkway is designated as a Major Arterial in the City's General Plan. Within the study area, currently Southport Parkway (north of Marshall Road) is a four-lane, divided roadway with a posted speed limit of 35 mph; Southport Parkway (south of Marshall Road) is currently a two-lane, divided roadway with a posted speed limit of 35 mph. On-street parking is not permitted along the street segment.

- **Otis Avenue:** Within the study area, Otis Avenue is designated as a Collector in the City's General Plan. Within the study area, Otis Avenue is a two-lane, undivided roadway with a posted speed limit of 25 mph. On-street parking is not permitted along the street segment. It should be noted that per the City's Safety Memo, the observed speed along Otis Avenue is 35 mph. Therefore, for cumulative scenario analysis purposes, the observed speed was used.

- **Jefferson Boulevard:** Jefferson Boulevard is designated as a Major Arterial between Southport Parkway and Davis Road, and as a Minor Arterial between Davis Road and Linden Road in the City's General Plan. Within the study area, Jefferson Boulevard is a two-lane, undivided roadway with a posted speed limit of 45 mph.

Figure 3-2 illustrates existing study intersection geometrics and traffic control.

As previously mentioned, The City's Requirement Memo outlined the study area intersection control type and configuration that should be assumed in the cumulative scenarios. Table 3.A summarizes the existing and traffic control, as well as the assumptions and modifications that were proposed to the study area intersections under cumulative conditions per the City's Requirement Memo and were incorporated in the intersection LOS analysis under cumulative conditions in the TS.

Figure 3-3 illustrates study intersection geometrics and traffic control in cumulative conditions.

3.2 BICYCLE, PEDESTRIAN, AND TRANSIT FACILITIES

3.2.1 Bicycle Network

The City is committed to improving non-motorized travel. To facilitate and encourage bicycle trips among other non-motorized modes of travel, the City has prepared the *West Sacramento Bicycle, Pedestrian, and Trails Master Plan* (City BPTMP), updated in 2024, that details a network of existing and the proposed bicycle facilities along with an inventory of all existing bicycle infrastructure improvements to be implemented in the future.

According to the City BPTMP, the bikeway network within the City is classified into five categories: Class I – Bike Path, Class II – Bike Lane, Class III – Bike Route, Class IV – Separated Bikeway, and unpaved trail. Class I bikeways are off-street facilities that provide exclusive right of way for bicyclists and pedestrians. Class II bikeways are on-street bike lane facilities that use striping and signage to denote use for bicyclists. Class III bikeways are streets with signage and optional road markings where bicyclists share a lane with motor vehicles. Class IV bikeways are physically separated bicycle and pedestrian facilities and roadways. Unpaved trails are multipurpose facilities suitable for recreational use by hikers, pedestrians, equestrians, and off-road cyclists.

Within the study area, Class II bike lanes are currently provided along Marshall Road, Southport Parkway, Otis Avenue, Golden Gate Drive, and Jefferson Boulevard (north of Harmon Road). According to the City BPTMP, Class I bikeways (bike paths) have been proposed along Main Canal (south of Marshall Road), and Class II bikeways (bike lanes) have been proposed on Jefferson Boulevard (south of Harmon Road) within the study area in the future.

3.2.2 Pedestrian Network

Within the vicinity of the project site, continuous sidewalks are currently provided along the north side of Marshall Road and both sides of Southport Parkway and Golden Gate Drive.

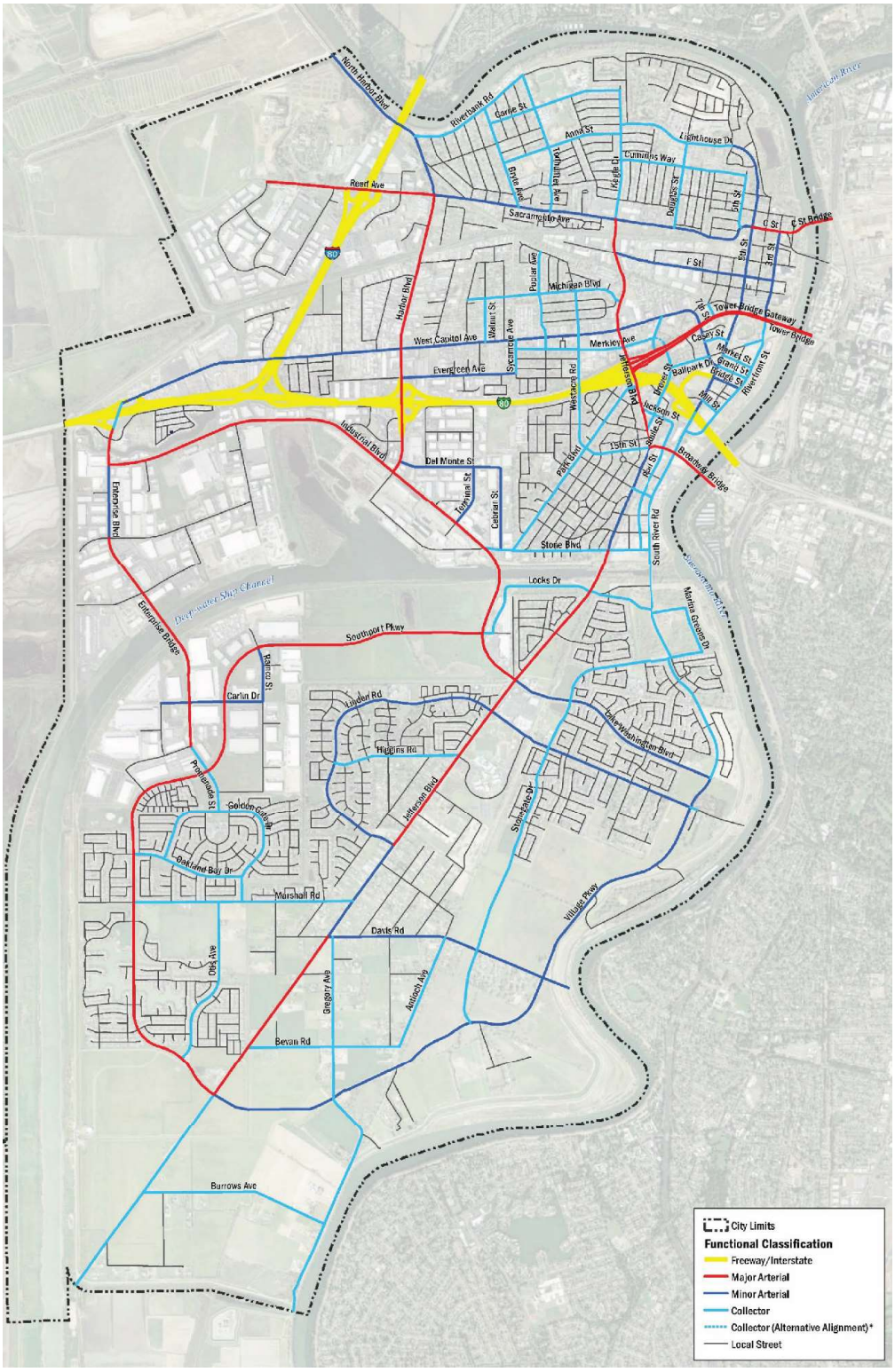
The proposed project includes several off-site/frontage improvements, which include new sidewalks along the north side of the project site on Marshall Road and the Otis Avenue frontage.

3.2.3 Transit Network

Yolobus is the primary transit provider in the City and offers both fixed-route and demand-response bus service. Local Bus Route 37 provides bus service to the area via Marshall Road, Southport Parkway, and Jefferson Boulevard. Local Bus Route 37 has bus stops at the northeast corner of Marshall Road/Southport Parkway (approximately 0.4 mile away from the project site) and at the northwest corner of Seymour Avenue/Marshall Road (approximately 0.4 mile away from the project site).

3.3 LIST OF CHAPTER 3.0 FIGURES AND TABLES

- Figure 3-1: City of West Sacramento Roadway Classifications
- Figure 3-2: Existing Study Intersection Geometrics and Traffic Control
- Figure 3-3: Cumulative Year Study Intersection Geometrics and Traffic Control
- Table 3.A: Study Intersection Traffic Control under LOS Analysis Scenarios



LSA

FIGURE 3-1

N

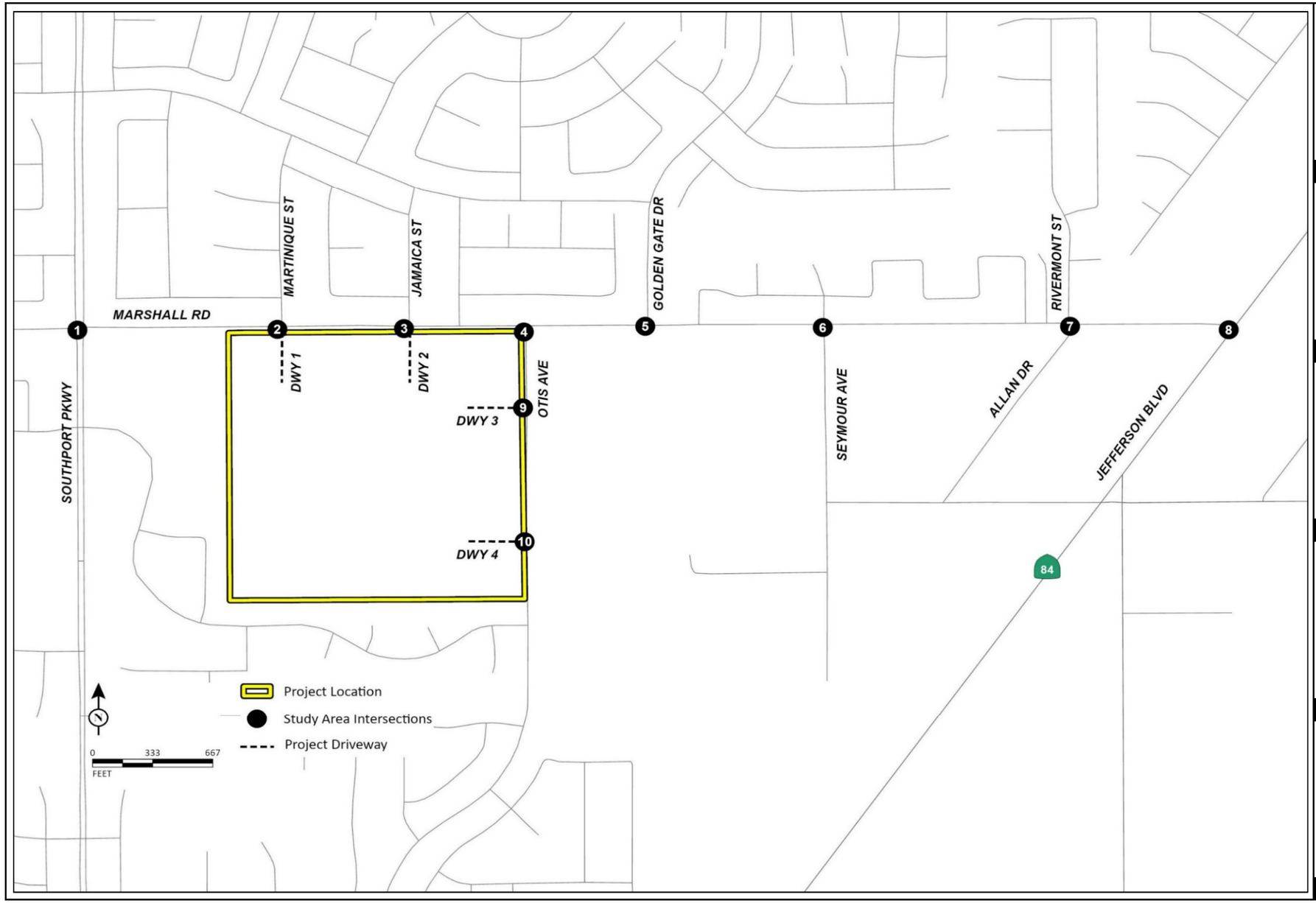
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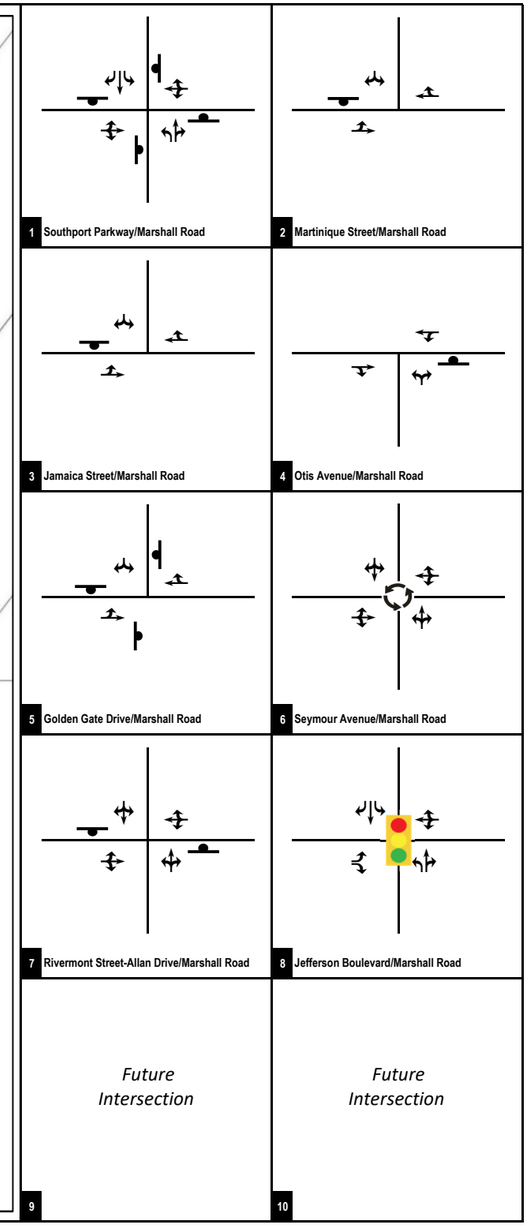
Brar Farms Residential Development Project
Transportation Study

City of West Sacramento Roadway Classifications

SOURCE: City of West Sacramento, General Plan 2035 Policy Document, updated January 2024.

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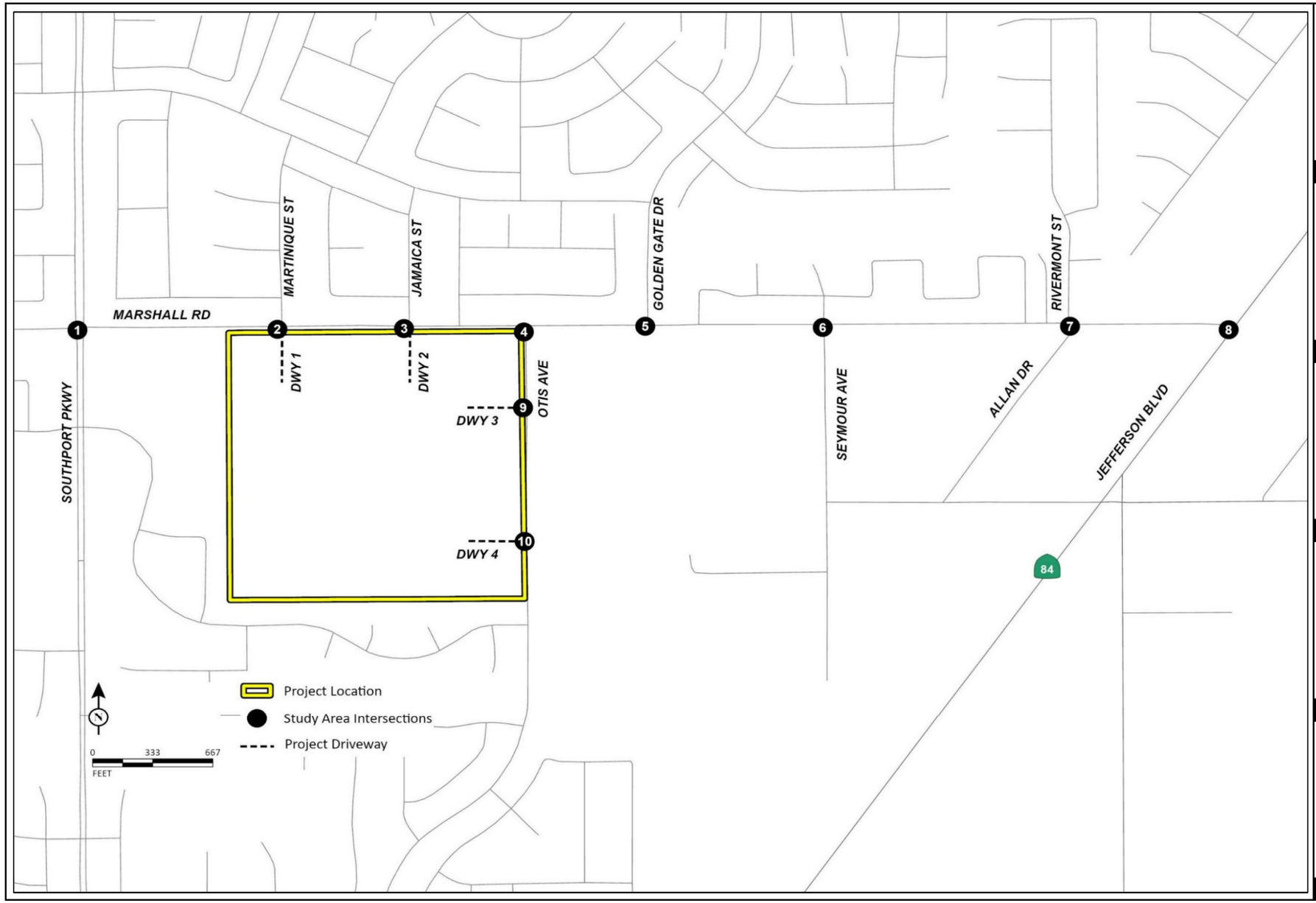
FIGURE 3-2

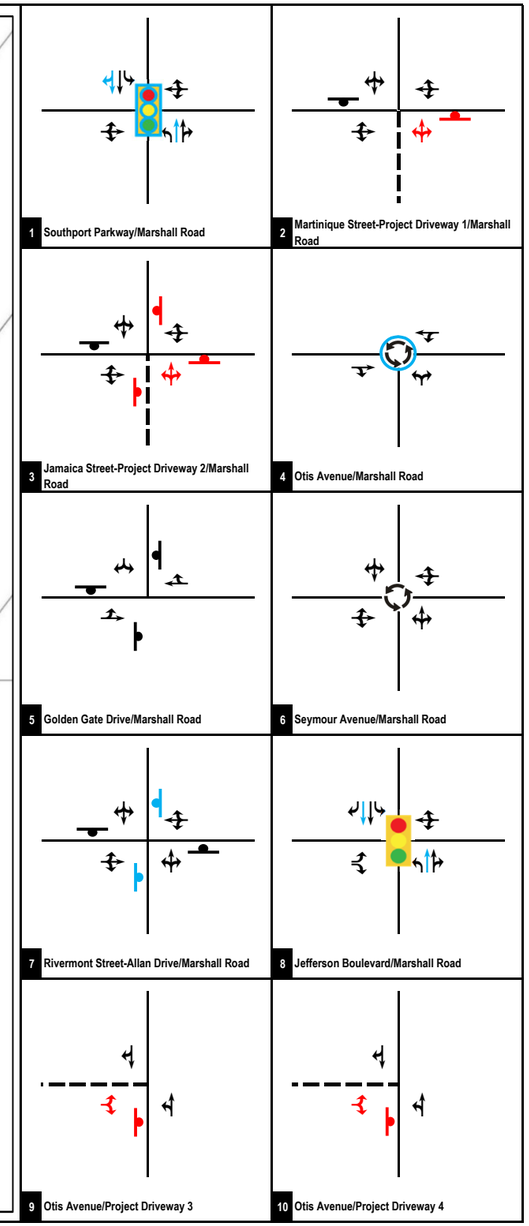
Legend
Signal
Stop Sign
Roundabout

Brar Farms Residential Development Project
Transportation Study

Existing Study Intersection Geometrics and Traffic Control

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LSA

FIGURE 3-3

Legend

Signal
Stop Sign
Roundabout
Future Signal
Future Roundabout
Future Improvements
Project Feature
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Cumulative Year Study Intersection Geometrics and Traffic Control

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Table 3.A: Study Intersection Traffic Control under LOS Analysis Scenarios

Study Area Intersection	Existing Conditions	Cumulative No Project Conditions	Cumulative Plus Project Conditions
1. Southport Parkway/Marshall Road	AWSC	New signal; add a second NB through lane and convert a SB right-turn to a second SB through lane.	New signal; add a second NB through lane and convert a SB right-turn to a second SB through lane.
2. Martinique Street–Project Driveway 1/Marshall Road	OWSC	OWSC	TWSC
3. Jamaica Street–Project Driveway 2/Marshall Road	OWSC	OWSC	AWSC
4. Otis Avenue/Marshall Road	OWSC	New Roundabout	New Roundabout
5. Golden Gate Drive/Marshall Road	AWSC	AWSC	AWSC
6. Seymour Avenue/Marshall Road	Roundabout	Roundabout	Roundabout
7. Rivermont Street–Allan Drive/Marshall Road	TWSC	AWSC	AWSC
8. Jefferson Boulevard/Marshall Road	Signal	Signal; add a second NB and second SB through lane.	Signal; add a second NB and second SB through lane.
9. Otis Avenue/Project Driveway 3	Future Intersection	OWSC	OWSC
10. Otis Avenue/Project Driveway 4	Future Intersection	OWSC	OWSC

Source: Google aerial photos (2026); City of West Sacramento. 2025. *Brar Farms Cumulative Transportation Analysis Requirements Memorandum.* Community Development Department Transportation and Mobility Division. November 26.
AWSC = All-Way Stop Control; OWSC = One-Way Stop Control; TWSC = Two-Way Stop Control
NB = Northbound; SB = Southbound

4.0 EXISTING CONDITIONS ANALYSIS

As previously mentioned, the LLG Study included traffic volumes, project trip generation, distribution assignment, and operational analysis for seven study intersections under existing and existing plus project conditions. In addition, the City Safety Memo included operational analysis for the remaining three study area intersections under existing conditions. Therefore, as recommended by City staff, the data and findings (LOS results and conclusions) for existing and existing plus project conditions were obtained from these studies and summarized in this section. These two studies are included as Appendix A and Appendix C of this TS, along with the detailed traffic counts and LOS analysis worksheets for the existing conditions.

4.1 EXISTING AND EXISTING PLUS PROJECT LEVELS OF SERVICE

Table 4.A summarizes the LOS results at study intersections under existing and existing plus project conditions. As shown in this table, all study intersections are currently operating at a satisfactory LOS under existing no project conditions.

All study intersections are expected to continue operating at a satisfactory LOS under existing plus project conditions, except for the following study area intersection:

7. Rivermont Street–Allan Drive/Marshall Road (a.m. peak hour)

Rivermont Street–Allan Drive/Marshall Road is currently a two-way stop-controlled intersection with stop signs on side streets (i.e., Rivermont Street and Allan Drive). Per the City's Safety Memo, the installation of an all-way stop control was recommended at Rivermont Street–Allan Drive/Marshall to eliminate the LOS deficiencies and improve the traffic operation. In addition, per City's Requirement Memo, all-way stop control should be assumed for Rivermont Street–Allan Drive/Marshall Road in cumulative conditions, which was incorporated in the intersection LOS analysis under cumulative conditions provided later in this TS. Therefore, no additional improvement was recommended for this intersection. Detail description of this improvement is included in Appendix C.

4.2 LIST OF CHAPTER 4.0 TABLES

- Table 4.A: Existing Intersection Levels of Service

LSA

Table 4.A: Existing Intersection Levels of Service

Intersection	Jurisdiction	LOS Standard	No Project[1,2]				Plus Project[1,2]				
			Control	AM Peak Hour Delay (sec.)	AM Peak Hour LOS	PM Peak Hour Delay (sec.)	PM Peak Hour LOS	Control	AM Peak Hour Delay (sec.)	AM Peak Hour LOS	PM Peak Hour Delay (sec.)	PM Peak Hour LOS
1 . Southport Parkway/Marshall Road	City of West Sacramento	C	AWSC	11.7	B	10.0	A	AWSC	12.1	B	10.2	B
2 . Martinique Street–Project Driveway 1/Marshall Road	City of West Sacramento	C	OWSC	1.5 (10.1 SBL)	A (B)	1.0 (10.1 SBL)	A (B)	TWSC	2.2 (10.7 SBL)	A (B)	1.8 (11.2 SBL)	A (B)
3 . Jamaica Street–Project Driveway 2/Marshall Road	City of West Sacramento	C	OWSC	1.3 (10.6 SBL)	A (B)	0.5 (10.1 SBL)	A (B)	TWSC	2.4 (12.1 SBL)	A (B)	1.9 (11.9 SBL)	A (B)
4 . Otis Avenue/Marshall Road	City of West Sacramento	C	OWSC	4.9 (11.8 NBL)	A (B)	3.0 (9.8 NBL)	A (A)	OWSC	5.7 (14.0 NBL)	A (B)	3.4 (10.8 NBL)	A (B)
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	C	AWSC	14.4	B	13.5	B	AWSC	18.8	C	22.7	C
6 . Seymour Avenue/Marshall Road	City of West Sacramento	C	Roundabout	6.5	A	6.1	A	Roundabout	7.5	A	7.6	A
7 . Rivermont Street–Allan Drive/Marshall Road	City of West Sacramento	C	TWSC	1.5 (12.0 SB)	A (B)	1.4 (9.3 SB)	A (A)	TWSC	7.3 (87.5 SB)	**A (F)** *	1.6 (11.7 SB)	A (B)
8 . Jefferson Boulevard/Marshall Road	City of West Sacramento	C	Signal	24.9	C	21.4	C	Signal	33.6	C	33.0	C
9 . Otis Avenue/Project Driveway 3	City of West Sacramento	C	---	*Future Intersection*				OWSC	1.4 (10.8 EBL)	A (B)	1.1 (10.2 EBL)	A (B)
10 . Otis Avenue/Project Driveway 4	City of West Sacramento	C	---	*Future Intersection*				OWSC	0.6 (10.1 EBL)	A (B)	0.6 (9.7 EBL)	A (A)

Notes:

AWSC = All-Way Stop Control; OWSC = One-Way Stop Control; TWSC = Two-Way Stop Control; LOS = Level of Service

Delay = Average control delay in seconds (For OWSC/TWSC intersections, both overall average and worst-case movement delays are reported). Worst-case movement delay is included in parentheses.

L=Left

NB= northbound; SB = southbound; EB = eastbound

* Exceeds LOS Standard

[1] LOS results for Intersections 1 through 5 and 9 through 10 were obtained from the *3425 Marshall Road Residential Project Transportation Study* (Linscott, Law & Greenspan, Engineers [LLG], April 2025).

[2] LOS results for Intersections 6, 7, and 8 were obtained from the *Marshall & Higgins Public Safety and Traffic Calming Project Memorandum* (City of West Sacramento, January 29, 2024)

5.0 TRAFFIC VOLUMES FOR CUMULATIVE YEAR WITHOUT PROJECT SCENARIOS

As stated in the City's Requirement Memo and recommended by City staff, traffic volumes for cumulative without project conditions were developed using the Enterprise Crossing model provided by City staff. The Enterprise Crossing model is a variant of the SACOG SACSIM23 beta1 version model with further refinements throughout the City, updated Traffic Analysis Zone (TAZ) boundaries, model roadway network, and growth assumptions between a refined base year of 2024 and future year 2050, accounting for large projects within the City, including Yarbrough, Liberty, and River Park Master Plans. The methodology used to develop cumulative without project traffic volumes at all study intersections is consistent with the National Cooperative Highway Research Program (NCHRP) for post-processing of modeled traffic volumes.

In addition, per the City's Requirement Memo, the City also requested to include the construction of the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard as an alternative analysis scenario under cumulative conditions.

5.1 CUMULATIVE NO ENTERPRISE CROSSING WITHOUT PROJECT TRAFFIC VOLUMES

Under this scenario, the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard was not included. Figure 5-1 illustrates the peak hour traffic volumes at study intersections under cumulative no Enterprise Crossing without project conditions.

Detailed volume development worksheets are included in Appendix D.

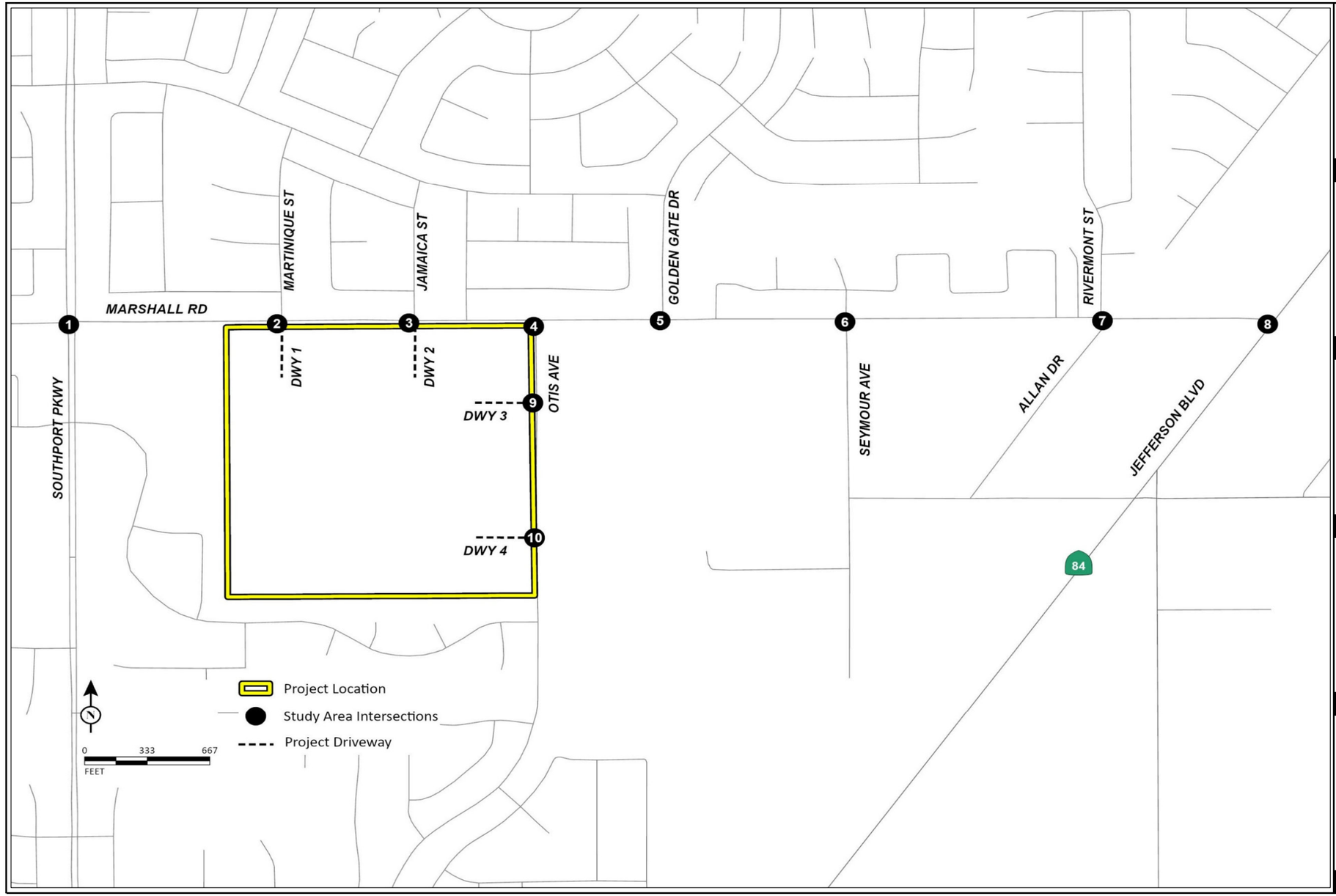
5.2 CUMULATIVE WITH ENTERPRISE CROSSING WITHOUT PROJECT TRAFFIC VOLUMES

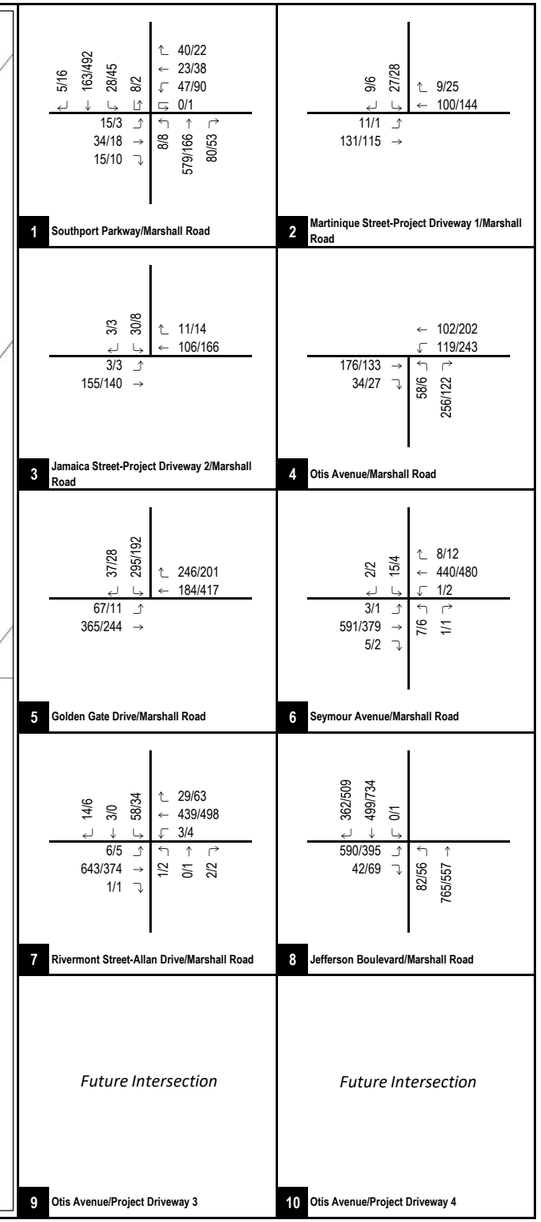
Under this scenario, the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard was included. Figure 5-2 illustrates the peak hour traffic volumes at study intersections under cumulative with Enterprise Crossing without project conditions.

Detailed volume development worksheets are included in Appendix D.

5.3 LIST OF CHAPTER 5.0 FIGURES

- Figure 5-1: Cumulative No Enterprise Crossing Without Project Peak Hour Traffic Volumes
- Figure 5-2: Cumulative With Enterprise Crossing Without Project Peak Hour Traffic Volumes





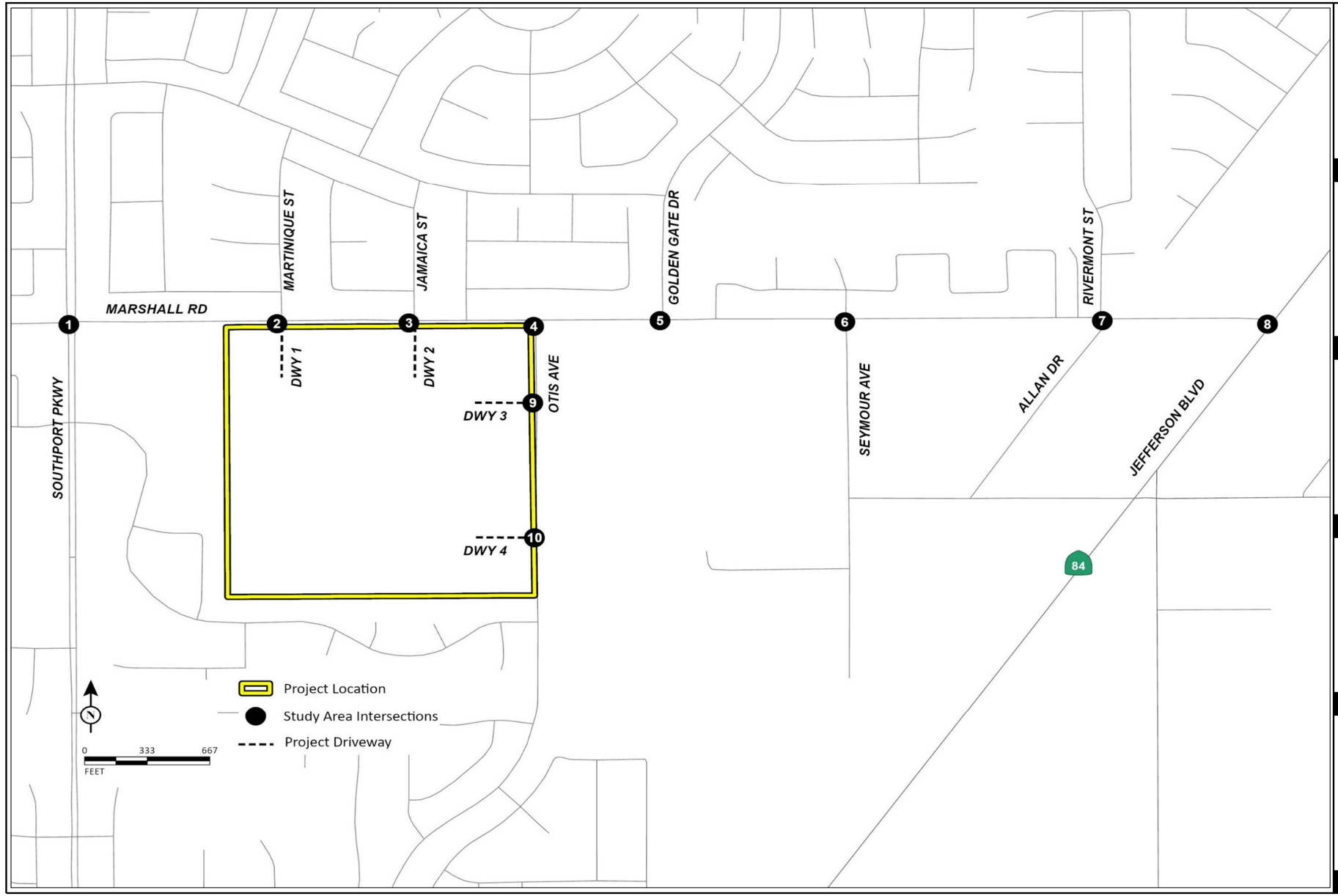
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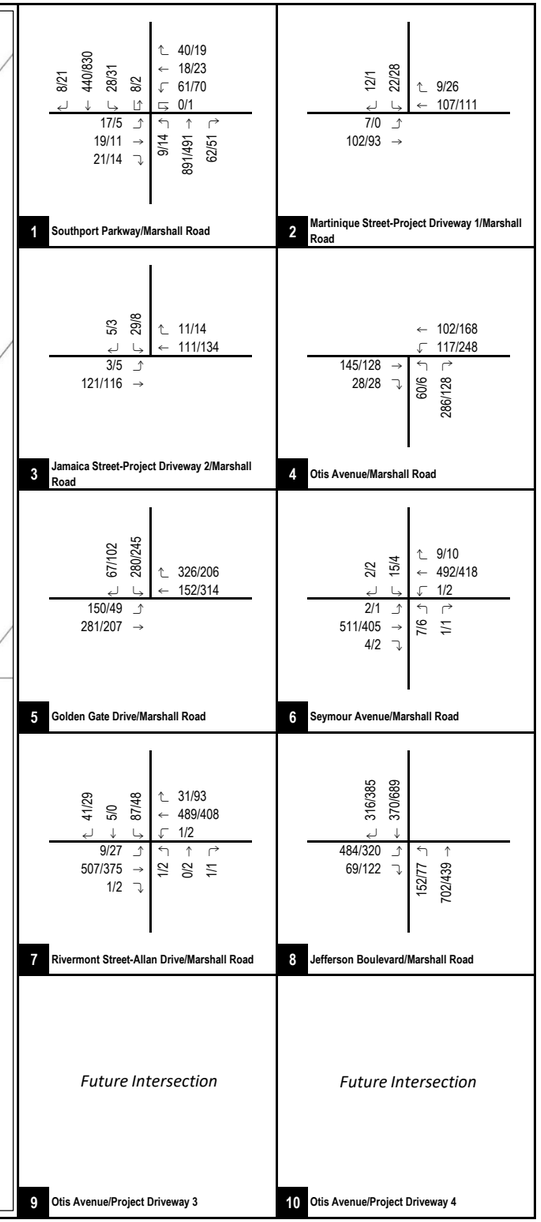
FIGURE 5-1

XXX/YYY
AM/PM Peak Hour Traffic Volumes

Brar Farms Residential Development Project
Transportation Study

Cumulative No Enterprise Crossing Without Project Peak Hour Traffic Volumes





LSA

FIGURE 5-2

XXX/YYY
AM/PM Peak Hour Traffic Volumes

Brar Farms Residential Development Project
Transportation Study

Cumulative With Enterprise Crossing Without Project Peak Hour Traffic Volumes

6.0 PROJECT TRAFFIC FOR CUMULATIVE YEAR SCENARIOS

6.1 PROJECT TRIP GENERATION

As recommended by City staff, the trip generation for the proposed project (259 single-family dwelling units) was obtained from the LLG Study. Table 6.A summarizes the project trip generation. As shown in Table 6.A, the proposed project is anticipated to generate 2,422 daily trips, with 178 trips occurring in the a.m. peak hour and 244 trips occurring in the p.m. peak hour.

6.2 PROJECT TRIP DISTRIBUTION

As recommended by City Staff, the project trip distribution patterns, under the cumulative conditions, were developed using the select zone model run results from the Enterprise Crossing model. The project distribution was further refined based on the local roadway network.

As previously mentioned, the City has requested to include the construction of the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard as an alternative analysis scenario under cumulative conditions. Therefore, two select zone model runs (without and with the Enterprise Crossing/Enterprise Bridge) were conducted under cumulative conditions. As such, two sets of project trip distribution (without and with the Enterprise Crossing/Enterprise Bridge) have been prepared under cumulative conditions.

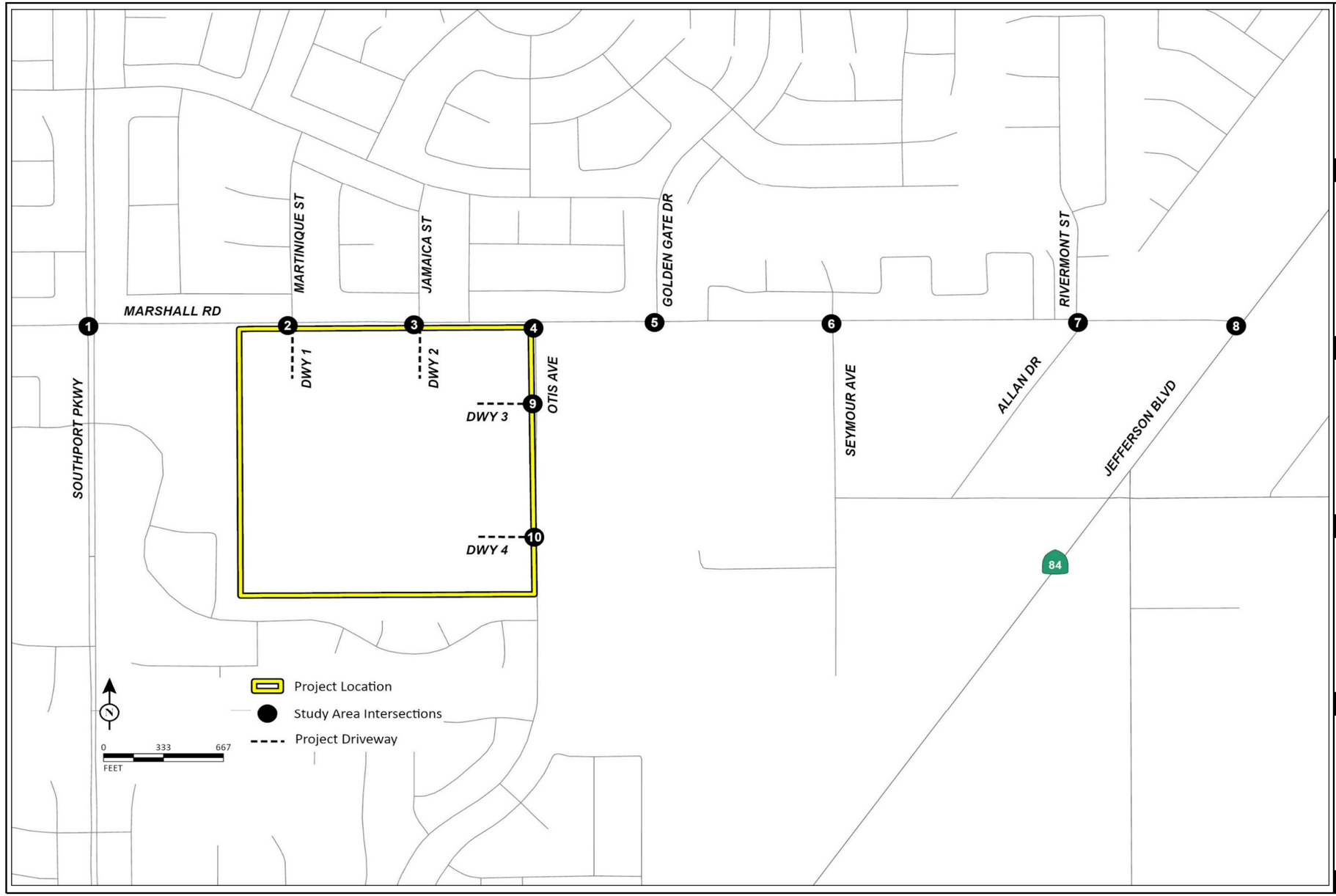
The select zone distribution plots are provided in Appendix E. Figure 6-1 illustrates the project trip distribution at the study intersections under the cumulative no Enterprise Crossing conditions. Figure 6-2 illustrates the project trip distribution at the study intersections under the cumulative with Enterprise Crossing conditions. The select zone distribution plots and project trip distribution figures for the proposed project have been reviewed and approved by City staff, prior to the finalization of traffic volumes and intersection LOS analysis for the cumulative conditions.

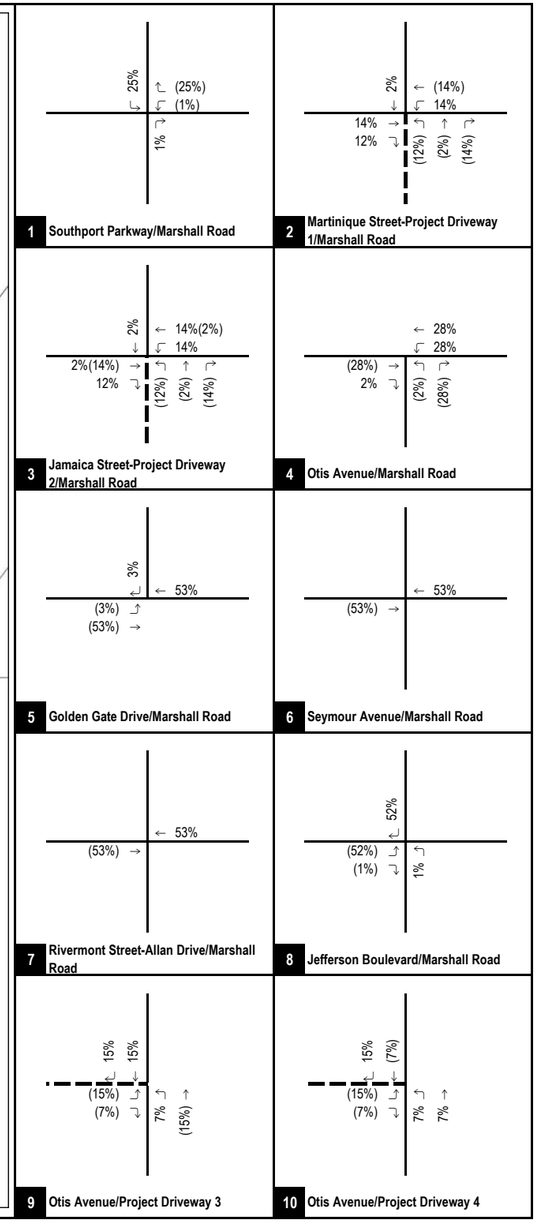
6.3 PROJECT TRIP ASSIGNMENT

The project trip assignment at the study intersections is the product of the project trip generation and corresponding trip distribution percentages. Figure 6-3 illustrates the project trip assignment at the study intersections under the cumulative no Enterprise Crossing conditions. Figure 6-4 illustrates the project trip assignment at the study intersections under the cumulative with Enterprise Crossing conditions.

6.4 LIST OF CHAPTER 6.0 FIGURES AND TABLES

- Figure 6-1: Project Trip Distribution (Cumulative No Enterprise Crossing)
- Figure 6-2: Project Trip Distribution (Cumulative With Enterprise Crossing)
- Figure 6-3: Project Trip Assignment (Cumulative No Enterprise Crossing)
- Figure 6-4: Project Trip Assignment (Cumulative With Enterprise Crossing)
- Table 6.A: Project Trip Generation





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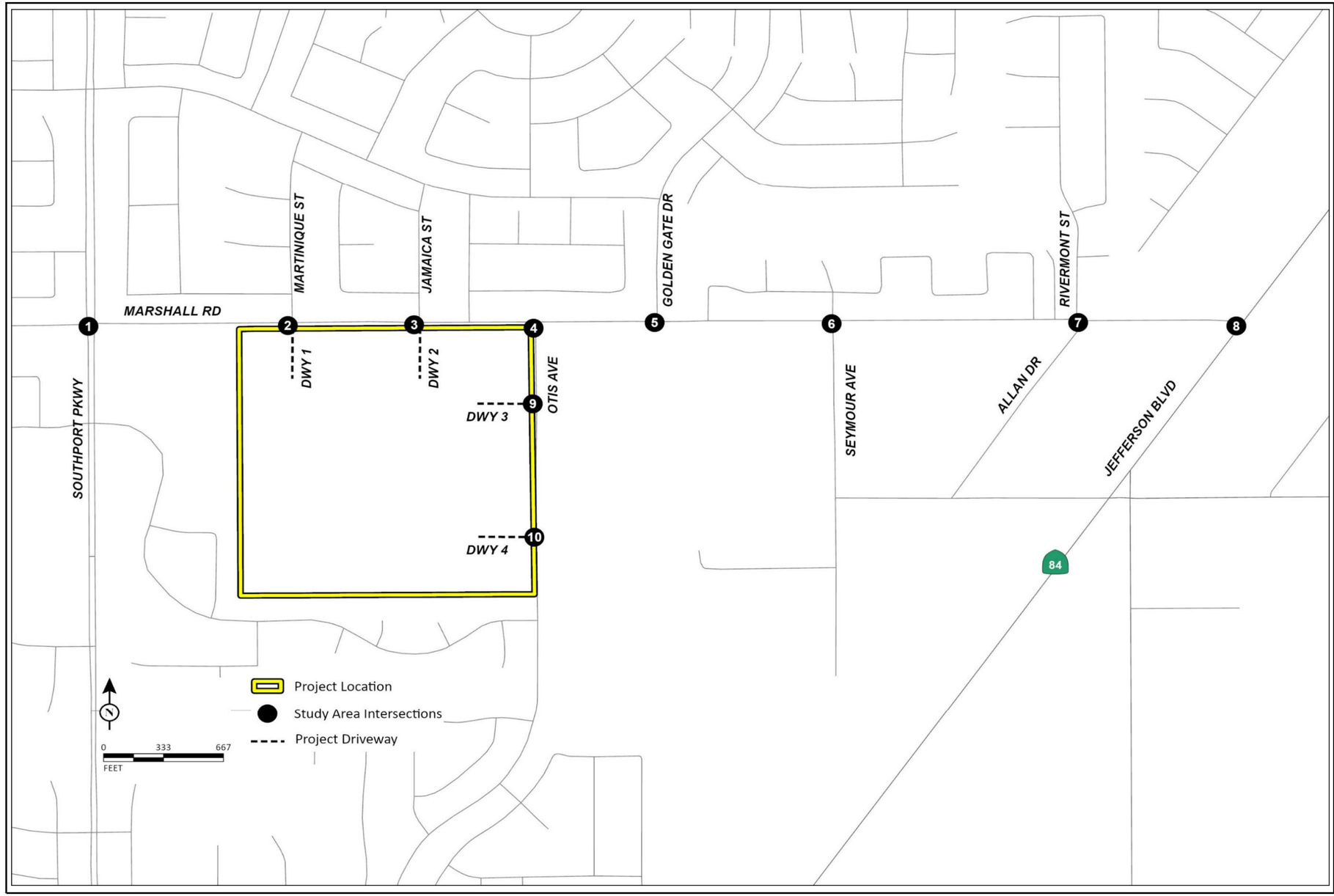
FIGURE 6-1

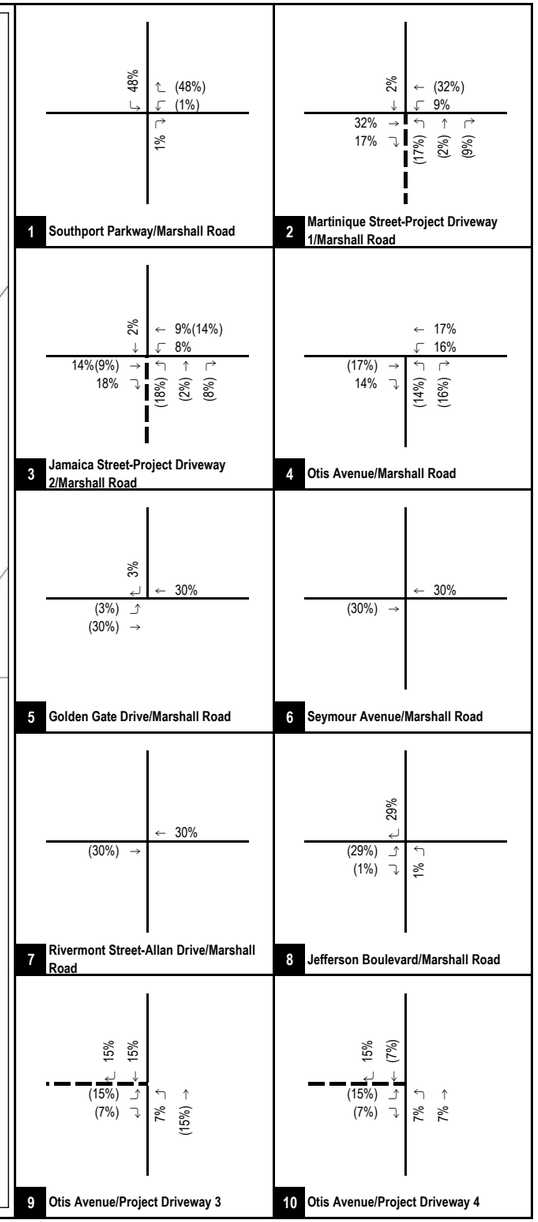
XX% (YY%)
Inbound (Outbound) Distribution
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Project Trip Distribution (Cumulative No Enterprise Crossing)

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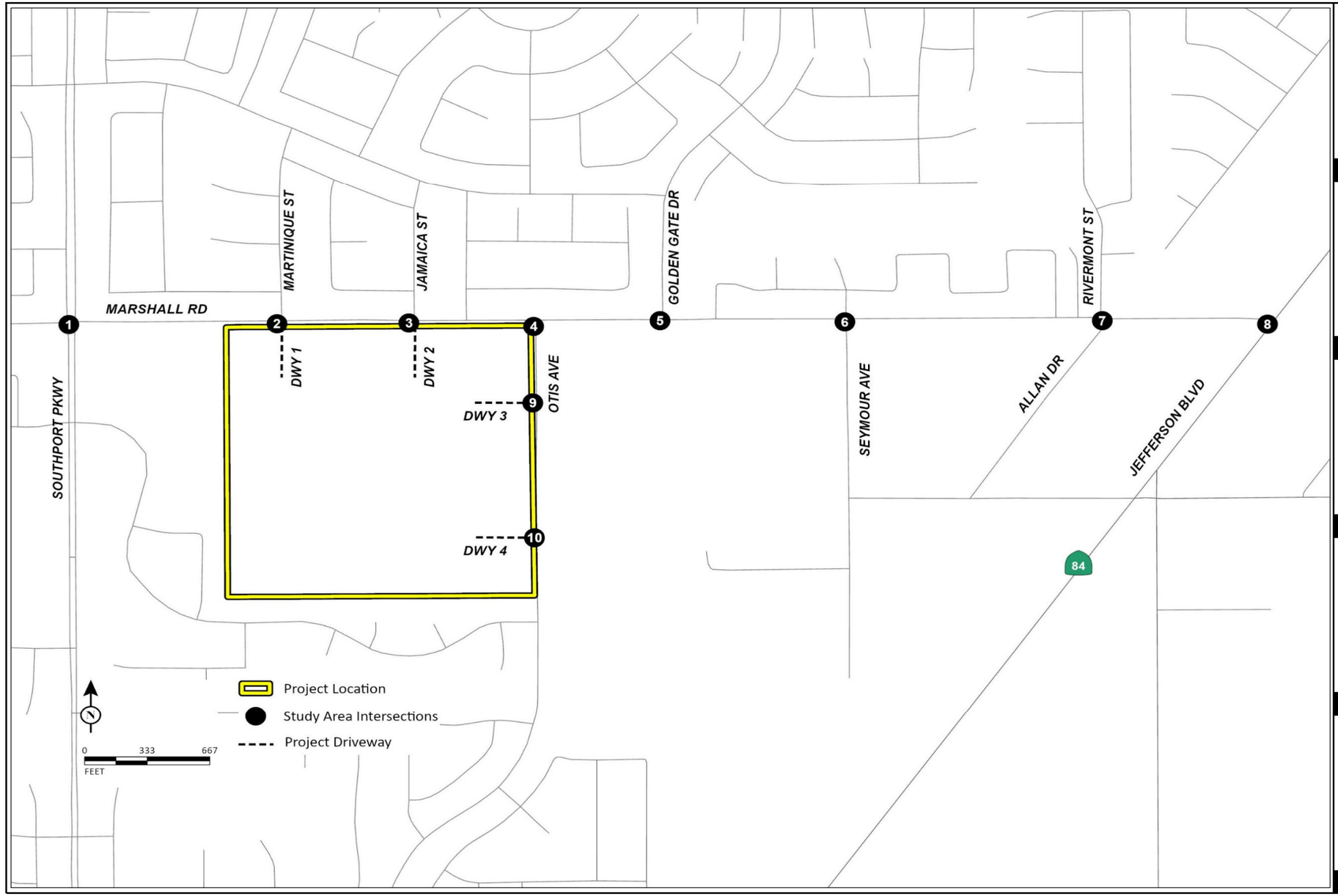
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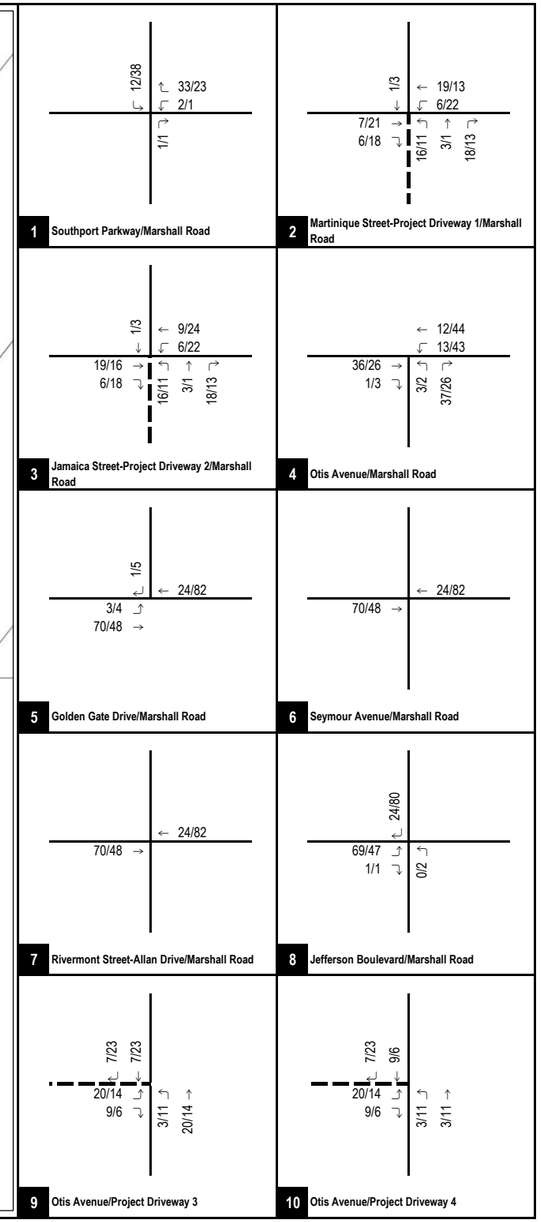
FIGURE 6-2

XX% (YY%)
Inbound (Outbound) Distribution
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Project Trip Distribution (Cumulative With Enterprise Crossing)





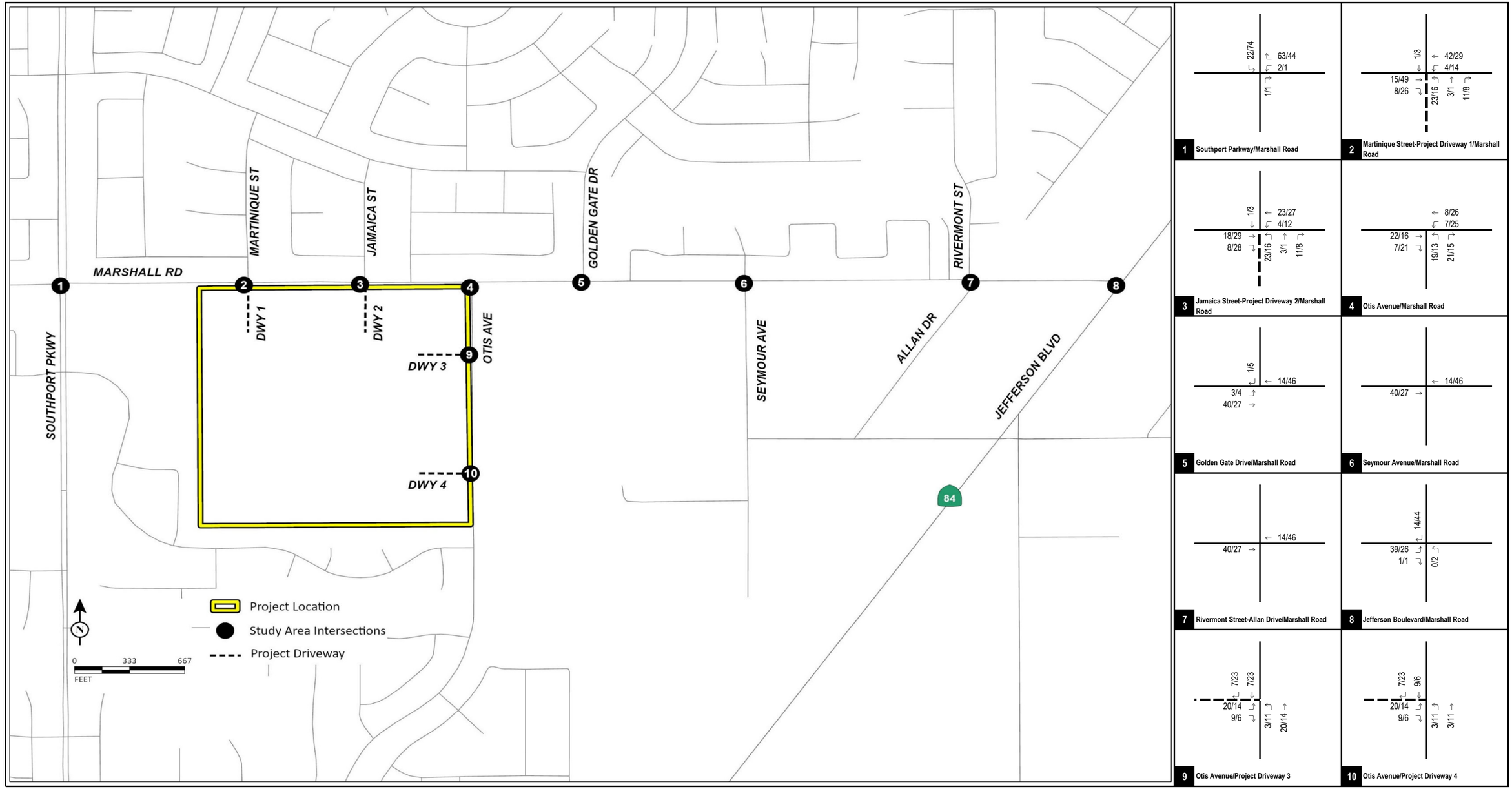
LSA

FIGURE 6-3

XX/YY
AM/PM Peak Hour Traffic Volumes
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Project Trip Assignment (Cumulative No Enterprise Crossing)



1 Southport Parkway/Marshall Road

2 Martinique Street-Project Driveway 1/Marshall Road

3 Jamaica Street-Project Driveway 2/Marshall Road

4 Otis Avenue/Marshall Road

5 Golden Gate Drive/Marshall Road

6 Seymour Avenue/Marshall Road

7 Rivermont Street-Allan Drive/Marshall Road

8 Jefferson Boulevard/Marshall Road

9 Otis Avenue/Project Driveway 3

10 Otis Avenue/Project Driveway 4

LSA

FIGURE 6-4

XX/YY
AM/PM Peak Hour Traffic Volumes
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Project Trip Assignment (Cumulative With Enterprise Crossing)

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LSA

Table 6.A: Project Trip Generation

Land Use	Units	A.M. Peak Hour			P.M. Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Single-Family Detached Housing Trip Generation[1]	259 DU	46	132	178	154	90	244	2,422
Total Trip Generation		**46**	**132**	**178**	**154**	**90**	**244**	**2,422**

Notes:

DU = Dwelling Units

[1] Trip generation referred to Table 5-1 (Project Trip Generation) from the 3425 Marshall Road Residential Project Transportation Study, prepared by Linscott, Law & Greenspan, Engineers (LLG) in April 2025.

7.0 TRAFFIC VOLUMES FOR CUMULATIVE YEAR PLUS PROJECT SCENARIOS

Cumulative plus project traffic volumes were developed by adding project traffic to the traffic for the 'without project' scenarios.

7.1 CUMULATIVE NO ENTERPRISE CROSSING PLUS PROJECT TRAFFIC VOLUMES

Under this scenario, the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard was not included. Figure 7-1 illustrates the peak hour traffic volumes at study intersections under cumulative no Enterprise Crossing plus project conditions.

Detailed volume development worksheets are included in Appendix D.

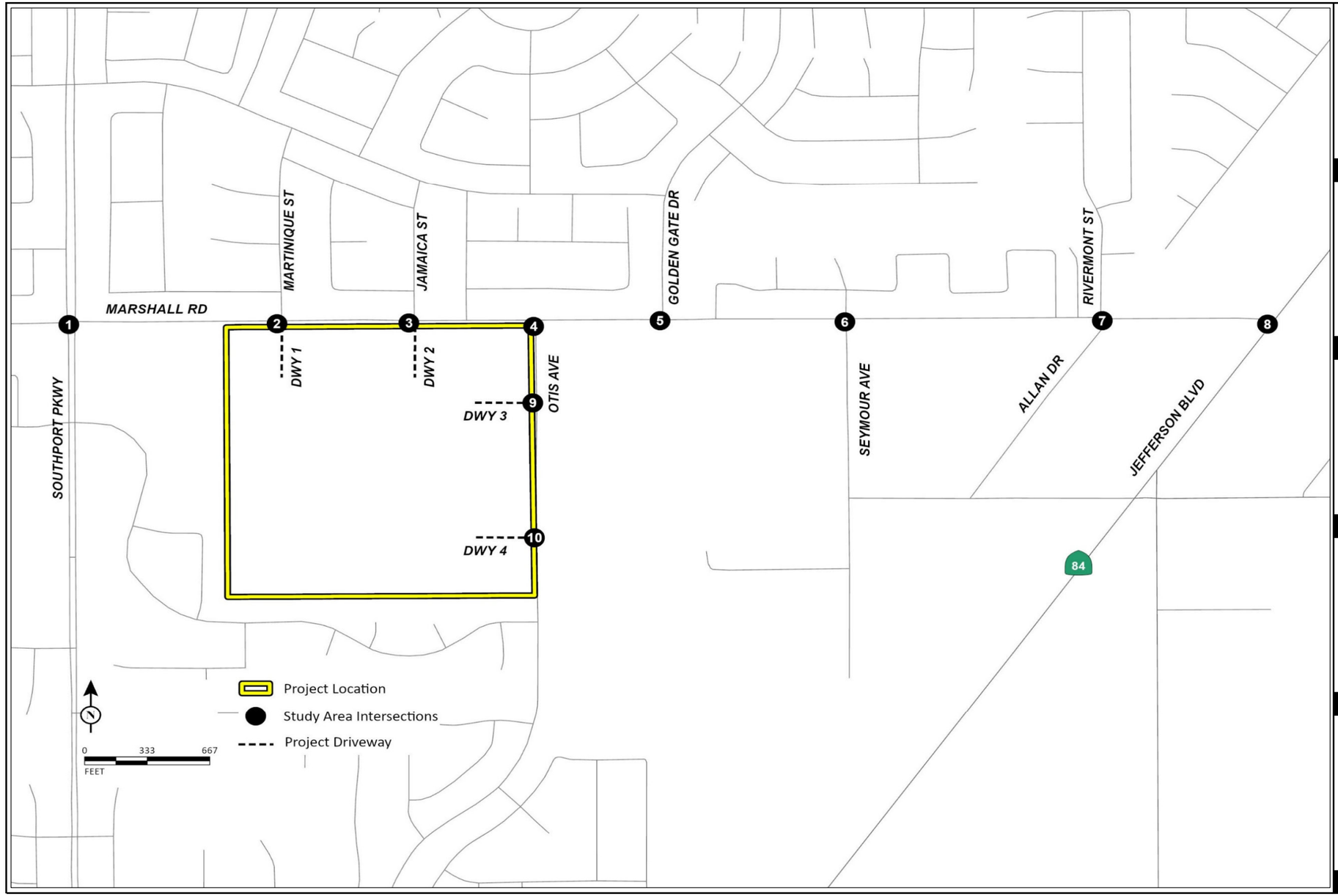
7.2 CUMULATIVE WITH ENTERPRISE CROSSING PLUS PROJECT TRAFFIC VOLUMES

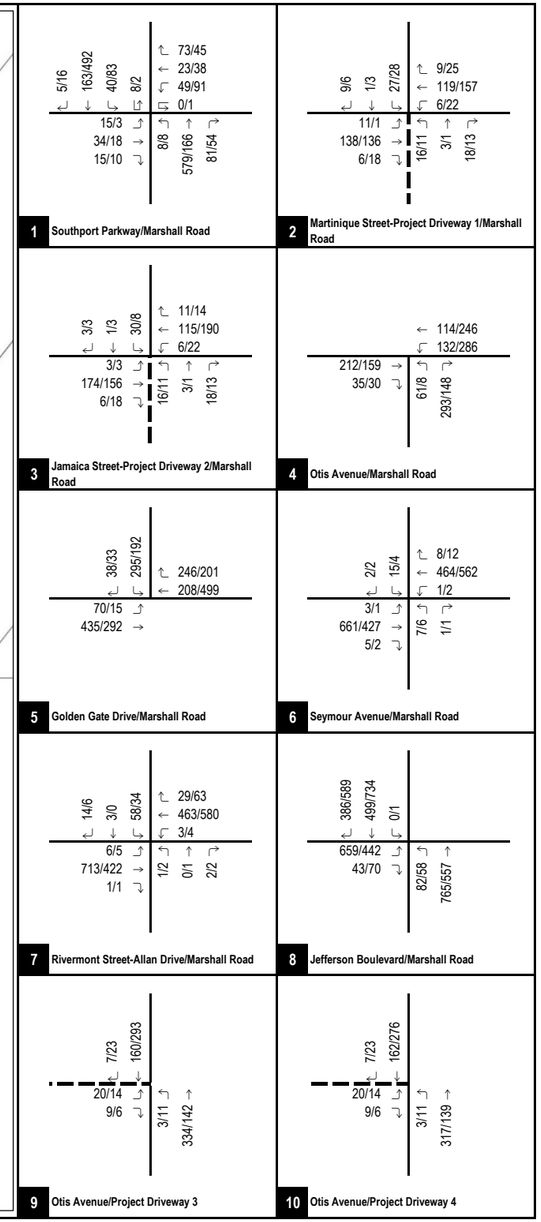
Under this scenario, the Enterprise Crossing/Enterprise Bridge between Southport Parkway and Enterprise Boulevard was included. Figure 7-2 illustrates the peak hour traffic volumes at study intersections under cumulative with Enterprise Crossing plus project conditions.

Detailed volume development worksheets are included in Appendix D.

7.3 LIST OF CHAPTER 7.0 FIGURES

- Figure 7-1: Cumulative No Enterprise Crossing Plus Project Peak Hour Traffic Volumes
- Figure 7-2: Cumulative With Enterprise Crossing Plus Project Peak Hour Traffic Volumes





LSA

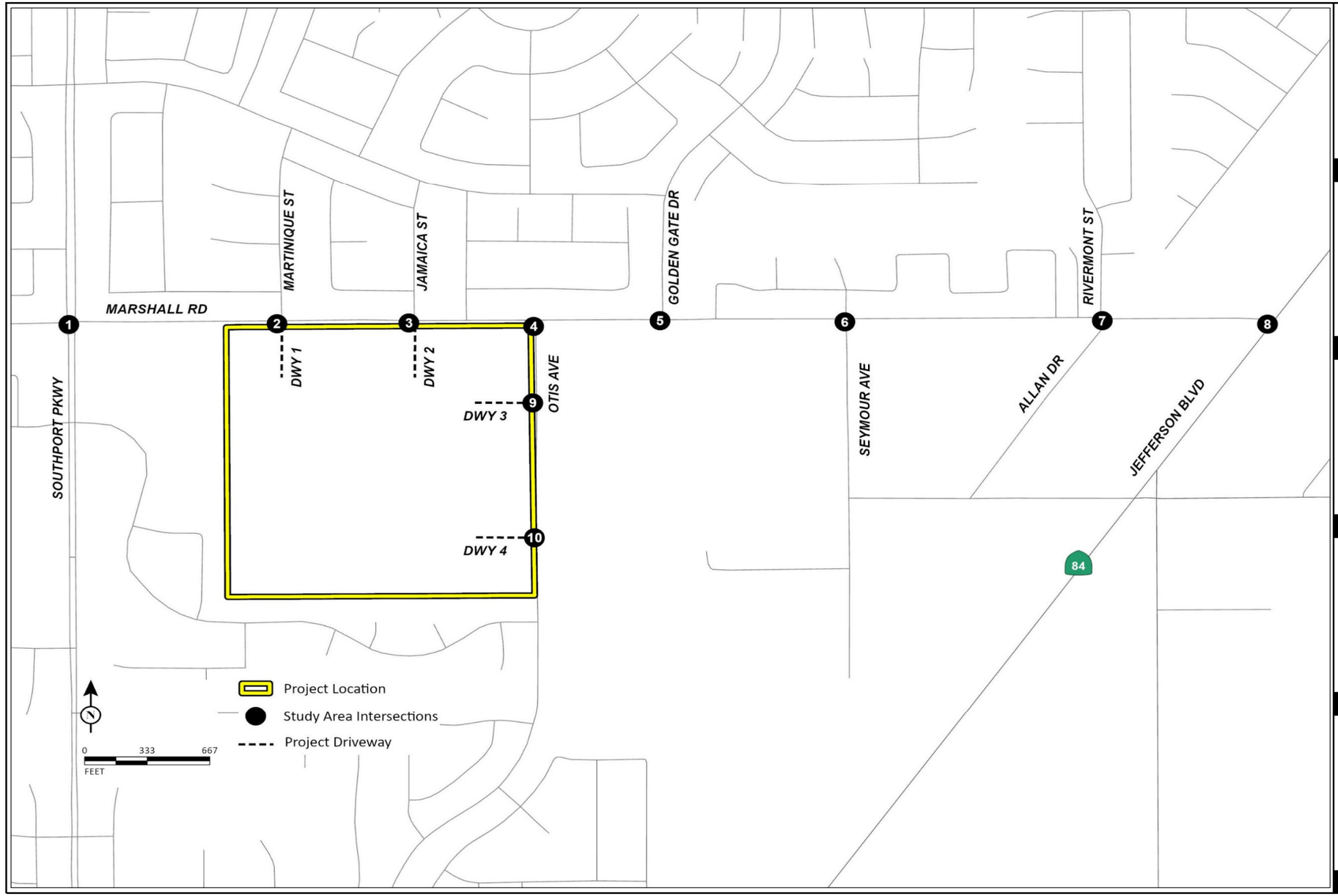
FIGURE 7-1

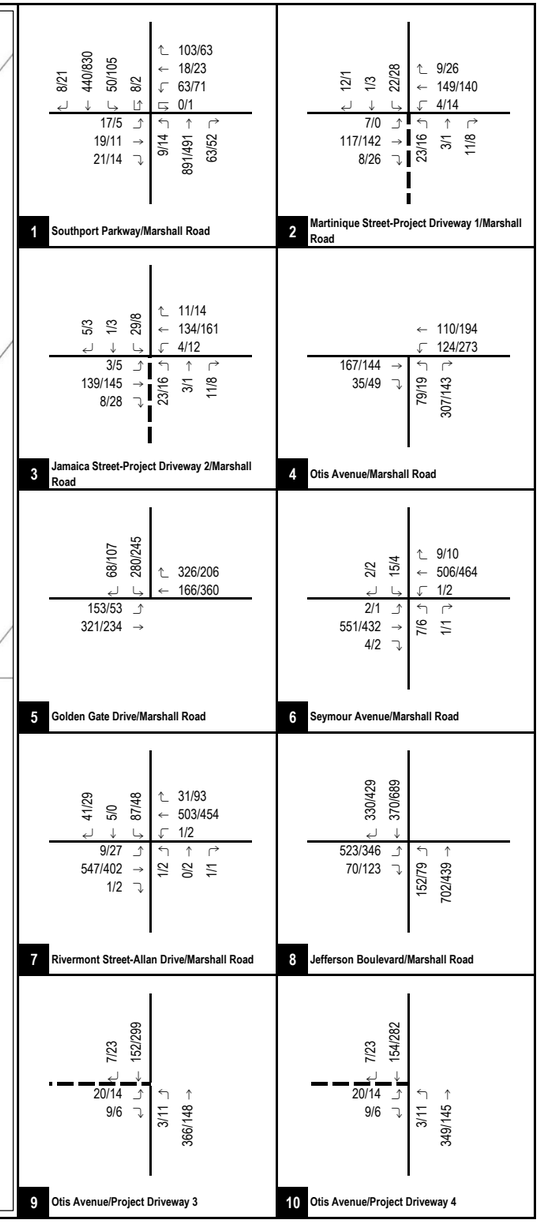
XXX/YYY
AM/PM Peak Hour Traffic Volumes
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Cumulative No Enterprise Crossing Plus Project Peak Hour Traffic Volumes

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LSA

FIGURE 7-2

XXX/YYY
AM/PM Peak Hour Traffic Volumes
Project Driveway

Brar Farms Residential Development Project
Transportation Study

Cumulative With Enterprise Crossing Plus Project Peak Hour Traffic Volumes

8.0 CUMULATIVE YEAR STUDY INTERSECTION LEVELS OF SERVICE

8.1 CUMULATIVE NO ENTERPRISE CROSSING WITHOUT PROJECT LEVELS OF SERVICE

An intersection LOS analysis was conducted for cumulative no Enterprise Crossing without project conditions using the methodologies previously discussed. Table 8.A summarizes the results of this analysis and shows that the following study intersections are forecast to operate at a deficient LOS under cumulative no Enterprise Crossing without project conditions:

5. Golden Gate Drive/Marshall Road (p.m. peak hour)

7. Rivermont Street–Allan Drive/Marshall Road (a.m. peak hour)

All other study intersections are forecast to operate at a satisfactory LOS under cumulative no Enterprise Crossing without project conditions.

Detailed intersection LOS worksheets are included in Appendix F.

8.2 CUMULATIVE WITH ENTERPRISE CROSSING WITHOUT PROJECT LEVELS OF SERVICE

An intersection LOS analysis was conducted for cumulative with Enterprise Crossing without project conditions using the methodologies previously discussed. Table 8.B summarizes the results of this analysis and shows that the following study intersection is forecast to operate at a deficient LOS under cumulative with Enterprise Crossing without project conditions:

5. Golden Gate Drive/Marshall Road (a.m. peak hour)

All other study intersections are forecast to operate at a satisfactory LOS under cumulative with Enterprise Crossing without project conditions.

Detailed intersection LOS worksheets are included in Appendix F.

8.3 CUMULATIVE NO ENTERPRISE CROSSING PLUS PROJECT LEVELS OF SERVICE

An intersection LOS analysis was conducted for cumulative no Enterprise Crossing plus project conditions using the methodologies previously discussed. Table 8.A summarizes the results of this analysis and shows that the following study intersections are forecast to operate at a deficient LOS under cumulative no Enterprise Crossing plus project conditions:

5. Golden Gate Drive/Marshall Road (both a.m. and p.m. peak hours)

7. Rivermont Street–Allan Drive/Marshall Road (a.m. peak hour)

It should be noted that both these intersections are also forecast to operate at a deficient LOS under cumulative no Enterprise Crossing without project conditions. As such, the project would be adding to the already forecasted deficiencies at these locations.

All other study intersections are forecast to operate at a satisfactory LOS under cumulative no Enterprise Crossing plus project conditions.

Detailed intersection LOS worksheets are included in Appendix F.

8.4 CUMULATIVE WITH ENTERPRISE CROSSING PLUS PROJECT LEVELS OF SERVICE

An intersection LOS analysis was conducted for cumulative with Enterprise Crossing plus project conditions using the methodologies previously discussed. Table 8.B summarizes the results of this analysis and shows that the following study intersections are forecast to operate at a deficient LOS under cumulative with Enterprise Crossing plus project conditions:

5. Golden Gate Drive/Marshall Road (both a.m. and p.m. peak hours)

7. Rivermont Street–Allan Drive/Marshall Road (a.m. peak hour)

It should be noted that the intersection of Golden Gate Drive/Marshall Road is also forecast to operate at a deficient LOS under cumulative with Enterprise Crossing without project conditions. As such, the project would be adding to the already forecasted deficiencies at this location.

All other study intersections are forecast to operate at a satisfactory LOS under cumulative with Enterprise Crossing plus project conditions.

Detailed intersection LOS worksheets are included in Appendix F.

8.5 LIST OF CHAPTER 8.0 TABLES

- Table 8.A: Cumulative No Enterprise Crossing Intersection Levels of Service
- Table 8.B: Cumulative With Enterprise Crossing Intersection Levels of Service

LSA

Table 8.A: Cumulative No Enterprise Crossing Intersection Levels of Service

Intersection	Jurisdiction	LOS Standard	No Project[1,2]					Plus Project[1,2]				
			Control	AM Peak Hour Delay (sec.)	AM Peak Hour LOS	PM Peak Hour Delay (sec.)	PM Peak Hour LOS	Control	AM Peak Hour Delay (sec.)	AM Peak Hour LOS	PM Peak Hour Delay (sec.)	PM Peak Hour LOS
1 . Southport Parkway/Marshall Road	City of West Sacramento	C	Signal	12.5	B	11.8	B	Signal	13.6	B	12.7	B
2 . Martinique Street–Project Driveway 1/Marshall Road	City of West Sacramento	C	OWSC	1.5 (10.0 SBL)	A (A)	1.1 (10.2 SBL)	A (B)	TWSC	2.5 (10.8 SBL)	A (B)	2.0 (11.5 SBL)	A (B)
3 . Jamaica Street–Project Driveway 2/Marshall Road	City of West Sacramento	C	OWSC	1.2 (10.3 SBL)	A (B)	0.4 (10.1 SBL)	A (B)	AWSC	8.3	A	8.5	A
4 . Otis Avenue/Marshall Road	City of West Sacramento	C	Roundabout	5.2	A	4.8	A	Roundabout	5.8	A	5.4	A
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	C	AWSC	23.0	C	26.0	**D** *	AWSC	34.8	**D** *	47.6	**E** *
6 . Seymour Avenue/Marshall Road	City of West Sacramento	C	Roundabout	5.9	A	4.9	A	Roundabout	6.3	A	5.3	A
7 . Rivermont Street–Allan Drive/Marshall Road	City of West Sacramento	C	AWSC	29.8	**D** *	16.8	C	AWSC	45.1	**E** *	23.9	C
8 . Jefferson Boulevard/Marshall Road	City of West Sacramento	C	Signal	22.8	C	19.7	B	Signal	27.3	C	24.5	C
9 . Otis Avenue/Project Driveway 3	City of West Sacramento	C	---	*Future Intersection*				OWSC	0.7(11.6 EBL)	A (B)	0.7 (11.6 EBL)	A (B)
10 . Otis Avenue/Project Driveway 4	City of West Sacramento	C	---	*Future Intersection*				OWSC	0.7 (11.5 EBL)	A (B)	0.7 (11.4 EBL)	A (B)

Notes:

AWSC = All-Way Stop Control; OWSC = One-Way Stop Control; TWSC = Two-Way Stop Control; LOS = Level of Service

Delay = Average control delay in seconds (For OWSC/TWSC intersections, both overall average and worst-case movement delays are reported). Worst-case movement delay is included in parentheses.

L=Left

NB= northbound; SB = southbound; EB = eastbound

* Exceeds LOS Standard

LSA

Table 8.B: Cumulative With Enterprise Crossing Intersection Levels of Service

Intersection	Jurisdiction	LOS Standard	No Project[1,2]					Plus Project[1,2]				
				AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour	
			Control	Delay (sec.)	LOS	Delay (sec.)	LOS	Control	Delay (sec.)	LOS	Delay (sec.)	LOS
1 . Southport Parkway/Marshall Road	City of West Sacramento	C	Signal	16.8	B	13.1	B	Signal	21.9	C	15.3	B
2 . Martinique Street–Project Driveway 1/Marshall Road	City of West Sacramento	C	OWSC	1.5 (9.7 SBL)	A (A)	1.1 (9.9 SBL)	A (A)	TWSC	2.3 (10.6 NBL)	A (B)	1.8 (11.4 SBL)	A (B)
3 . Jamaica Street–Project Driveway 2/Marshall Road	City of West Sacramento	C	OWSC	1.3 (10.1 SBL)	A (B)	0.5 (9.8 SBL)	A (A)	AWSC	8.2	A	8.2	A
4 . Otis Avenue/Marshall Road	City of West Sacramento	C	Roundabout	5.2	A	4.7	A	Roundabout	5.7	A	5.4	A
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	C	AWSC	28.1	**D** *	22.1	C	AWSC	35.2	**E** *	29.8	**D** *
6 . Seymour Avenue/Marshall Road	City of West Sacramento	C	Roundabout	5.6	A	4.7	A	Roundabout	5.8	A	4.9	A
7 . Rivermont Street–Allan Drive/Marshall Road	City of West Sacramento	C	AWSC	23.9	C	15.4	C	AWSC	28.6	**D** *	17.9	C
8 . Jefferson Boulevard/Marshall Road	City of West Sacramento	C	Signal	19.8	B	15.9	B	Signal	21.5	C	17.3	B
9 . Otis Avenue/Project Driveway 3	City of West Sacramento	C	---	*Future Intersection*				OWSC	0.7 (11.8 EBL)	A (B)	0.6 (11.7 EBL)	A (B)
10 . Otis Avenue/Project Driveway 4	City of West Sacramento	C	---	*Future Intersection*				OWSC	0.7 (11.7 EBL)	A (B)	0.7 (11.5 EBL)	A (B)

Notes:

AWSC = All-Way Stop Control; OWSC = One-Way Stop Control; TWSC = Two-Way Stop Control; LOS = Level of Service

Delay = Average control delay in seconds (For OWSC/TWSC intersections, both overall average and worst-case movement delays are reported). Worst-case movement delay is included in parentheses.

L=Left

NB= northbound; SB = southbound; EB = eastbound

* Exceeds LOS Standard

9.0 SIGNAL WARRANT ANALYSIS

A signal warrant analysis was conducted for deficient study intersections where installing a signal could be an appropriate and potential operational improvement measure. A Peak Hour Warrant analysis (Warrant 3) was conducted for such locations. Peak hour approach volumes for the study intersections were examined to determine whether signalization is warranted per the criteria defined in the latest version of the California Department of Transportation's (Caltrans) *California Manual on Uniform Traffic Control Devices*.

9.1 SIGNAL WARRANTS UNDER CUMULATIVE NO ENTERPRISE CROSSING CONDITIONS

9.1.1 Intersection 5: Golden Gate Drive/Marshall Road

Figure 9-1 illustrates Warrant 3 (peak hour) for this intersection under cumulative no Enterprise Crossing (without and with project) conditions. As shown in this figure, this intersection meets the signal warrant under cumulative no Enterprise Crossing (both without and with project) conditions. As such, a traffic signal is warranted at this location and could be recommended as a potential operational improvement measure.

9.1.2 Intersection 7: Rivermont Street–Allan Drive/Marshall Road

Figure 9-2 illustrates Warrant 3 (peak hour) for this intersection under cumulative no Enterprise Crossing (without and with project) conditions. As shown in this figure, this intersection does not meet the signal warrant under cumulative no Enterprise Crossing (both without and with project) conditions. As such, a traffic signal is not warranted at this location.

9.2 SIGNAL WARRANTS UNDER CUMULATIVE WITH ENTERPRISE CROSSING CONDITIONS

9.2.1 Intersection 5: Golden Gate Drive/Marshall Road

Figure 9-3 illustrates Warrant 3 (peak hour) for this intersection under cumulative with Enterprise Crossing (without and with project) conditions. As shown in this figure, this intersection meets the signal warrant under cumulative with Enterprise Crossing (both without and with project) conditions. As such, a traffic signal is warranted at this location and could be recommended as a potential operational improvement measure.

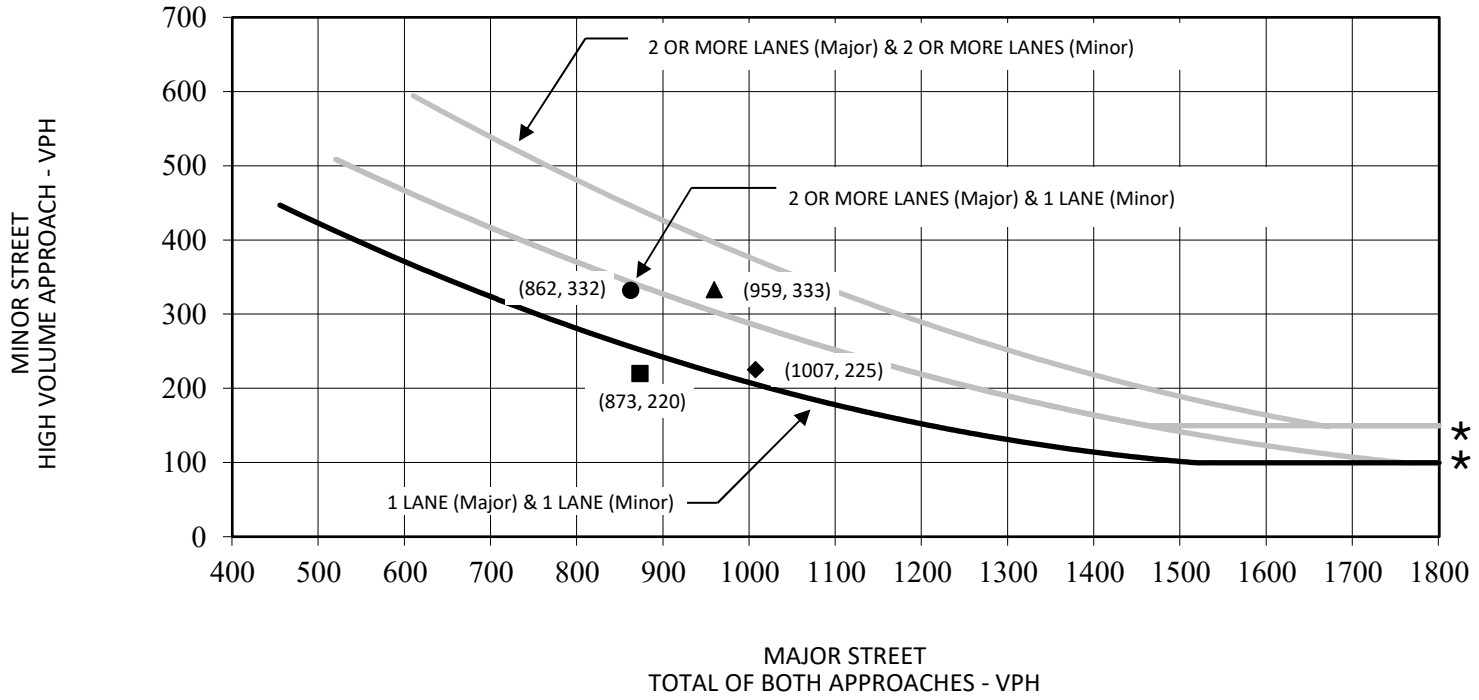
9.2.2 Intersection 7: Rivermont Street–Allan Drive/Marshall Road

Figure 9-4 illustrates Warrant 3 (peak hour) for this intersection under cumulative with Enterprise Crossing (without and with project) conditions. As shown in this figure, this intersection does not meet the signal warrant under cumulative with Enterprise Crossing (both without and with project) conditions. As such, a traffic signal is not warranted at this location.

9.3 LIST OF CHAPTER 9.0 FIGURES

- Figure 9-1: Signal Warrant 3: Peak Hour - Intersection 5 Golden Gate Drive/Marshall Road - Cumulative No Enterprise Crossing Conditions
- Figure 9-2: Signal Warrant 3: Peak Hour - Intersection 7 Rivermont Street-Allan Drive/Marshall Road - Cumulative No Enterprise Crossing Conditions
- Figure 9-3: Signal Warrant 3: Peak Hour - Intersection 5 Golden Gate Drive/Marshall Road - Cumulative With Enterprise Crossing Conditions
- Figure 9-4: Signal Warrant 3: Peak Hour - Intersection 7 Rivermont Street-Allan Drive/Marshall Road - Cumulative With Enterprise Crossing Conditions

WARRANT 3, PEAK HOUR



* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 9-1

● Without Project AM Peak Hour

▲ With Project AM Peak Hour

■ Without Project PM Peak Hour

◆ With Project PM Peak Hour

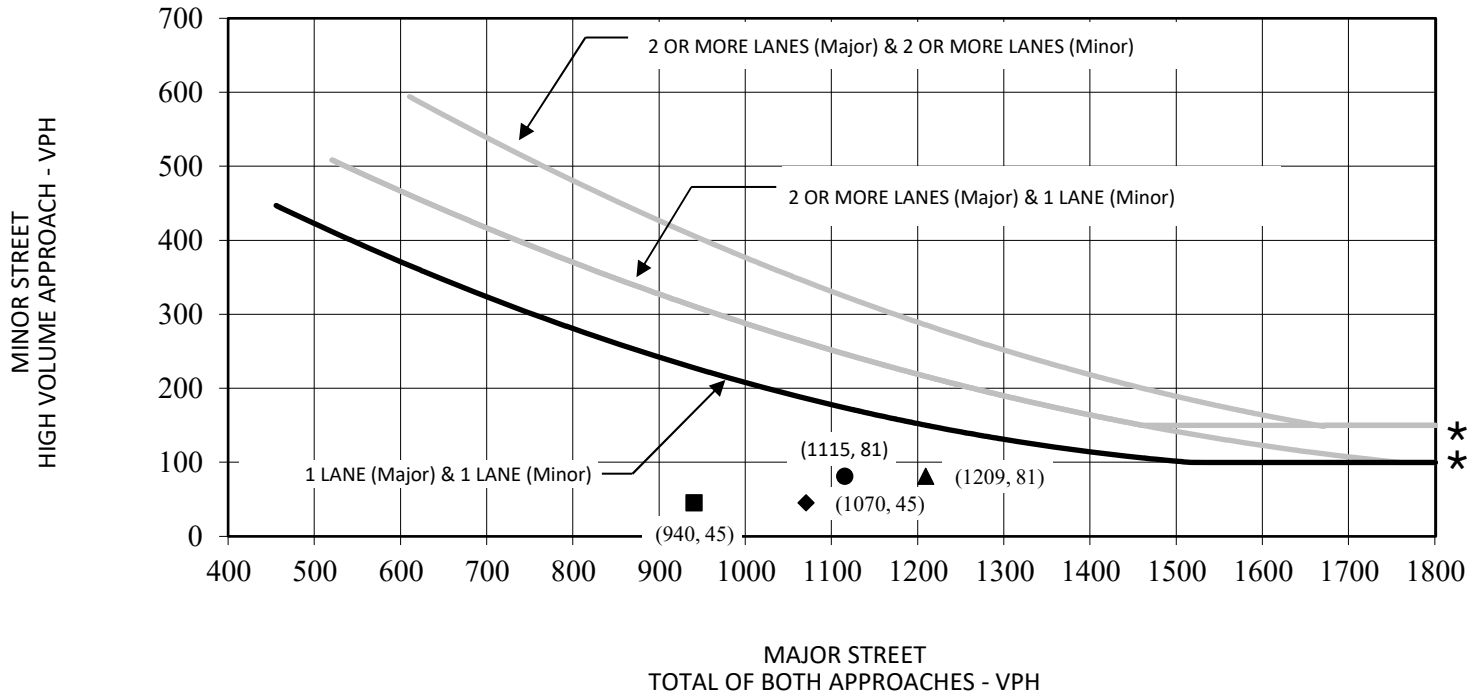
Brar Farms Residential Development Project
Transportation Study

Signal Warrant 3: Peak Hour - Intersection 5 Golden Gate Drive/Marshall Road - Cumulative No Enterprise Crossing Conditions

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

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WARRANT 3, PEAK HOUR



* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 9-2

● Without Project AM Peak Hour

▲ With Project AM Peak Hour

■ Without Project PM Peak Hour

◆ With Project PM Peak Hour

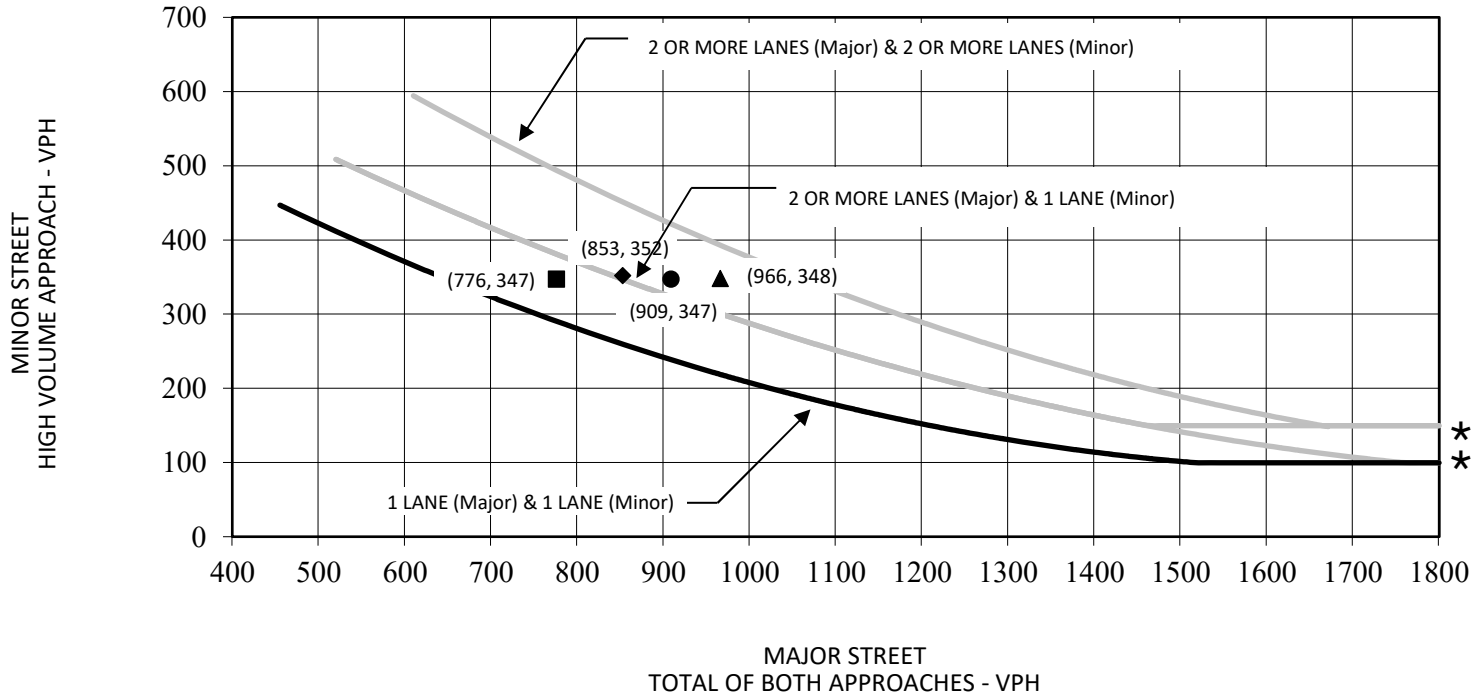
Brar Farms Residential Development Project
Transportation Study

Signal Warrant 3: Peak Hour - Intersection 7 Rivermont Street-Allan Drive/Marshall Road - Cumulative No Enterprise Crossing Conditions

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

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WARRANT 3, PEAK HOUR



* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 9-3

● Without Project AM Peak Hour
▲ With Project AM Peak Hour
■ Without Project PM Peak Hour
◆ With Project PM Peak Hour

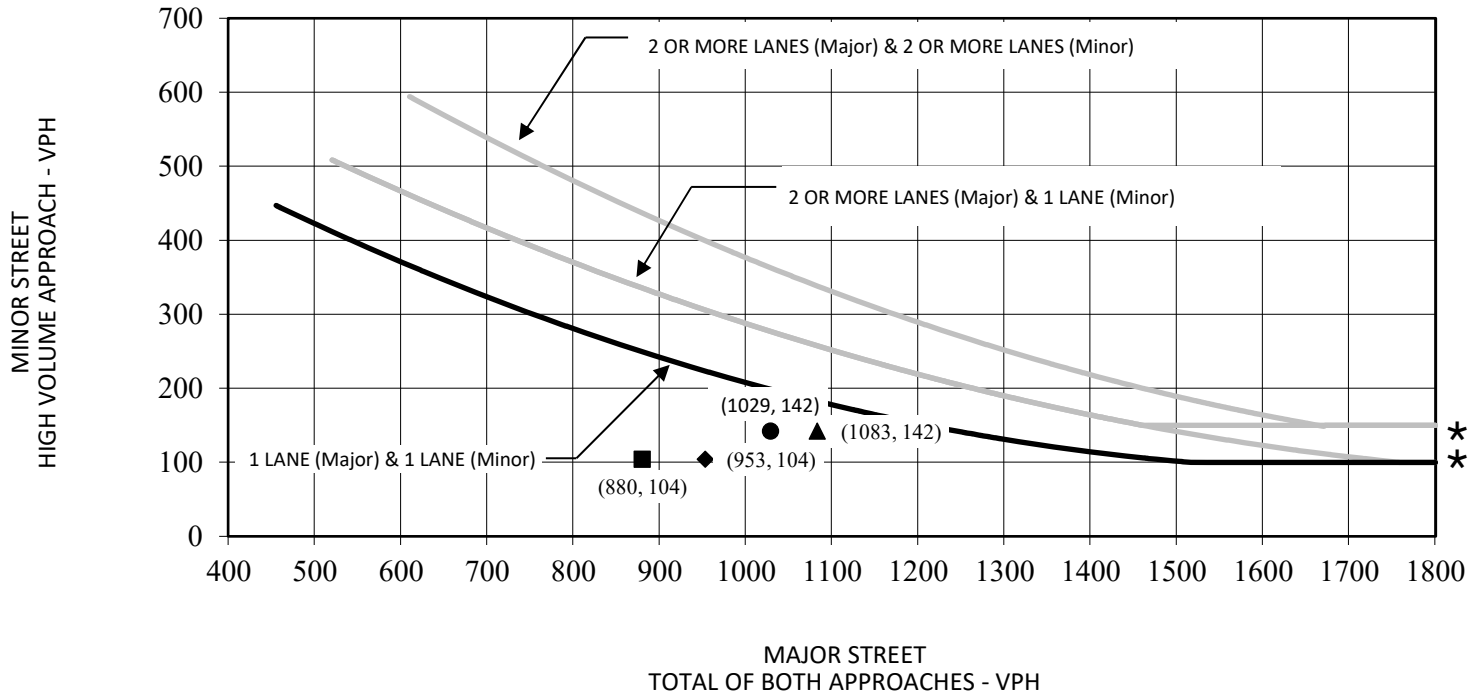
Brar Farms Residential Development Project
Transportation Study

Signal Warrant 3: Peak Hour - Intersection 5 Golden Gate Drive/Marshall Road - Cumulative With Enterprise Crossing Conditions

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

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WARRANT 3, PEAK HOUR



* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 9-4

● Without Project AM Peak Hour
▲ With Project AM Peak Hour
■ Without Project PM Peak Hour
◆ With Project PM Peak Hour

Brar Farms Residential Development Project
Transportation Study

Signal Warrant 3: Peak Hour - Intersection 7 Rivermont Street-Allan Drive/Marshall Road - Cumulative With Enterprise Crossing Conditions

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

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10.0 CIRCULATION IMPROVEMENTS AND FUNDING SOURCES

10.1 RECOMMENDED IMPROVEMENTS

Improvements have been recommended at study intersections where an operational deficiency has been identified based on the results of the LOS analysis. Table 10.A summarizes the recommended improvements for study intersections operating at a deficient LOS. Tables 10.B, 10.C, and 10.D summarize the post-improvement intersection LOS under existing plus project, cumulative no Enterprise Crossing plus project, and cumulative with Enterprise Crossing plus project conditions, respectively. Detailed LOS worksheets are included in Appendix F.

As shown in Table 10.B, with implementation of recommended improvements (conversion from two-way stop control to all-way stop control), intersection LOS deficiency at the Rivermont Street–Allan Drive/Marshall Road intersection can be fully improved under existing conditions, which has been demonstrated in the City's Safety Memo.

As shown in Table 10.C, with implementation of recommended improvement (installation of a traffic signal), intersection LOS deficiency at the Golden Gate Drive/Marshall Road intersection can be fully improved under cumulative no Enterprise Crossing conditions. Based on the peak-hour signal warrant analysis previously provided, a traffic signal is not warranted at the Rivermont Street–Allan Drive/Marshall Road intersection under cumulative no Enterprise Crossing conditions. In addition, the City's Safety Memo states that installation of a roundabout at the Rivermont Street–Allan Drive/Marshall Road intersection is likely not feasible due to right-of-way constraints, existing bus stop locations, and the distance to adjacent intersection with Stable Drive to the east. As such, no feasible improvement is recommended for the Rivermont Street–Allan Drive/Marshall Road intersection to address the intersection LOS deficiency. However, it is recommended that the City periodically monitors the intersection's traffic operation performance. Installation of a traffic signal may be considered as an improvement at Rivermont Street–Allan Drive/Marshall Road if it is warranted in the future.

As shown in Table 10.D, with implementation of recommended improvement (installation of a traffic signal), intersection LOS deficiency at the Golden Gate Drive/Marshall Road intersection can be fully improved under cumulative with Enterprise Crossing conditions. Similarly, based on the peak-hour signal warrant analysis previously provided, a traffic signal is not warranted at the Rivermont Street–Allan Drive/Marshall Road intersection under cumulative with Enterprise Crossing conditions. In addition, the City's Safety Memo states that installation of a roundabout at the Rivermont Street–Allan Drive/Marshall Road intersection is likely not feasible due to right-of-way constraints, existing bus stop locations, and the distance to adjacent intersection with Stable Drive to the east. As such, no feasible improvement is recommended for the Rivermont Street–Allan Drive/Marshall Road intersection to address the intersection LOS deficiency. However, it is recommended that the City periodically monitors the intersection's traffic operation performance. Installation of a traffic signal may be considered as an improvement at Rivermont Street–Allan Drive/Marshall Road if it is warranted in the future.

10.2 FUNDING SOURCES AND MECHANISMS

Where there is a funding mechanism (fee program) for the recommended improvements, payment into the fee program would be considered sufficient project obligation to alleviate project-related operational deficiencies. At study locations where the addition of project traffic creates an operational deficiency and there is no funding mechanism in place, the project will be responsible for the implementation of the improvement. At locations where the project adds to or creates a forecast deficiency and there is no funding mechanism in place, the project is responsible for its fair-share payment.

Table 10.E summarizes the recommended improvements and corresponding mechanism.

10.2.1 City of West Sacramento Traffic Impact Fees

The City's Traffic Impact Fee (TIF) program is intended to provide funding for the transportation improvements identified in City's transportation capital improvement program (CIP). The City updates its TIF program periodically to respond to changing conditions and to assure that traffic impact fees support the transportation improvements necessary to accommodate new developments.

The 2005 Traffic Impact Fee Study was prepared by DKS Associates to support the City's TIF program. Per the 2005 Traffic Impact Fee Study, Improvement No. 23 (Miscellaneous New Traffic Signals) was included in the CIP project list. Improvement No. 23 (Miscellaneous New Traffic Signals) proposes to install new traffic signals at existing and new intersections to accommodate cumulative growth within the City. The precise location of new signals was not identified in the 2005 Traffic Impact Fee Study and was proposed to be determined by actual conditions, traffic counts, and signal warrants. It should be noted that the City is currently in development of updating the TIF program.

As described above, installation of a traffic signal at Golden Gate Drive/Marshall Road is recommended as an improvement to address the LOS deficiency under cumulative conditions. As such, this recommended improvement is covered by the City's TIF program.

10.3 LIST OF CHAPTER 10.0 TABLES

- Table 10.A: Recommended Improvements at Study Intersections
- Table 10.B: Existing Plus Project with Recommended Improvements Intersection Levels of Service
- Table 10.C: Cumulative No Enterprise Crossing Plus Project with Recommended Improvements Intersection Levels of Service
- Table 10.D: Cumulative With Enterprise Crossing Plus Project with Recommended Improvements Intersection Levels of Service
- Table 10.E: Intersection Improvement Funding Mechanism and Fair Share

Table 10.A: Recommended Improvements at Study Intersections

Intersection	Jurisdiction	Existing Plus Project Improvements	Cumulative No Enterprise Crossing Plus Project Improvements	Cumulative With Enterprise Crossing Plus Project Improvements
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	---	Install a signal.	Install a signal.
7 . Rivermont Street–Allan Drive/Marshall Road	City of West Sacramento	Convert to All-Way Stop Controlled.	No feasible improvement.	No feasible improvement.

LSA

Table 10.B: Existing Plus Project with Recommended Improvements Intersection Levels of Service

Intersection	Jurisdiction	LOS Standard	Plus Project Without Improvement[1]					Plus Project With Improvement[1]				
				AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour	
			Control	Delay (sec.)	LOS	Delay (sec.)	LOS	Control	Delay (sec.)	LOS	Delay (sec.)	LOS
7 . Rivermont Street–Allan Drive/Marshall Road	City of West Sacramento	C	TWSC	7.3 (87.5 SB)	**A (F)** *	1.6 (11.7 SB)	A (B)	AWSC	13.9	B	11.5	B

Notes:

AWSC = All-Way Stop Control; TWSC = Two-Way Stop Control; LOS = Level of Service

Delay = Average control delay in seconds (For TWSC intersections, both overall average and worst-case movement delays are reported). Worst-case movement delay is included in parentheses.

* Exceeds LOS Standard

[1] LOS results were obtained from the *Marshall & Higgins Public Safety and Traffic Calming Project Memorandum* (City of West Sacramento, January 29, 2024)

LSA

Table 10.C: Cumulative No Enterprise Crossing Plus Project with Recommended Improvements Intersection Levels of Service

Intersection	Jurisdiction	LOS Standard	Plus Project Without Improvement					Plus Project With Improvement				
				AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour	
			Control	Delay (sec.)	LOS	Delay (sec.)	LOS	Control	Delay (sec.)	LOS	Delay (sec.)	LOS
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	C	AWSC	34.8	D *	47.6	E *	Signal	11.9	B	10.6	B

Notes:

AWSC = All-Way Stop Control; LOS = Level of Service

Delay = Average control delay in seconds.

* Exceeds LOS Standard

LSA

Table 10.D: Cumulative With Enterprise Crossing Plus Project with Recommended Improvements Intersection Levels of Service

Intersection	Jurisdiction	LOS Standard	Plus Project Without Improvement						Plus Project With Improvement				
				AM Peak Hour		PM Peak Hour				AM Peak Hour		PM Peak Hour	
			Control	Delay (sec.)	LOS	Delay (sec.)	LOS		Control	Delay (sec.)	LOS	Delay (sec.)	LOS
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	C	AWSC	35.2	E	* 29.8	D	*	Signal	17.2	B	12.5	B

Notes:

AWSC = All-Way Stop Control; LOS = Level of Service

Delay = Average control delay in seconds.

* Exceeds LOS Standard

LSA

Table 10.E: Intersection Improvement Funding Mechanism and Fair Share

Intersection	Jurisdiction	Cumulative Conditions Recommended Improvements	Funding Mechanism	Additional Comments
5 . Golden Gate Drive/Marshall Road	City of West Sacramento	Install a signal.	City of West Sacramento Traffic Impact Fees	Per 2005 Traffic Impact Fee Study Update (Improvement #23. Miscellaneous New Traffic Signals), the City of West Sacramento plans to install new traffic signals at existing and new intersections throughout the City to accommodate the traffic growth. However, the precise location of new signals was not identified in the 2005 Traffic Impact Fee Study and was proposed to be determined by actual conditions, traffic counts, and signal warrants. It should be noted that the City of West Sacramento is currently in development of updating the Traffic Impact Fee program.

11.0 VEHICLE MILES TRAVELED ANALYSIS

On December 28, 2018, the California Office of Administrative Law cleared the revised CEQA guidelines for use. Among the changes to the guidelines was removal of vehicle delay and LOS from consideration under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project's effect on VMT.

The City is yet to adopt its own VMT Guidelines. Therefore, the VMT analysis was conducted in accordance with the OPR TA, which includes screening criteria, VMT analysis methodology, and recommended VMT impact thresholds.

11.1 METHODOLOGY

11.1.1 Project Screening Criteria

The OPR TA provides multiple screening criteria for land use projects. The project was compared with the screening criteria established in the "Screening Thresholds for Land Use Projects" section of the OPR TA to check if the project can be screened out. Majority of these criteria are also included in the City's *General Plan Mobility Element* (Mobility Implementation Program 14). Following is a brief description about the project in relation to these project screening criteria:

- **Low Trip Generator Screening:** Based on the OPR TA, projects generating less than 110 daily trips could be screened out from a detailed VMT analysis. As included in LLG study, discussed in Section 6.1 – 'Project Trip Generation' and summarized in previously referenced Table 6.A, the proposed project is estimated to generate 2,422 daily trips. Therefore, this VMT screening criteria does not apply to the proposed project.
- **Project Located in Low VMT Area**: Traditional residential or office projects can be screened out from a detailed VMT analysis if located in a low VMT area because new development would result in similar level of VMT. For this evaluation, the project location was examined in SACOG's Senate Bill (SB) 743 Regional VMT Project Screening Maps, as well as Figure M-2: Existing VMT per Capita, Household-Generated VMT from the City's *General Plan Mobility Element* to determine if the project is located within a low VMT area. For residential projects, the threshold is 85 percent less than the regional average. Based on SACOG's SB 743 Regional VMT Project Screening Map (residential VMT) and the City's General Plan Figure M-2, the proposed project is located in three hexagons. All three hexagons have an average residential VMT per Capita higher than 85 percent of the regional average. Therefore, this VMT screening criteria does not apply to the proposed project.
- **Transit Priority Area (TPA) Screening:** The proposed project was evaluated using the SACOG's SB 743 TPA map to determine whether it is within a transit priority area (TPA). The proposed project is not located within a TPA. Therefore, this VMT screening criteria does not apply to the proposed project.
- **Affordable Residential Development**: The proposed project is not an affordable housing project and is not proposing at least 50 percent of units to be deed-restricted low-income housing. Therefore, this VMT screening criteria does not apply to the proposed project.

- **Other Screening Criteria**: The proposed project could not be classified as local-serving retail/commercial uses, institutional/government uses, or public service uses. Therefore, this screening criteria do not apply to the project.

As shown above, the project could not be screened out from detailed VMT analysis. As such, pursuant to the OPR TA, a detailed VMT analysis was conducted to assess the project's VMT impact.

11.1.2 Threshold of Significance

As described above, the project is a residential project and cannot be screened out based on the project screening criteria identified in the OPR TA. Additionally, the project requires a GPA and ZC. Therefore, pursuant to the OPR TA, the project VMT per capita needs to be compared with the existing VMT per capita for the region. Based on the OPR TA, the significance threshold for a residential project is 85 percent less than the existing VMT per capita for the region. As confirmed and recommended by City staff, the SACOG region was considered as the applicable region for VMT analysis. The SACOG modeling area encompasses six counties; therefore, the majority of project-generated trips, with the exception of external trips that have one trip end outside the modeling area, are expected to remain within the SACOG modeling area. Throughout this chapter, the SACOG modeling area is referred to as the "SACOG region". It should be noted that VMT data using the City as the region was provided for information purposes only.

The numerical value of 19.33 as the City average VMT per capita and the numerical value of 20.50 as the SACOG regional average VMT per capita were obtained from the Enterprise Crossing model using base year (2024) no project model run. The Enterprise Crossing model is based on SACOG's SACSIM23 with refined TAZ and roadway inputs throughout the City. As such, the threshold of significance was determined to be 85 percent of the value of 20.50 (SACOG regional average), which equates to 17.43 (SACOG regional threshold).

11.1.3 Project Traffic Analysis Zone Update

The same Enterprise Crossing model that was used to develop the VMT threshold was also used for the project VMT analysis. To estimate project-generated VMT and the associated VMT metrics, project land uses must be isolated within the model. This is typically accomplished by assigning the project land uses to a separate TAZ. SACOG's SACSIM23 is an activity-based model (ABM) that simulates travel behavior at the individual person level. The model's land use inputs are represented at the parcel, household and person levels rather than at the TAZ level. Therefore, assigning project land uses to vacant parcels within the model enables the project's VMT to be isolated and evaluated separately from existing development. For residential projects, the project households can also be individually identified and tracked within the activity-based model, allowing project-generated trips and associated VMT to be isolated and analyzed directly.

Accordingly, the proposed dwelling units were incorporated into the model by allocating synthesized households to vacant parcels within the TAZ containing the project site. All relevant model inputs were updated to reflect the proposed project land uses before conducting the VMT analysis.

11.1.4 Model Run and Project VMT Estimation

A model run was conducted for the existing/base scenario with the updated inputs as described above. The outputs from this model run were used to calculate the project VMT per capita.

The VMT metric (VMT per capita) includes two components of VMT estimation, internal-internal (II) and internal-external/external-internal (IX/XI) VMT. II VMT is estimated for trips that have both origins and destinations within the modeling area whereas IX/XI VMT is estimated for trips that have one trip end (either origin or destination) inside the modeling area and the other trip end outside the modeling area. While II trips and VMT are estimated using the ABM's DaySim, IX/XI VMT is estimated separately given the modeling limitations.

Internal-external (IX) VMT is used to estimate VMT associated with residential land uses, while external-internal (XI) VMT is used for non-residential land uses. Estimating a project's IX/XI VMT requires two data sources: the Citywide travel demand model and the "Outside Region VMT Spreadsheet" from SACSIM.

The Enterprise Crossing model captures VMT between the project TAZ and the model's external stations or gateways. However, consistent with the OPR TA, VMT should not be truncated at the regional boundary and should instead reflect the full length of the trip.

To account for travel occurring outside the model region, the SACOG SACSIM23 model provides an "Outside Region VMT" spreadsheet that estimates the average trip length to a trip's destination beyond the regional boundary for trips originating in each TAZ. The number of external trips from the project TAZ, together with the average outside-region trip length, is used to estimate the portion of project VMT occurring outside the modeled region.

Total IX VMT for the project TAZ is calculated by combining (1) VMT from the project TAZ to the external gateway, as estimated by the travel demand model, and (2) VMT beyond the regional boundary to the trip destination, as estimated using the "Outside Region VMT" spreadsheet.

The project's II VMT from the Enterprise Crossing model and the project's IX VMT from the above methodology were aggregated to estimate the total project VMT. The project's VMT per capita was estimated by dividing the total project VMT by the total project population.

11.2 PROJECT VMT ANALYSIS

Table 11.A summarizes the region threshold and project VMT per capita. As shown in Table 11.A, the project VMT per capita is 20.88, which is higher than the SACOG regional threshold. The project VMT per capita (20.88) is 19.79 percent higher than the SACOG regional threshold (17.43). Therefore, based on the OPR TA, the project will have a significant VMT impact.

Detailed VMT calculation for the project is included in Appendix G.

11.3 VMT REDUCTION MEASURES – PROJECT DESIGN FEATURES AND MITIGATION MEASURES

When a lead agency identifies a significant CEQA impact, the agency must identify feasible mitigation measures to avoid or substantially reduce that impact. These measures can be incorporated as part of plans, policies, regulations, or project designs. Project design features that encourage mode shift from automobiles to transit or non-motorized modes can therefore help reduce project VMT. Typically, VMT reduction and benefits from these project design features are not accounted for in the project VMT calculations conducted using the regional travel demand model. Therefore, the VMT reduction credit will account for these design features, similar to VMT mitigation measures to help reduce or eliminate the project's VMT impact. Enforcement of mitigation measures will be subject to the mitigation monitoring requirements under CEQA, as well as the regular police powers of the lead agency.

Evaluation of VMT reductions should use state-of-the-practice methodologies, recognizing that many of the VMT mitigation strategies/project design features are dependent on resident performance over time. The following is a detailed description of both project design features and the corresponding potential reduction that could be achieved with implementation of these measures.

11.3.1 Project Design Features

As per information provided under the project description, the project intends to implement project design features that will help reduce project VMT. As previously mentioned, the City's *General Plan Mobility Element* (Mobility Implementation Program 14) indicates that the City shall develop and implement a VMT Reduction Program that includes VMT-reduction strategies. However, the City's VMT Reduction Program was not yet available at the time this TS was prepared. Therefore, the proposed project design features were evaluated using the 2024 California Air Pollution Control Officers Association (CAPCOA) *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity – Designed for Local Governments, Communities, and Project Developers* (CAPCOA Handbook) as described below.

Provide Pedestrian Network Improvement

The project proposes to add new pedestrian paths/sidewalks both internal to the project site and long the project frontage (a total of 4.96 miles). The integration of sidewalks and pedestrian paths within the project to the external pedestrian facilities around the project can allow for connection with the surrounding community for easy access without vehicular dependency and enhancing the city's active transportation network. CAPCOA Handbook measure **"T-18. Provide Pedestrian Network Improvement"** can be used to quantify VMT reduction. Based on the data compiled in Table 11.B, this measure is anticipated to reduce the project's VMT by 0.45 percent.

Traffic Calming Measure

This measure would encourage walking and bicycling instead of using a vehicle through the implementation of pedestrian and bicycle safety and traffic calming measures. Traffic calming would reduce motor vehicle speeds through features such as marked crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, count-down signal timers, curb

extensions, speed tables, raised crosswalks, on-street parking, planter strips with street trees, chicanes/chokers, and similar improvements. The project proposes to develop a safe and integrated active transportation network by adding sidewalks and installing a roundabout at Otis Avenue/Marshall Road and an internal roundabout within the project site. This measure is in the CAPCOA Handbook as **"Measure T-35 Provide Traffic Calming Measures"**, which is considered as a supporting, non-quantified measure. While implementation of this measure would potentially help in some reduction in project VMT, due to the non-quantifiable nature of this measure as specified in the CAPCOA Handbook, no VMT reduction has been attributed to this project design feature.

11.3.2 Proposed Vehicle Miles Traveled Mitigation

In addition to the project design features, following VMT mitigation measures could be implemented by the project to reduce the VMT impact:

Implement Subsidized or Discounted Transit Program

The project can provide subsidized or discounted, or free transit passes for residents. As such, to encourage use of transit and reduce the VMT/capita of the project, the project shall implement a subsidized transit pass program. This measure would encourage the use of transit by reducing the cost for choosing transit, thereby reducing VMT and greenhouse gas (GHG) emissions. CAPCOA Handbook transportation measure **"T-9. Implement Subsidized or Discounted Transit Program"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Provide Community-Based Travel Planning

The project can target residences in the project community with community-based travel planning. This measure offers a residential-based approach to outreach and provide households with customized information, incentive, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing VMT and GHG emissions. CAPCOA Handbook transportation measure **"T-23. Provide Community-Based Travel Planning"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Implement Conventional Carshare Program

This measure expands community carshare access through the deployment of traditional carshare vehicles. Offering convenient access to cars for daily needs promotes alternative transportation and reduces individual vehicle ownership, which directly decreases VMT and mitigates associated GHG emissions. CAPCOA Handbook transportation measure **"T-21-A. Implement Conventional Carshare Program"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Implement Electric Carshare Program

This measure expands community carshare access by deploying electric vehicles, providing a convenient option for personal and commuting needs. This reduces private car ownership, lowers VMT, and cuts GHG emissions by shifting drivers from gas-powered to cleaner electric cars. CAPCOA Handbook transportation measure **"T-21-B. Implement Electric Carshare Program"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Implement Pedal (Non-Electric) Bikeshare Program

This measure establishes a bikeshare program, providing on-demand access to bicycles for short-term use. By facilitating a shift from driving to cycling, the program reduces VMT and lowers overall GHG emissions. CAPCOA Handbook transportation measure **"T-22-A. Implement Pedal (Non-Electric) Bikeshare Program"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Implement Electric Bikeshare Program

This measure establishes an electric bikeshare program, providing on-demand access to electric pedal assist bikes for short-term rentals. By facilitating a shift from driving to electric bicycles, the program reduces VMT and lowers overall GHG emissions. CAPCOA Handbook transportation measure **"T-22-B. Implement Electric Bikeshare Program"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Establish a School Bus Program

This measure establishes or expands a school bus program. Offering school bus service provides a practical way to transport students to school, which would reduce GHG emissions by replacing vehicle trips when there is high enough ridership. CAPCOA Handbook transportation measure **"T-40. Establish a School Bus Program"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Implement Active Modes of Transportation for Youth

This measure includes a variety of active transportation efforts that assist youth in their commute to school. This includes infrastructure improvements such as new sidewalks, bike lanes, off-street pathways, and street crossings. CAPCOA Handbook transportation measure **"T-56. Active Modes of Transportation for Youth"** can be used to quantify VMT reduction. While implementation of this measure may potentially help in some reduction in project VMT, due to lack of substantial data no VMT reduction has been attributed to this mitigation measure.

Table 11.B provides methodology, assumptions, and parameters used in the estimation/calculation of VMT reduction for the project along with the potential amount of VMT reduction that can be achieved.

11.4 VMT IMPACT

In conclusion, VMT mitigation measures/project design features and strategies aim to promote overall mobility with the goal of reducing VMT and GHG emissions. As indicated previously, the above project design features and VMT mitigation measures have the potential to reduce the project's VMT by approximately 0.45 percent. The above-listed VMT reduction measures demonstrate the project's best-faith effort to reduce its VMT impact. However, the project VMT per capita (20.88) is 19.79 percent higher than the SACOG regional threshold (17.43). Since the VMT reduction measures can only achieve an approximately 0.45 percent reduction, and given the uncertainty of the effectiveness of the above-listed VMT reduction measures, the project will continue to have a significant transportation impact under CEQA. If implemented, these measures and strategies may need to be monitored for their usage and effectiveness.

11.5 LIST OF CHAPTER 11.0 TABLES

- Table 11.A: Existing Threshold and Project VMT per Capita
- Table 11.B: Calculated VMT Reduction

Table 11.A: Existing Threshold and Project VMT per Capita

VMT Analysis Scenario	VMT per Capita
	SACOG Regional
VMT Threshold[1]	17.43
Project VMT Rate[2]	20.88
Difference	3.45
Percentage Difference	19.79%
Above or Below VMT Threshold	**Above**
Significant Impact?	**Yes**

Source: The Enterprise Crossing model base year (2024) model run.
[1] Threshold is calculated as 85 % of the baseline average. The SACOG regional baseline average was calculated from the Enterprise Crossing model base year (2024) no project model run.
SACOG Regional Threshold: 20.50 * 0.85 = 17.43
[2]Obtained from the Enterprise Crossing model base year (2024) plus project model run.
SACOG = Sacramento Area Council of Governments
VMT = vehicle miles traveled

Table 11.B: Calculated VMT Reduction

Mitigation Measure	Formula	Comments	Calculated Reduction in VMT (%)
Proposed Project Design Feature			
T-18. Provide Pedestrian Network Improvement	$A = \left(\frac{C}{B} - 1\right) \times D$ • B = Existing sidewalk length in study area, 55.25 (miles) • C = Sidewalk length in study area with measure, 60.21 (miles) • D = Elasticity of household VMT with respect to the ratio of sidewalks-to-streets (-0.05)	Per CAPCOA Handbook, the recommended study area is 0.6 mile around the project site, which represents 6-to-10-minute walking distance. The project proposes adding approximately another 4.96 miles of sidewalk/pedestrian access.	Estimated 0.45% reduction in VMT
T-35. Provide Traffic Calming Measures		This is a supporting, non-quantified measure.	
Proposed VMT Mitigation			
T-9. Implement Subsidized or Discounted Transit Program	$A = \frac{C}{B} \times G \times D \times E \times F \times H \times I$ • B = Average transit fare without subsidy ($) • C = Subsidy amount ($) • D= Percent of employees eligible for subsidy (0–100%) • E = Percent of project-generated VMT from employees (0–100%) • F = Transit mode share of all trips or work trips (2.90% from T-3.1) • G = Elasticity of transit boardings with respect to transit fare price (-0.43) • H = Percent of transit trips that would otherwise be made in a vehicle (50%) • I = Conversion factor of vehicle trips to VMT (1.0)	The project is within 0.5 mile of Local Bus Route 37.	Up to 5.5% (Reduction not applied due to lack of adequate data)
T-21-A. Implement Conventional Carshare Program	$A = \frac{B \times (E - D)}{C}$ • B = Number of vehicles deployed in plan/community • C = VMT in plan/community without measure (VMT per day) • D = Conventional VMT avoided with measure (68.2 VMT per day per vehicle) • E = Conventional VMT added with measure (24.4 VMT per day per vehicle)		Up to 0.15% (Reduction not applied due to lack of adequate data)

Table 11.B: Calculated VMT Reduction

Mitigation Measure	Formula	Comments	Calculated Reduction in VMT (%)
T-21-B. Implement Electric Carshare Program	$A = -1 \times \frac{B \times (E \times G \times H \times I \times J) - (D \times F))}{C \times F}$ • B = Number of electric vehicles deployed in plan/community • C = VMT in plan/community without measure (VMT per day) • D = Conventional VMT avoided with measure (54.8 VMT per day per electric vehicle) • E = Electric VMT added with measure (13.7 VMT per day per electric vehicle) • F = Emission factor of non-electric light duty fleet mix (307.5 g CO_{2e} per mile) • G = Energy efficiency of carshare electric vehicle (0.327 kWh per mile) • H = Carbon intensity of local electricity provider (from Tables E-4.3 and E-4.4) • I = Conversion from lb to g (454 g per lb) • J = Conversion from kWh to MWh (0.001 MWh per kWh)		Up to 0.18% (Reduction not applied due to lack of adequate data)
T-22-A. Implement Pedal (Non-Electric) Bikeshare Program	$A = -1 \times \frac{(C - B) \times D \times E \times F}{G \times H}$ • B = Percent of residences in plan/community with access to bikeshare system without measure (0–100%) • C = Percent of residences in plan/community with access to bikeshare system with measure (0–100%) • D = Daily bikeshare trips per person (0.021 trips per day per person) • E = Vehicle to bikeshare substitution rate (19.6%) • F = Bikeshare average one-way trip length (1.4 miles per trip) • G = Daily vehicle trips per person (2.7 trips per day per person) • H = Regional average one-way vehicle trip length (from Table T-10.1)		Up to 0.02% (Reduction not applied due to lack of adequate data)

Table 11.B: Calculated VMT Reduction

Mitigation Measure	Formula	Comments	Calculated Reduction in VMT (%)
T-22-B. Implement Electric Bikeshare Program	$A = -1 \times \frac{(C - B) \times D \times E \times F}{G \times H}$ • B = Percent of residences in plan/community with access to electric bikeshare system without measure (0–100%) • C = Percent of residences in plan/community with access to electric bikeshare system with measure (0–100%) • D = Daily electric bikeshare trips per person (0.021 trips per day per person) • E = Vehicle to electric bikeshare substitution rate (35%) • F = Electric bikeshare average one-way trip length (2.1 miles per trip) • G = Daily vehicle trips per person (2.7 trips per day per person) • H = Regional average one-way vehicle trip length (from Table T-10.1)		Up to 0.06% (Reduction not applied due to lack of adequate data)
T-23. Provide Community-Based Travel Planning	$A = \frac{C}{B} \times D \times -E \times F$ • B = Residences in plan/community (residences) • C = Residences in plan/community targeted with CBTP (residences) • D= Percent of targeted residences that participate (19%) • E = Percent vehicle trip reduction by participating residences (12%) • F = Adjustment factor from vehicle trips to VMT (1)		Up to 2.3% (Reduction not applied due to lack of adequate data)

Table 11.B: Calculated VMT Reduction

Mitigation Measure	Formula	Comments	Calculated Reduction in VMT (%)
T-40. Establish a School Bus Program	$A = -\frac{B \times C \times D \times (\frac{H}{E} - \frac{G \times I}{F})}{\frac{H}{E}}$ • B = Percent of students across the school who begin riding the bus as a result of the program (0–100%) • C = Percent of students served by bus system (regardless of whether they ride) (0–100%) • D = Percent of new bus riders who drove or were driven beforehand (79%) • E = Average student occupancy of cars driving to school (1.58 students/car) • F = Average student occupancy of school buses (from Table T-40.1) • G = Adjustment for ratio of bus touring distance to driving distance (3.42) • H = Light-duty emission factor (from Table T-30.2) • I = School bus emission factor (from Table T-40.2)		Up to 57% (Reduction not applied due to lack of adequate data)
T-56. Active Modes of Transportation for Youth	$A = C \times F \times \frac{B - D}{G \times E \times (1 - C) + C \times D \times F}$ • B = Known or estimated percent of students within 2 miles who are driven to school after project implementation (0–100%) • C = Percent of students living within 2 miles of the school (62%) • D = Percent of students within 2 miles who are driven to school before measure implementation (51%) • E = Percent of students more than 2 miles who are driven to school (66%) • F = Average driving distance for students who could walk or bike to school (2 miles) • G = Average driving distance for students who cannot walk or bike to school (> 2 miles) (5.66 miles)		Up to 22.2% (Reduction not applied due to lack of adequate data)
		Total VMT Reduction Required[1]	0.45%

Source: California Air Pollution Control Officers Association (CAPCOA). 2024. *Handbook for Analyzing Greenhouse Gas Emission Reduction, Assessing Climate Vulnerabilities, and Advancing Health and Equity, California Air Pollution Control Officers Association*. October.

Note: Number of mitigation measure corresponds to the CAPCOA Handbook.

[1] Per CAPCOA, total VMT reduction for multiple strategies within same subsector is calculated using the equation: 1-(1-A)*(1-B)*(1-C)... where A, B, C are equal to individual mitigation strategy reduction percentages.

VMT = vehicle miles traveled

12.0 SUMMARY AND CONCLUSIONS

The proposed project is located at 3425 Marshall Road. The project site is approximately 60 acres and currently undeveloped. It is bounded to the north by Marshall Road, to the east by Otis Avenue and a mix of residential and agricultural uses, to the south by single-family residential uses, and to the west by an existing retention pond that is part of the Bridgeway Lakes Community Park and the Bridgeway Lakes residential development.

The proposed project involves the development of 259 single-family dwelling units. It will require a GPA to the City's existing General Plan and an amendment to the Southport Framework Plan to change the General Plan and Framework Plan designations from RE to LR, as well as a Zoning Map/Code amendment from RE to R-1-A. The proposed project is anticipated to generate 2,422 daily trips, with 178 trips occurring in the a.m. peak hour and 244 trips occurring in the p.m. peak hour.

12.1 EXISTING CONDITIONS SUMMARY

With implementation of recommended improvements, all study intersections operate at satisfactory LOS under existing conditions.

12.2 CUMULATIVE NO ENTERPRISE CROSSING CONDITIONS SUMMARY

With implementation of recommended improvements, all study intersections operate at satisfactory LOS under cumulative no Enterprise Crossing conditions, except for the following study area intersection:

7. Rivermont Street-Allan Drive/Marshall Road

A traffic signal is not warranted at Rivermont Street–Allan Drive/Marshall Road under cumulative no Enterprise Crossing conditions. In addition, the City's Safety Memo states that installation of a roundabout at Rivermont Street–Allan Drive/Marshall Road is likely not feasible due to right-of-way constraints, existing bus stop locations, and the distance to adjacent intersection with Stable Drive to the east. As such, no feasible improvement is recommended for Rivermont Street–Allan Drive/Marshall Road to address the intersection LOS deficiency. However, it is recommended that the City periodically monitors the intersection's traffic operation performance. Installation of a traffic signal may be considered as an improvement at Rivermont Street–Allan Drive/Marshall Road if it is warranted in the future.

12.3 CUMULATIVE WITH ENTERPRISE CROSSING CONDITIONS SUMMARY

With implementation of recommended improvements, all study intersections operate at satisfactory LOS under cumulative with Enterprise Crossing conditions, except for the following study area intersection:

7. Rivermont Street-Allan Drive/Marshall Road

A traffic signal is not warranted at Rivermont Street–Allan Drive/Marshall Road under cumulative with Enterprise Crossing conditions. In addition, the City's Safety Memo states that installation of a

roundabout at Rivermont Street–Allan Drive/Marshall Road is likely not feasible due to right-of-way constraints, existing bus stop locations, and the distance to adjacent intersection with Stable Drive to the east. As such, no feasible improvement is recommended for Rivermont Street–Allan Drive/Marshall Road to address the intersection LOS deficiency. However, it is recommended that the City periodically monitors the intersection's traffic operation performance. Installation of a traffic signal may be considered as an improvement at Rivermont Street–Allan Drive/Marshall Road if it is warranted in the future.

12.4 IMPROVEMENTS SUMMARY

Improvements were recommended at study locations where traffic operations were forecasted to have failed to meet LOS standards as described in the City's General Plan. As such, a traffic signal was recommended at the Golden Gate Drive/Marshall Road intersection. With implementation of the recommended improvement, Golden Gate Drive/Marshall Road is forecast to operate at a satisfactory LOS under both cumulative no Enterprise Crossing plus project and cumulative with Enterprise Crossing plus project conditions. A traffic signal may be considered as an improvement at the Rivermont Street–Allan Drive/Marshall Road intersection in the future when a traffic signal is warranted. The recommended circulation improvement is covered by the City's TIF program and, therefore, the project does not need to pay its fair share.

12.5 VEHICLE MILES TRAVELED SUMMARY

The project could not be screened out and a detailed VMT analysis using the Enterprise Crossing model was conducted for the project. The project VMT per capita (20.88) is 19.79 percent higher than the SACOG regional threshold (17.43). Therefore, the project would have a significant VMT impact. Project design features and additional mitigation measures are estimated to reduce project VMT by 0.45 percent. However, since these project design features and mitigation measures cannot bring the project down to less than significant, and given the uncertainty of actual VMT reduction from these project design features and VMT mitigation measures, the project will have a significant VMT impact.

APPENDIX A

3425 MARSHALL ROAD RESIDENTIAL PROJECT TRANSPORTATION STUDY

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TRANSPORTATION STUDY

3425 MARSHALL ROAD RESIDENTIAL

City of West Sacramento, California
April 02, 2025

LLG Ref. 3-24-3921

Prepared by:
Erika Carino, PE, RSP
Transportation Engineer III

Under the Supervision of:
K.C Yellapu, PE, TE, PTOE
Principal

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APPENDIX

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I. CAPCOA VMT Calculation Worksheet

TRANSPORTATION STUDY

3425 MARSHALL ROAD RESIDENTIAL

City of West Sacramento, California
April 02, 2025

1.0 INTRODUCTION

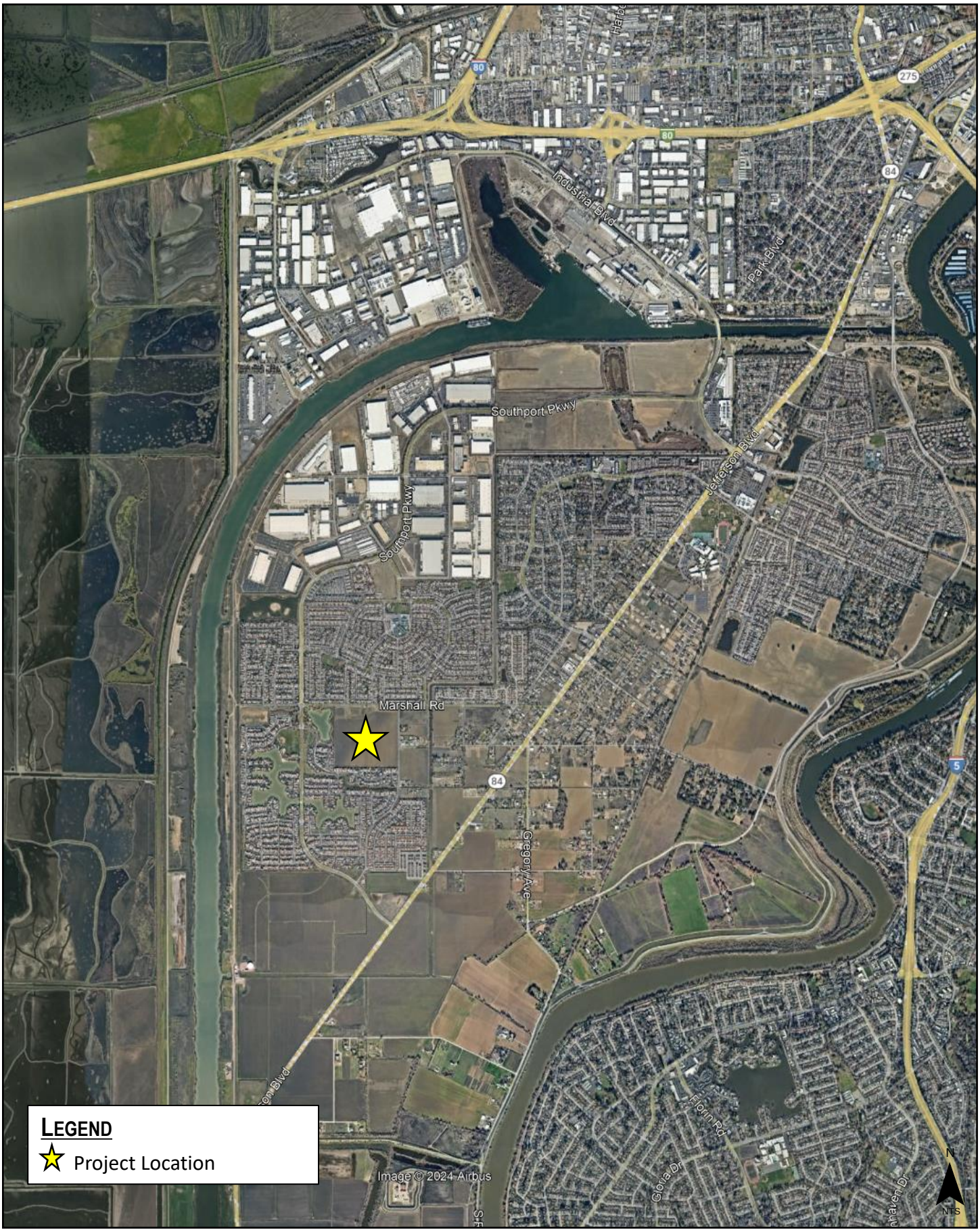
Linscott, Law & Greenspan, Engineers (LLG) has prepared this transportation study for 3425 Marshall Road Residential (herein referred to as the Project) located in the City of West Sacramento. ***Figure 1–1*** shows the Project area map. Included in this report are the following:

- Existing Conditions
- Analysis Approach and Methodology
- Intersection Analysis of Existing Conditions
- Trip Generation/Distribution/Assignment
- Intersection Analysis of Existing+Project Conditions
- Operational Impact Assessment
- Vehicle Miles Traveled Assessment
- Conclusion

1.1 Project Description

The Project proposes the development of 259 single-family dwelling units located at 3425 Marshall Road, which is currently a vacant site to the southeast of the Marshall Road/Otis Avenue intersection.

Access to the site is proposed via four (4) full-access driveways – two (2) located off Marshall Road and two (2) located off Otis Avenue. ***Figure 1–2*** shows the conceptual site plan.

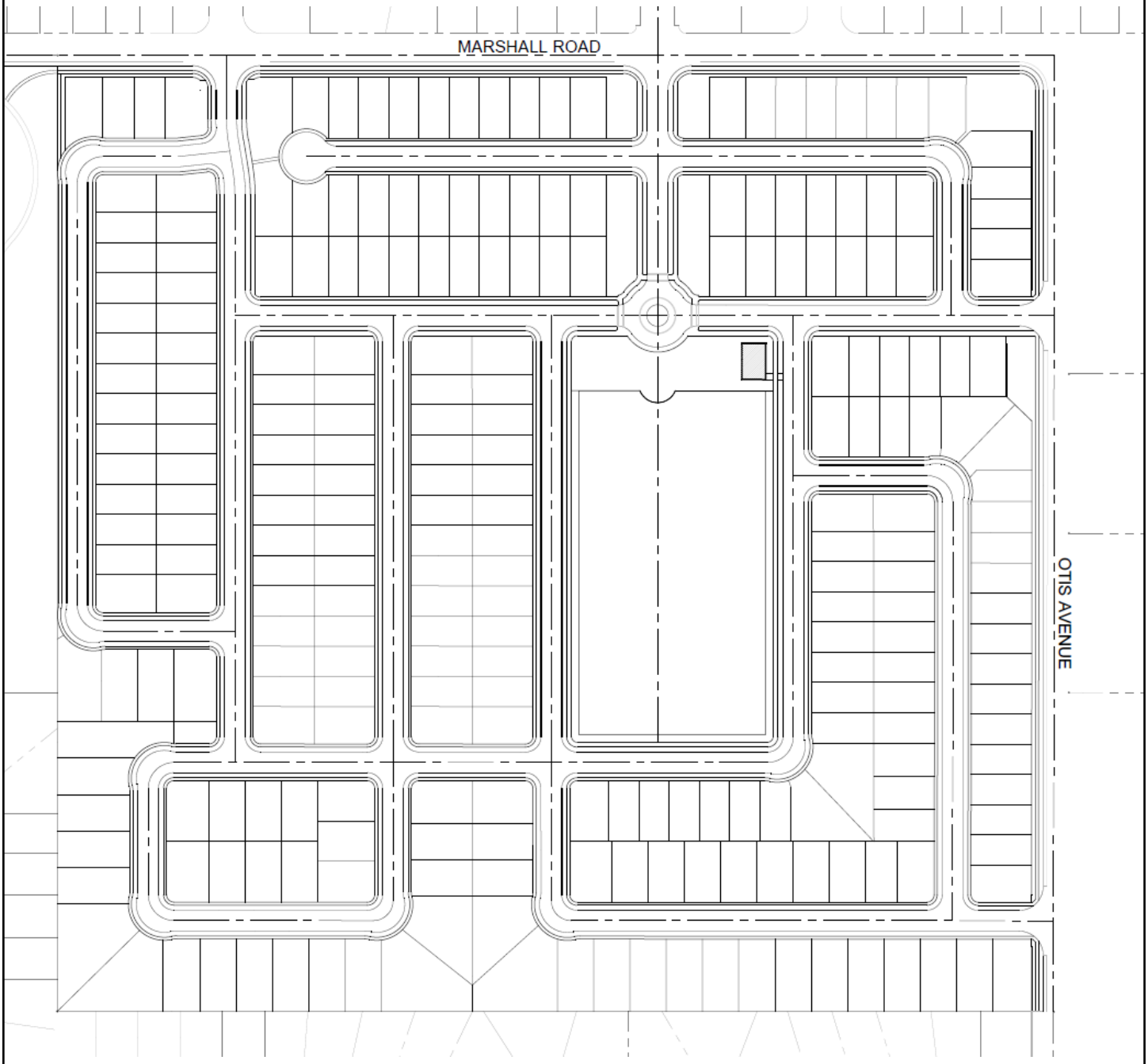


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Figure 1-1

Project Area

MARSHALL ROAD RESIDENTIAL



N

NTS

Source: The HLA Group Landscape Architects & Planners, Inc. (10/17/2024)

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Figure 1-2

Conceptual Site Plan

MARSHALL ROAD RESIDENTIAL

2.0 EXISTING CONDITIONS

Effective evaluation of the traffic effects associated with the proposed Project requires an understanding of the existing transportation system within the area. ***Figure 2–1*** shows an existing conditions diagram, which includes intersection controls and lane configurations for the following study area intersections:

1. Southport Parkway/Marshall Road
2. Marshall Road/Martinique Street/Project Driveway #1
3. Marshall Road/Jamaica Street/Project Driveway #2
4. Marshall Road/Guadalupe Street
5. Marshall Road/Otis Avenue
6. Marshall Road/Golden Gate Drive
7. Jefferson Boulevard/Marshall Road
8. Otis Avenue/Project Driveway #3
9. Otis Avenue/Project Driveway #4

2.1 Existing Street Network

The following is a brief description of the existing street network in the area.

Marshall Road is functionally classified as a collector in the *City of West Sacramento General Plan – Mobility Element.* It is currently constructed as a two-lane undivided roadway. The posted speed limit is 35 MPH. On-street parking is not permitted along the street segment.

Southport Parkway is functionally classified as a major arterial in the *City of West Sacramento General Plan – Mobility Element*. Southport Parkway is currently constructed as a two-lane divided roadway with intermittent left-turn lanes and opens northerly to a four-lane divided roadway with intermittent left-turn lanes. The posted speed limit ranges from 35 to 45 MPH. On-street parking is not permitted along the street segment.

Jefferson Boulevard is functionally classified as a major arterial from Southport Parkway to Davis Road and as a minor arterial from Davis Road to Linden Road in the *City of West Sacramento General Plan – Mobility Element.* It is currently constructed as a two-lane undivided roadway with intermittent left turn lanes. The posted speed limit is 45 MPH. On-street parking is not permitted along the street segment.

2.2 Existing Bicycle Network

Currently, there is a Class II bicycle facility (i.e., bike lanes) along Marshall Road, Southport Parkway, Otis Avenue, and Golden Gate Drive. No other bicycle facilities are provided along the street segments within the study area.

2.3 Existing Pedestrian Conditions

Continuous sidewalks are provided along the north side of Marshall Road, on both sides of Southport Parkway, Otis Avenue, and Golden Gate Drive in the study area.

Currently, sidewalks are missing along the following locations in the vicinity of the Project:

- South side of Marshal Road from the west terminus of the road to Jefferson Boulevard
- Both sides of Otis Avenue, from Marshall Road to Bridgeway Lakes Drive

2.4 Existing Transit Conditions

The study area is serviced by the Yolo Transportation District via bus. Local Bus Route 37 provides bus service to the area via Marshall Road, Southport Parkway, and Jefferson Boulevard in a clockwise directional route. As of March 2023, the following bus stops are provided along Marshall Road:

- Northwest corner of the Marshall Road / Rivermont Street / Allan Drive intersection (Timepoint-Scheduled Stop)
- Northwest corner of Marshall Road / Seymour Avenue intersection
- Northeast corner of Marshall Road / Southport Parkway

There is no transit service south of Southport Parkway and south of Jefferson Boulevard.

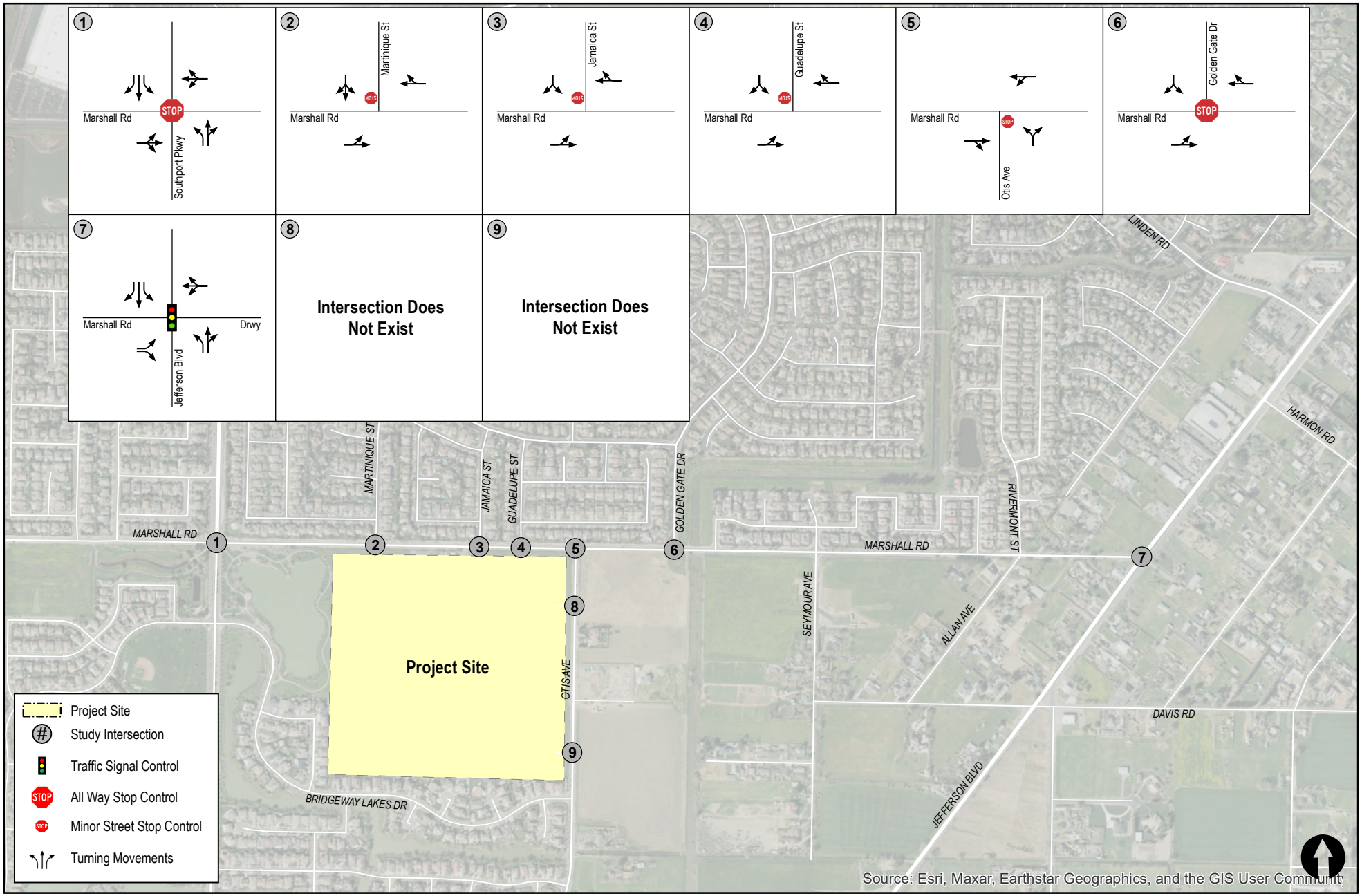
2.5 Existing Traffic Volumes

Weekday AM and PM peak period intersection turning movement counts were conducted on May 21, 2024, while schools in the vicinity were in session. The intersection counts were used to analyze the peak AM and PM hours between 7:00-9:00 AM and 4:00-6:00 PM, respectively. Based on vehicular classification counts conducted on October 2, 2024, the heavy vehicle percentage is calculated to be 2.4%. ***Table 2–1*** below summarizes the peak hours and peak hour factors at the study intersections based on the traffic counts.

TABLE 2–1
INTERSECTION PEAK HOURS

Intersection	Peak Hour	Time	Peak Hour Factor
1. Southport Pkwy / Marshall Rd	AM	7:30-8:30	0.82
	PM	4:45-5:45	0.87
2. Marshall Rd / Martinique St	AM	7:30-8:30	0.82
	PM	4:45-5:45	0.94
3. Marshall Rd / Jamaica St	AM	7:30-8:30	0.80
	PM	4:45-5:45	0.98
4. Marshall Rd / Guadalupe St	AM	7:30-8:30	0.90
	PM	4:45-5:45	0.92
5. Marshall Rd / Otis Ave	AM	7:30-8:30	0.90
	PM	4:45-5:45	0.93
6. Marshall Rd / Golden Gate Dr	AM	7:30-8:30	0.92
	PM	4:30-5:30	0.94
7. Jefferson Blvd / Marshall Rd	AM	7:30-8:30	0.97
	PM	4:30-5:30	0.95

Figure 2–2 shows the Existing Traffic Volumes. ***Appendix A*** contains the intersection turning movement counts sheet. ***Appendix B*** contains the vehicular classification survey.



N:\3921\Figures

Figure 2-1

Existing Conditions

Marshall Road Residential

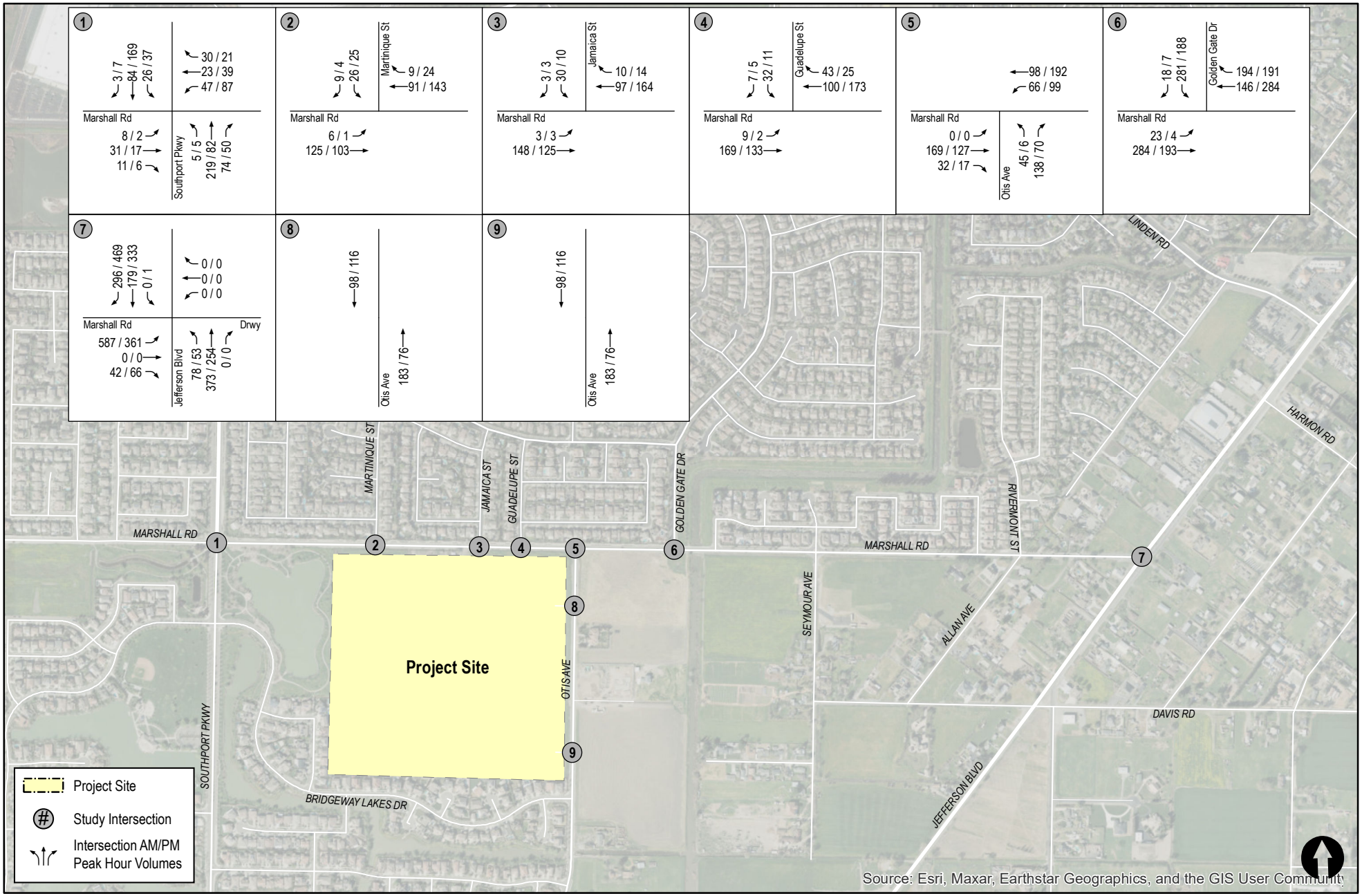


Figure 2-2

N:\3921\Figures

Existing Traffic Volumes

Marshall Road Residential

3.0 ANALYSIS APPROACH AND METHODOLOGY

3.1 Study Scenarios

The following scenarios were analyzed in this study:

- Existing
- Existing+Project

3.2 Intersection Analysis

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service designation is reported differently for signalized and unsignalized intersections.

Intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in the *Highway Capacity Manual,* 7th Edition (HCM 7), with the assistance of the *Synchro* (version 12) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection Level of Service (LOS).

A more detailed explanation of the methodology is attached in ***Appendix C***.

3.3 Policy Considerations

Below are the policies from the *City of West Sacramento General Plan Mobility Element* that are relevant to this transportation study:

Goal M-3.2 Automobile Level of Service

For planning purposes, the City shall endeavor to maintain a Level of Service "C" on all streets within the City, except at intersections and on roadway segments within one-quarter mile of a freeway interchange or bridge crossing of the Deep Water Ship Channel, barge canal, or Sacramento River, where a Level of Service "D" shall be deemed acceptable, and within pedestrian oriented, high-density, mixed-use areas, such as the Bridge District Specific Plan area, the Washington Specific Plan area, and West Capitol Avenue from Harbor Blvd. east, where a Level of Service "E" shall be deemed acceptable.

3.4 Thresholds of Significance

Section 15064.3 of the CEQA Guidelines states that a project's impact on automobile delay is no longer a criterion for determining significant transportation impacts. However, intersection level of service is still reported to assess the Project's consistency with Policy M-3.2 of the *City of West Sacramento General Plan 2035 Policy Document* pertaining to level of service goals.

With respect to non-auto travel modes and other relevant transportation elements per Appendix G of the State CEQA Guidelines, a significant impact would occur if the Project would:

- Disrupt or interfere with bicycle/pedestrian facilities
- Disrupt or interfere with transit facilities or services
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency access

4.0 INTERSECTION ANALYSIS OF EXISTING CONDITIONS

Table 4–1 summarizes the peak hour level of service operations for the Existing conditions. As seen in ***Table 4–1***, all intersections are calculated to currently operate at LOS C or better. ***Appendix D*** contains the Syncrho analysis worksheet.

TABLE 4–1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
1. Southport Pkwy / Marshall Rd	AWSC[c]	AM	11.7	B
		PM	10.0	A
2. Marshall Rd / Martinique St	OWSC[d]	AM	10.1	B
		PM	10.1	B
3. Marshall Rd / Jamaica St	OWSC	AM	10.6	B
		PM	10.1	B
4. Marshall Rd / Guadalupe St	OWSC	AM	10.6	B
		PM	10.3	B
5. Marshall Rd / Otis Ave	OWSC	AM	11.8	B
		PM	9.8	A
6. Marshall Rd / Golden Gate Dr	AWSC	AM	14.4	B
		PM	13.5	B
7. Jefferson Blvd / Marshall Rd	Signal	AM	25.0	C
		PM	19.2	B

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. AWSC – All-Way Stop-Controlled intersection.
d. OWSC – One-Way Stop-Controlled intersection. Worst-case movement delay is reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

5.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

5.1 Trip Generation

The Project proposes the development of 259 single-family detached units. The Project traffic generation was calculated using the fitted curve equations in the *Trip General Manual (11th Edition)*, published by the Institute of Transportation Engineers (ITE). Based on the land use type proposed by the Project, ITE Lane Use Code 210 for Single-Family Detached Housing was utilized.

Table 5–1 tabulates the total Project traffic generation. The Project is calculated to generate approximately 2,422 ADT with 46 inbound / 132 outbound trips during the AM peak hour and 154 inbound / 90 outbound trips during the PM peak hour.

It should be noted that the Yolo Transportation District services the study area via Bus Route 37. A transit reduction could be applied to account for this mode split since, for this area, approximately 2.25% of people utilize the bus as a means of transportation (Source: 2022 American Community Survey from the U.S. Census Bureau for Census Tract 104.02). However, to be conservative, a transit trip reduction was not applied.

TABLE 5–1
PROJECT TRIP GENERATION

Land Use (ITE[a] Code)	Size	Total Daily Trip End Volume (ADT[b])	AM Peak Hour Volume			PM Peak Hour Volume		
			In	Out	Total	In	Out	Total
Single-Family Detached Housing (210)	259 DU[c]	2,422	46	132	178	154	90	244

General Notes:
- Total volumes are calculated using the fitted curve equation from ITE's *Trip General Manual (11th Edition)*, published by the Institute of Transportation Engineers (ITE).

Footnotes:
a. Institute of Transportation Engineers
b. ADT = Average Daily Traffic
c. DU = Dwelling Units

5.2 Trip Distribution/Assignment

The traffic generated by the proposed Project was distributed and assigned based on existing traffic patterns, the site accesses, and the Project's location relative to local arterials and freeways. ***Figure 5–1*** shows the project traffic distribution. ***Figure 5–2*** shows the project traffic volumes. ***Figure 5–3*** shows the Existing+Project traffic volumes.



Figure 5-1

Project Traffic Distribution

Marshall Road Residential

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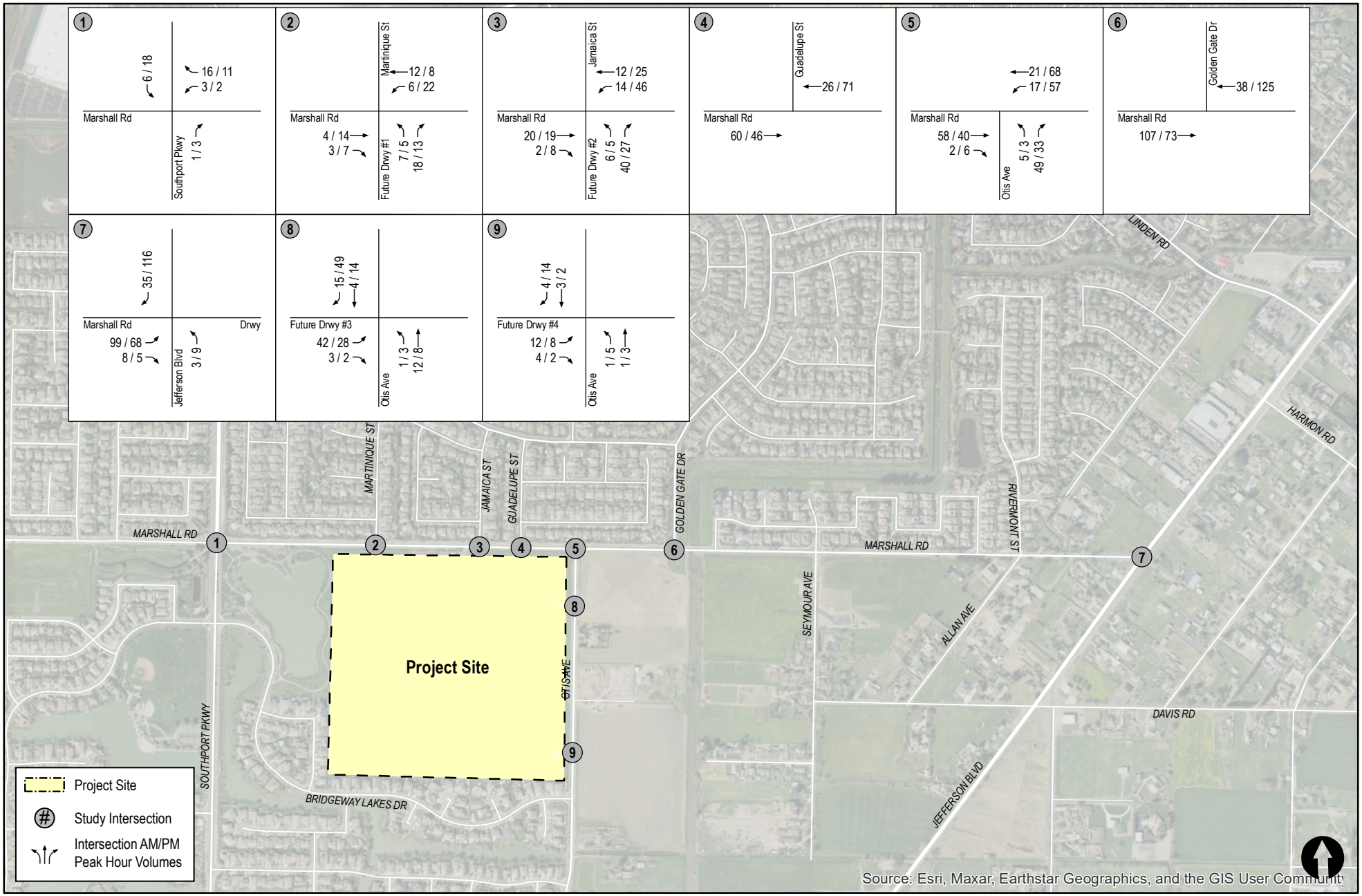


Figure 5-2

Project Traffic Volumes

Marshall Road Residential

N:\3921\Figures

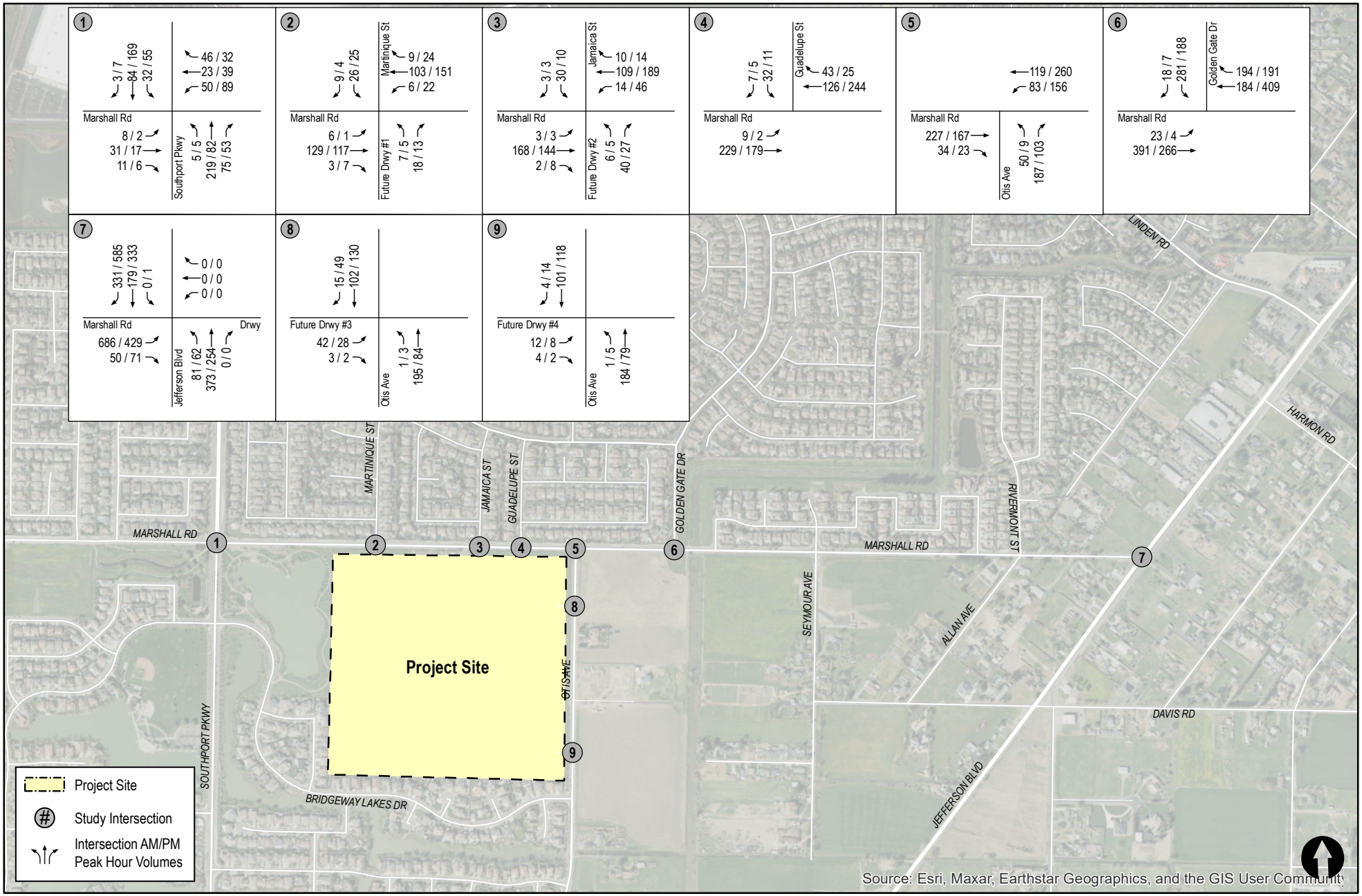


Figure 5-3

N:\3921\Figures

Existing + Project Traffic Volumes

Marshall Road Residential

6.0 INTERSECTION ANALYSIS OF EXISTING+PROJECT CONDITIONS

Table 6–1 summarizes the peak hour level of service operations for the Existing+Project conditions. As seen in ***Table 6–1***, with the addition of Project traffic, all of the study intersections are calculated to continue to operate at LOS C or better. ***Appendix E*** contains the Syncrho analysis worksheet.

TABLE 6–1
EXISTING+PROJECT INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + Project	
			Delay[a]	LOS[b]	Delay	LOS
1. Southport Pkwy / Marshall Rd	AWSC[c]	AM	11.7	B	12.1	B
		PM	10.0	A	10.2	B
2. Marshall Rd / Martinique St / Project Drwy 1	TWSC[d]	AM	10.1	B	10.7	B
		PM	10.1	B	11.2	B
3. Marshall Rd / Jamaica St / Project Drwy 2	TWSC	AM	10.6	B	12.1	B
		PM	10.1	B	11.9	B
4. Marshall Rd / Guadalupe St	OWSC[e]	AM	10.6	B	11.4	B
		PM	10.3	B	11.2	B
5. Marshall Rd / Otis Ave	OWSC	AM	11.8	B	14.0	B
		PM	9.8	A	10.8	B
6. Marshall Rd / Golden Gate Dr	AWSC	AM	14.4	B	18.8	C
		PM	13.5	B	22.7	C
7. Jefferson Blvd / Marshall Rd	Signal	AM	25.0	C	33.6	C
		PM	19.2	B	30.4	C
8. Otis Ave / Project Drwy 3	OWSC	AM	-	-	10.8	B
		PM	-	-	10.2	B
9. Oti Ave / Project Drwy 4	OWSC	AM	-	-	10.1	A
		PM	-	-	9.7	A

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. AWSC – All-Way Stop-Controlled intersection.
d. TWSC – Two-Way Stop-Controlled intersection. Worst-case movement delay is reported.
e. OWSC – One-Way Stop-Controlled intersection. Worst-case movement delay is reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

7.0 OPERATIONAL IMPACT ASSESSMENT

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

7.1 Effects of the Project on Vehicular Level of Service

Based on the Existing+Project operations analysis presented in ***Section 6.0***, the study intersections continue to operate at a LOS C or better, which does not conflict with the City's policy regarding the level of service performance of the circulation system. Therefore, at the study intersections analyzed in this report, the Project would not have an impact on the City's level of service performance policy.

Subsequent to the initial submittal of this transportation study, the City prepared the *Marshall & Higgins Public Safety and Traffic Calming Project* study in January 2025. See ***Appendix F*** for the City's traffic calming study. The results presented in LLG's report are consistent with those in the traffic calming study. However, it should be noted that the City's analysis included one additional intersection – Marshall Road / Rivermont Street / Allen Drive. The traffic calming study identified that the Project would cause the intersection to operate at LOS F. To mitigate this operational deficiency, the traffic calming study recommends the installation of an all-way stop control at this intersection.

7.2 Effects of the Project on Bicycle/Pedestrian Facilities

Based on a review of the existing class two bicycle facilities (i.e., bike lanes) along Marshall Road and Otis Avenue, as well as the proposed Project frontage design, the Project driveways would not disrupt or interfere with bicycle travel. Moreover, on-street parking that could potentially interfere with bicycle travel is not proposed. Therefore, the Project would not have an impact on the bicycle facilities and no mitigation improvements would be required by the Project.

Based on a review of the existing sidewalk facilities along Marshall Road and the proposed pathways along the Project frontage, the Project would not have an impact on the pedestrian facilities and no mitigation improvements would be required by the Project. Since there are currently no contiguous sidewalks on the south side of Marshall Road to the east and west of the Project site, the sidewalk connectivity along that side would be incomplete.

7.3 Effects of the Project on Transit Facilities

Based on a review of the Yolo Bus Route 37, Route 37's transit stop locations, and the proposed Project frontage design, the Project would not disrupt or interfere with transit facilities/services. Therefore, the Project would not have an impact on the transit facilities and no coordination would be needed with the local transit agency by the Project.

7.4 Effects of the Project on Roadway Hazards

Based on a review of the Project driveway locations, the Project would not substantially increase hazards due to a design feature (e.g., sharp curves, dangerous intersections, etc.). Section 8.0 contains site access recommendations that should be incorporated into the design to ensure that the project would not cause any hazardous design features. Therefore, the Project would not have an impact on roadway hazards and no mitigation improvements would be required by the Project.

7.5 Effects of the Project Emergency Access

The Project is proposing two full-access driveways, two along Marshall Road and two along Otis Avenue, that could be used by emergency vehicles to access the internal roadway network and parcels of the Project. Based on the proximity of Fire Sation 42 (less than 1 mile away), existing vehicle preemption at the Marshall Road/Jefferson Boulevard intersection, and the proposed Project site accesses, the Project would not result in inadequate emergency access. Therefore, the Project would not have an impact on emergency access and no mitigation improvements would be required by the Project.

8.0 SITE ACCESS AND OTHER CONSIDERATIONS

As shown in ***Figure 1–2***, the Project plans to provide four (4) access points – two (2) located off Marshall Road and two (2) located off Otis Avenue. The following access-related improvements should be considered:

- Provide stop signs and pavement markings on the minor street approach (i.e., stop control for the driveway egress)
- Ensure sufficient sight distance at the Project driveways are in conformance with City's design standards

9.0 VEHICLE MILES TRAVELED (VMT) ASSESSMENT

9.1 VMT Background

In September 2013, the Governor's Office signed SB 743 into law, starting a process that fundamentally changes the way transportation impact analysis is conducted under CEQA. These changes include the elimination of auto delay, level of service (LOS), and similar measurements of vehicular roadway capacity and traffic congestion as the basis for determining significant impacts. The justification for this paradigm shift is that Auto Delay/LOS impacts lead to improvements that increase roadway capacity and therefore induce more traffic and greenhouse gas emissions. The VMT standard for evaluating transportation impacts under CEQA became mandatory statewide on July 1, 2020.

VMT is defined as a measurement of miles traveled by vehicles within a specified region and for a specified time period to quantify the use and efficiency of the transportation network. VMT is calculated based on individual vehicle trips generated and their associated trip lengths. VMT accounts for two-way (round trip) travel and is estimated for a typical weekday to measure transportation impacts.

9.2 VMT Impact Assessment

Potential VMT impacts associated with the Project were analyzed using the Sacramento Area Council of Government's (SACOG) SACSIM travel demand model which results in a series of hexagons (HEX) that are overlayed onto a map of the region. Each HEX is identified with a specific VMT per capita for that enclosed area. For residential projects, the threshold is 85% less than the City or regional average.

The Project site is situated in an area comprised of three hexagons. Hexagon 3360 was used in the assessment because its boundaries encompass most of the Project site, as well as three proposed Project access points. See ***Appendix G*** for hexagon data. As shown in ***Table 8–1,*** the residential VMT/capita this hexagon is not 85% less than the City or regional average. **Therefore, the Project has a significant VMT impact.**

TABLE 8–1
RESIDENTIAL VMT/CAPITA

Hexagon ID	VMT/Capita	85% of the City Average (18.87*0.85)	85% of the Regional Average (20.82*0.85)	Below or Above the Threshold
3360	24.82	16.04	17.70	Above both the City and Regional Average

Source: Hexagon, City, and regional VMT data obtained from SACOG's SACSIM Residential Maps

9.3 Project Features

Per Mobility Implementation Program #14 of Table 3-5 in the Mobility Element, the City will be developing and implementing a VMT Reduction Program. This program will require proposed land development projects to incorporate, as feasible, reasonable, and applicable, the listed measures to reduce travel demand. ***Appendix H*** contains this table.

Based on the review of the listed VMT reduction measures under Mobility Implementation Program #14, as well as other potential measures, ***Table 8–2*** describes two measures that are incorporated into the Project's design to help reduce the Project's VMT.

TABLE 8–2
PROJECT FEATURES

VMT Reduction Measure[1]	Efficacy[1]	Application to the Project
14-11. Improve Network Connectivity. This measure could be relevant to infill developments or new developments with property subdivisions, and involves a relatively more connected transportation network that allows multiple routes between homes and nearby destinations. In general, a grid street network or modified grid is the ideal arrangement for a highly connected transportation network. The degree of connectivity is measured according to intersection density, but would also involve relatively short block lengths.	Up to 17 percent reduction in VMT, based on intersection density within project site and immediately adjacent intersections. VMT reduction would range from approximately 1 percent for 40 intersections per square mile to 17 percent for 87 intersections per square mile.	The Project proposes a total of 18 intersections on 59.98 acres. This includes intersections within and immediately adjacent to the site (i.e., project frontage). The density of the site was compared to the density of the HEX within which the site is located and using the methodology of Measure T-17 in the CAPCOA Handbook, a 3.6% VMT reduction was calculated. ***Appendix I*** contains the calculation worksheets.
14-12. Increase Housing Density. For new or redevelopment housing projects, design an improved project with relatively higher density of dwelling units in an area that supports bicycle, pedestrian, and/or transit access to reach daily destinations.	Up to a 30-percent reduction, with a 1-percent reduction awarded for 9 units per acre and a 30-percent reduction for 40 units per acre.	The Project proposes 259 single-family dwelling units on a total of 34.83 acres (exclusive of streets and open space area). This results in a ratio of 7.43 units/acre. Based on the efficacy column to the left, the Project density falls below the minimum VMT reduction that can be applied. Therefore, no VMT reduction can be applied. It should be noted that the Project is proposing a higher density than what it is zoned for in the City's Land Use Element.

Footnotes:
1. Obtained from Mobility Implementation Program #14 of Table 3-5 in the City's Mobility Element. See ***Appendix H***.

Based on the above quantifiable measures, a 3.6% VMT reduction can be applied to the VMT/Capita. As shown in ***Table 8–3***, even with the reduction, the Project would continue to have a significant VMT impact.

TABLE 8–3
ADJUSTED RESIDENTIAL VMT/CAPITA

Hexagon ID	Adjusted[1] VMT/Capita	85% of the City Average (18.87*0.85)	85% of the Regional Average (20.82*0.85)	Below or Above the Threshold
3360	23.93	16.04	17.70	Above both the City and Regional Average

Source: Hexagon, City, and regional VMT data obtained from SACOG's SACSIM Residential Maps
Footnotes:
1. VMT/Capita adjusted to account for Project features (i.e., a 17% reduction was applied)

9.4 VMT Mitigation

To mitigate the VMT impact, the applicant shall coordinate with the City to prepare a development agreement to address the VMT impact, as summarized in Measure 14-10 in ***Table 8–4*** below.

TABLE 8–4
PROJECT VMT MITIGATION

VMT Reduction Measure[1]	Efficacy[1]	Application to the Project
14-10. Pro-Rata Contribution. Projects may also contribute impact fees at a level necessary to reduce a project's net VMT per capita or per employee to 85 percent or less than the citywide or regional average. This would require the City to develop a nexus and range of project types that would reduce VMT within West Sacramento, though impact fees contributed for a project do not need to reduce VMT in the same area as the project site. The City may also allow projects to construct and dedicate to the City or other public agency facilities shown to reduce VMT, such as active transportation projects, projects to fill sidewalk gaps in West Sacramento near important destinations, projects that would construct high-quality bicycle facilities that would eliminate a cycling barrier between homes and destinations, and other VMT-reducing facilities.	To be determined by the City.	The Project shall coordinate with City of West Sacramento staff to prepare a development agreement to address the VMT impact.

Footnotes:
1. Obtained from Mobility Implementation Program #14 of Table 3-5 in the City's Mobility Element. See ***Appendix H***.

10.0 CONCLUSION

Based on the transportation assessment conducted, the Project would have a significant operational effect at the Marshall Road / Rivermont Street / Allen Drive intersection. To mitigate this operational deficiency, the traffic calming study prepared by the City recommends the installation of an all-way stop control at this intersection.

Based on the SACOG VMT residential maps and Project design features, the Project would have a significant VMT impact. Therefore, to mitigate the VMT impact, the Project applicant shall coordinate with the City to prepare a development agreement to address the VMT impact.

[End of Report]

TECHNICAL APPENDICES
3425 MARSHALL RESIDENTIAL

City of West Sacramento, California
April 02, 2025

LLG Ref. 3-24-3921

APPENDIX A

INTERSECTION COUNT SHEETS

Prepared by National Data & Surveying Services

Southport Pkwy & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-003
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (Southport Pkwy)

AM	3	84	26	8	265	AM
NOON	0	0	0	0	0	NOON
PM	7	169	35	2	107	PM
	1	1	1	0		

EASTBOUND (Marshall Rd)

AM	NOON	PM	
30	0	48	
0	0	0	0
8	0	2	0
31	0	17	1
11	0	6	0
AM	NOON	PM	

WESTBOUND (Marshall Rd)

PM	NOON	AM	
21	0	30	0
36	0	22	1
86	0	47	0
1	0	0	0
103	0	131	
PM	NOON	AM	

CONTROL

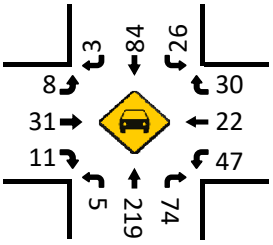
4-Way Stop

TEV	568 AM	0 NOON	519 PM
PHF	0.82		0.87

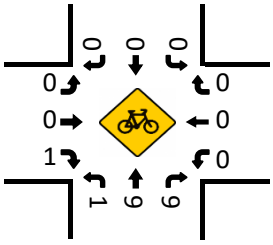
NORTHBOUND (Southport Pkwy)

PM	261	0	5	82	50	PM
NOON	0	0	0	0	0	NOON
AM	142	0	5	219	74	AM
		0	1	1	0	

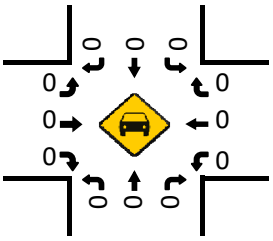
Totals (AM)



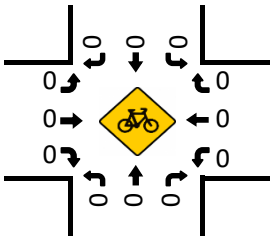
Total Bikes (AM)



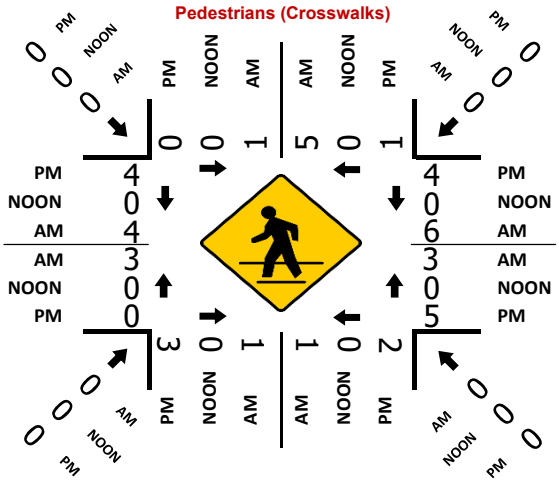
Totals (NOON)



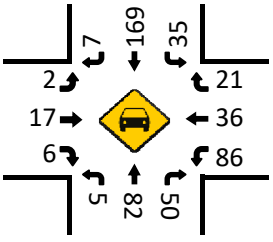
Total Bikes (NOON)



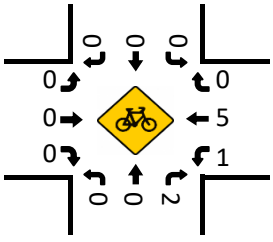
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



Prepared by National Data & Surveying Services

Martinique St & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-014
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

Period	PEAK HOURS	COUNT PERIODS
AM	07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (Martinique St)

	Right	Thru	Left	U-Turn	Departing
AM	9	0	26	0	15
NOON	0	0	0	0	0
PM	4	0	25	0	25
Lanes	0	1	0	0	

EASTBOUND (Marshall Rd)

	AM	NOON	PM	Lanes
Departing	99	0	145	
U-Turn	0	0	0	0
Left	6	0	1	0
Thru	125	0	103	1
Right	0	0	0	0

WESTBOUND (Marshall Rd)

	Lanes	PM	NOON	AM
Right	0	24	0	9
Thru	1	141	0	90
Left	0	0	0	0
U-Turn	0	0	0	0
Departing		128	0	151

NORTHBOUND (Martinique St)

	Departing	U-Turn	Left	Thru	Right
Lanes		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	0	0	0	0	0

CONTROL

1-Way Stop(SB)

	AM	NOON	PM
TEV	265	0	298
PHF	0.82		0.94

Totals (AM)

Approach	Left	Thru	Right	U-Turn
SB	26	0	9	
EB	6	125	0	
WB	0	90	9	
NB	0	0	0	

Totals (NOON)

Approach	Left	Thru	Right
SB	0	0	0
EB	0	0	0
WB	0	0	0
NB	0	0	0

Totals (PM)

Approach	Left	Thru	Right
SB	25	0	4
EB	1	103	0
WB	0	141	24
NB	0	0	0

Total Bikes (AM)

Approach	Left	Thru	Right
SB	0	0	0
EB	9	0	0
WB	0	0	0
NB	0	0	0

Total Bikes (NOON)

Approach	Left	Thru	Right
SB	0	0	0
EB	0	0	0
WB	0	0	0
NB	0	0	0

Total Bikes (PM)

Approach	Left	Thru	Right
SB	0	0	4
EB	0	2	0
WB	0	2	0
NB	0	0	0

Pedestrians (Crosswalks)

Crosswalk	Direction	AM	NOON	PM
North leg	Eastbound	5	0	1
North leg	Westbound	8	0	1
South leg	Eastbound	0	0	0
South leg	Westbound	0	0	0
West leg	Southbound	0	0	0
West leg	Northbound	0	0	0
East leg	Southbound	0	0	0
East leg	Northbound	0	0	0
NW diagonal		0	0	0
NE diagonal		0	0	0
SW diagonal		0	0	0
SE diagonal		0	0	0

Prepared by National Data & Surveying Services

Jamaica St & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-013
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

PEAK HOURS

AM: 07:30 AM - 08:30 AM
NOON: NONE
PM: 04:45 PM - 05:45 PM

COUNT PERIODS

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

SOUTHBOUND (Jamaica St)

AM	3	0	30	0	13	AM
NOON	0	0	0	0	0	NOON
PM	3	0	8	0	17	PM

EASTBOUND (Marshall Rd)

AM	NOON	PM	
100	0	166	
0	0	0	0
3	0	3	0
148	0	125	1
0	0	0	0
AM	NOON	PM	

WESTBOUND (Marshall Rd)

PM	NOON	AM	
14	0	10	0
163	0	97	1
0	0	0	0
0	0	0	0
133	0	178	
PM	NOON	AM	

NORTHBOUND (Jamaica St)

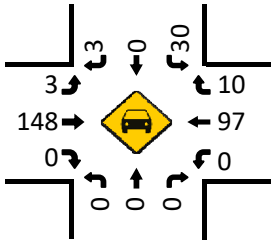
PM	0	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

CONTROL

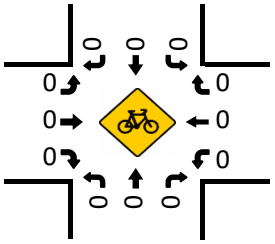
1-Way Stop(SB)

	AM	NOON	PM
TEV	291	0	316
PHF	0.80		0.98

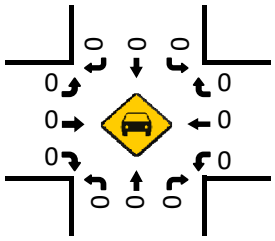
Totals (AM)



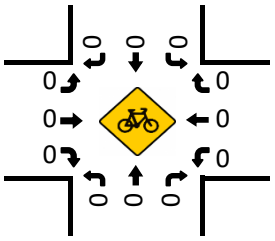
Total Bikes (AM)



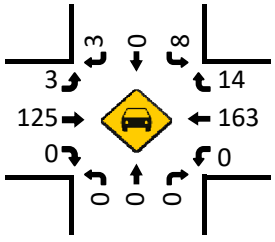
Totals (NOON)



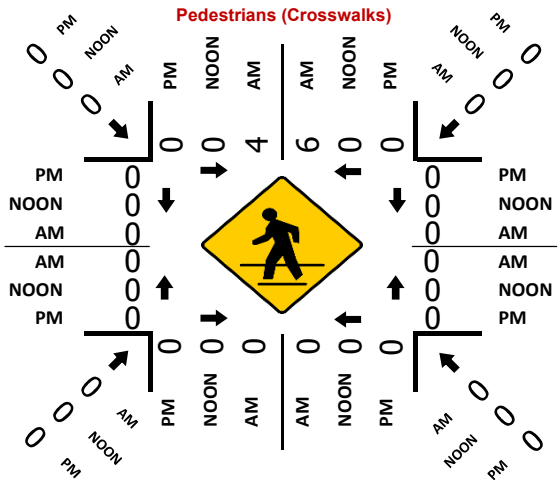
Total Bikes (NOON)



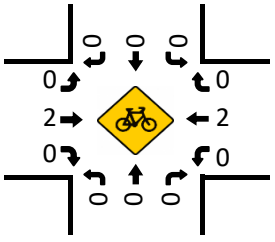
Totals (PM)



Pedestrians (Crosswalks)



Total Bikes (PM)



Prepared by National Data & Surveying Services

Guadelupe St & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-012
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (Guadelupe St)

AM	7	0	32	0	52	AM
NOON	0	0	0	0	0	NOON
PM	5	0	11	0	27	PM

EASTBOUND (Marshall Rd)

AM	NOON	PM		
107	0	178		
0	0	0	0	
9	0	2	0	
168	0	133	1	
0	0	0	0	
AM	NOON	PM		

WESTBOUND (Marshall Rd)

PM	NOON	AM	
25	0	43	0
173	0	100	1
0	0	0	0
0	0	0	0
144	0	200	
PM	NOON	AM	

NORTHBOUND (Guadelupe St)

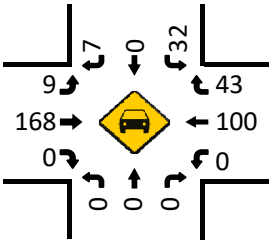
PM	0	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

CONTROL

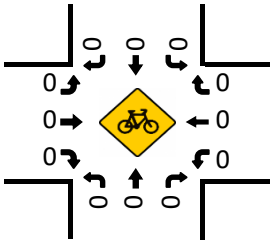
1-Way Stop(SB)

	AM	NOON	PM
TEV	359	0	349
PHF	0.90		0.92

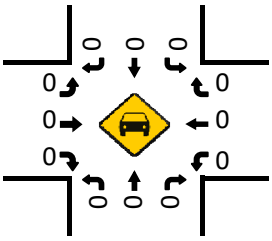
Totals (AM)



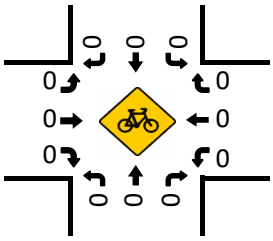
Total Bikes (AM)



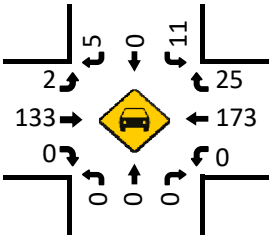
Totals (NOON)



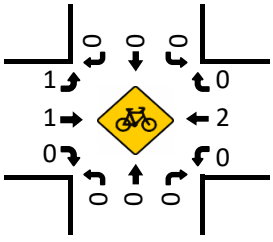
Total Bikes (NOON)



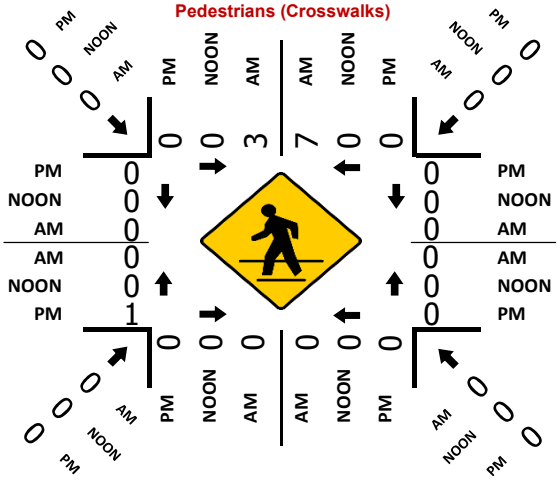
Totals (PM)



Total Bikes (PM)



Pedestrians (Crosswalks)



Prepared by National Data & Surveying Services

Otis Ave & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-008
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (Otis Ave)

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM

EASTBOUND (Marshall Rd)

AM	NOON	PM		
142	0	198	⇦	
0	0	0	↶	0
0	0	0	↱	0
168	0	127	→	1
32	0	17	↷	0
AM	NOON	PM		

WESTBOUND (Marshall Rd)

PM	NOON	AM		
0	0	0	↷	0
192	0	97	←	1
99	0	66	↰	0
0	0	0	↶	0
197	0	306	⇨	
PM	NOON	AM		

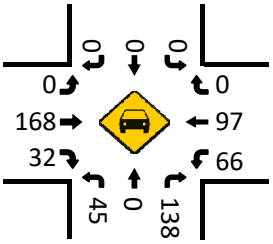
CONTROL: 1-Way Stop(NB)

TEV	546 AM	0 NOON	511 PM
PHF	0.90		0.93

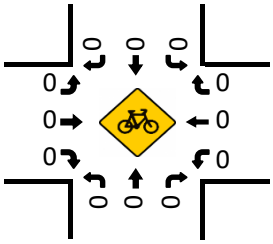
NORTHBOUND (Otis Ave)

PM	116	0	6	0	70	PM
NOON	0	0	0	0	0	NOON
AM	98	0	45	0	138	AM

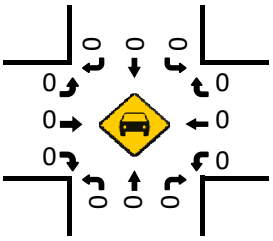
Totals (AM)



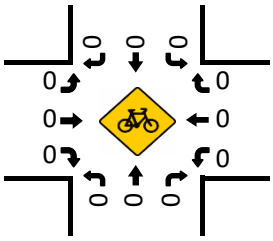
Total Bikes (AM)



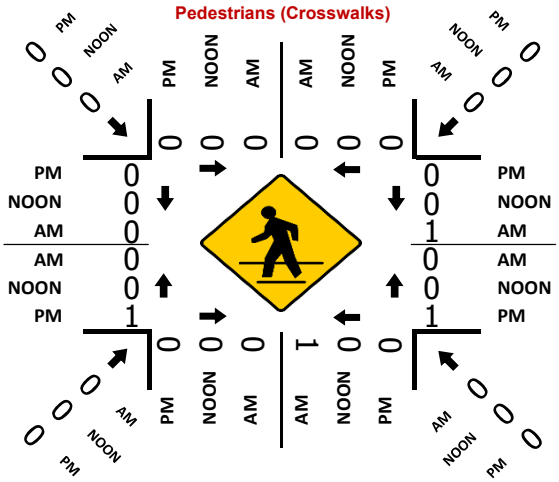
Totals (NOON)



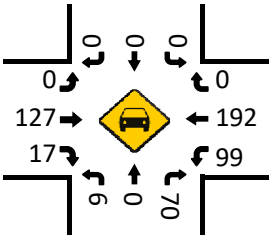
Total Bikes (NOON)



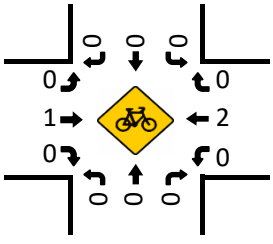
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



Prepared by National Data & Surveying Services

Golden Gate Dr & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-011
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

PEAK HOURS	COUNT PERIODS
AM: 07:30 AM - 08:30 AM	AM: 7:00 AM - 09:00 AM
NOON: NONE	NOON: NONE
PM: 04:30 PM - 05:30 PM	PM: 4:00 PM - 06:00 PM

SOUTHBOUND (Golden Gate Dr)

AM	18	0	281	0	217	AM
NOON	0	0	0	0	0	NOON
PM	7	0	188	0	195	PM

EASTBOUND (Marshall Rd)

AM	NOON	PM	
164	0	291	
0	0	0	0
23	0	4	0
281	0	190	1
0	0	0	0
AM	NOON	PM	

WESTBOUND (Marshall Rd)

PM	NOON	AM	
191	0	194	0
284	0	146	1
0	0	0	0
0	0	0	0
378	0	562	
PM	NOON	AM	

NORTHBOUND (Golden Gate Dr)

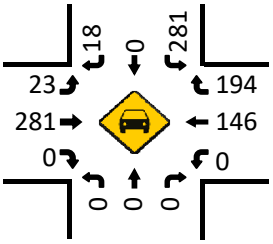
PM	0	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

CONTROL

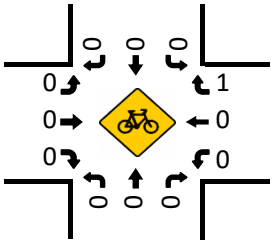
3-Way Stop(SB/EB/WB)

	AM	NOON	PM
TEV	943	0	864
PHF	0.92		0.94

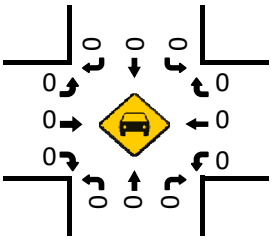
Totals (AM)



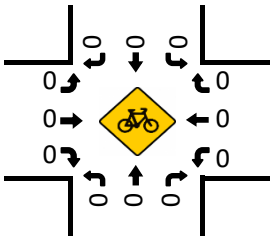
Total Bikes (AM)



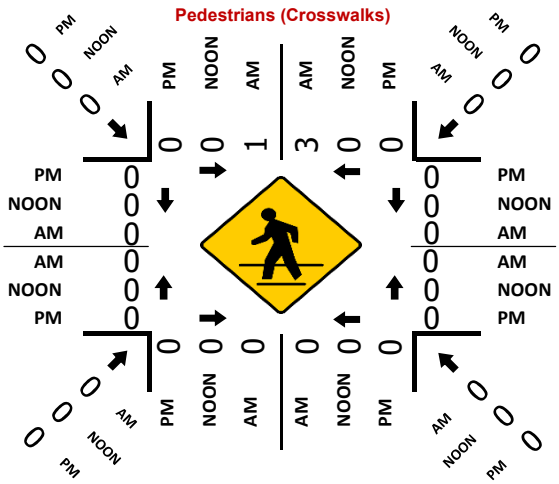
Totals (NOON)



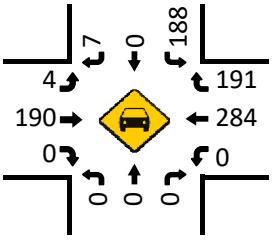
Total Bikes (NOON)



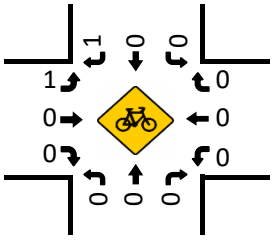
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



Prepared by National Data & Surveying Services

Jefferson Blvd & Marshall Rd

Peak Hour Turning Movement Count

ID: 24-070102-001
City: West Sacramento

Day: Tuesday
Date: 5/21/2024

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NONE	NONE
04:30 PM - 05:30 PM	4:00 PM - 06:00 PM

SOUTHBOUND (Jefferson Blvd)

AM	296	179	0	0	960	AM
NOON	0	0	0	0	0	NOON
PM	469	333	1	0	615	PM

EASTBOUND (Marshall Rd)

AM	NOON	PM	
374	0	522	
0	0	0	0
587	0	361	1
0	0	0	0
42	0	66	1
AM	NOON	PM	

WESTBOUND (Marshall Rd)

PM	NOON	AM	
0	0	0	0
0	0	0	1
0	0	0	0
0	0	0	0
1	0	0	
PM	NOON	AM	

NORTHBOUND (Jefferson Blvd)

PM	399	0	53	254	0	PM
NOON	0	0	0	0	0	NOON
AM	221	0	78	373	0	AM

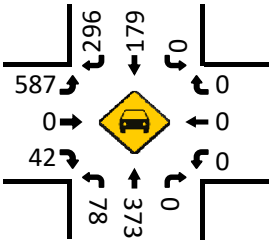
1	1	1	0	
0	1	1	0	

CONTROL

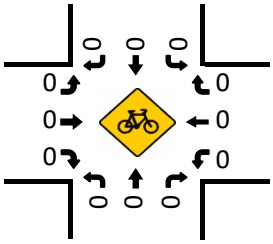
Signalized

TEV	1555 AM	0 NOON	1537 PM
PHF	0.97		0.95

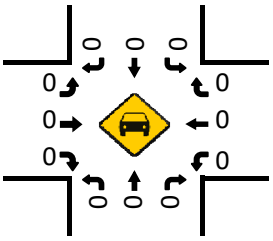
Totals (AM)



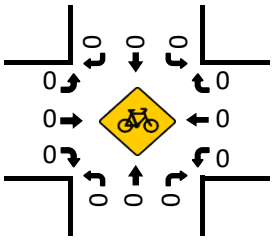
Total Bikes (AM)



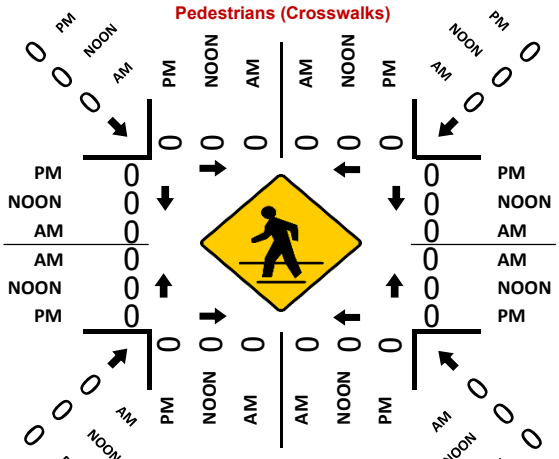
Totals (NOON)



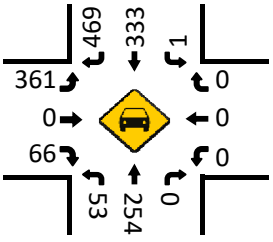
Total Bikes (NOON)



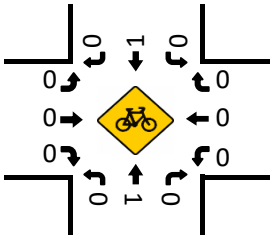
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



APPENDIX B

VEHICULAR CLASSIFICATION SURVEY

Type of report: Tube Count - Vehicle Classification Data

LOCATION: Marshall Rd btwn Martinique St and Otis Ave
SPECIFIC LOCATION:
CITY/STATE: West Sacramento, CA

QC JOB #: 16787101
DIRECTION: EB, WB
DATE: Oct 2 2024

Start Time	FHWA 1-3	FHWA 4-7	FHWA 8-10	FHWA 11-13	Total
12:00 AM	20	1	0	0	21
01:00 AM	6	0	0	0	6
02:00 AM	0	0	0	0	0
03:00 AM	4	0	0	0	4
04:00 AM	17	0	0	0	17
05:00 AM	43	2	0	0	45
06:00 AM	73	5	0	0	78
07:00 AM	218	**9**	0	0	227
08:00 AM	**231**	2	0	0	**233**
09:00 AM	132	5	1	0	138
10:00 AM	133	3	1	0	137
11:00 AM	134	8	**2**	0	144
12:00 PM	163	2	1	0	166
01:00 PM	161	3	0	0	164
02:00 PM	184	**9**	0	0	193
03:00 PM	191	2	0	0	193
04:00 PM	232	4	**2**	0	238
05:00 PM	**254**	4	0	0	**258**
06:00 PM	214	3	0	0	217
07:00 PM	219	1	1	0	221
08:00 PM	132	0	0	0	132
09:00 PM	80	0	0	0	80
10:00 PM	31	0	0	0	31
11:00 PM	23	0	0	0	23
Day Total	2895	63	8	0	2966
Percent	97.6%	2.1%	0.3%	0%	
ADT 2966					
AM Peak	8:00 AM	7:00 AM	11:00 AM	12:00 AM	8:00 AM
Volume	231	9	2	0	233
PM Peak	5:00 PM	2:00 PM	4:00 PM	12:00 PM	5:00 PM
Volume	254	9	2	0	258

Comments:

Report generated on 10/4/2024 11:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Vehicle Classification Data

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: Marshall Rd btwn Martinique St and Otis Ave
SPECIFIC LOCATION:
CITY/STATE: West Sacramento, CA

QC JOB #: 16787101
DIRECTION: EB, WB
DATE: Oct 2 2024

Start Time	FHWA 1-3	FHWA 4-7	FHWA 8-10	FHWA 11-13	Total
Grand Total	2895	63	8	0	2966
Percent	97.6%	2.1%	0.3%	0%	

ADT
2966



Comments:

Report generated on 10/4/2024 11:32 AM

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APPENDIX C

INTERSECTION METHODOLOGY

HIGHWAY CAPACITY 7th EDITION MANUAL
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

In the Highway Capacity Manual 7th Edition (HCM 7), Level of Service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level of Service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE	CONTROLLED DELAY PER VEHICLE (SEC)		
A		≤	10.0
B	10.1	to	20.0
C	20.1	to	35.0
D	35.1	to	55.0
E	55.1	to	80.0
F		>	80.0

Level of Service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in the level. The number of vehicles stopping is significant at this level, although many still pass through the intersections without stopping.

Level of Service D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At Level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of Service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e. when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

HIGHWAY CAPACITY 7th EDITION MANUAL
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

In the Highway Capacity Manual 7th Edition (HCM 7), Level of Service for unsignalized intersections is determined by the computed or measured control delay and is defined for each minor movement. Level of Service is not defined for the intersection as a whole. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The criteria are given in the following the table, and are based on the average control delay for any particular minor movement.

LEVEL OF SERVICE	AVERAGE CONTROL DELAY SEC/VEH			EXPECTED DELAY TO MINOR STREET TRAFFIC
A	0.0	≤	10.0	Little or no delay
B	10.1	to	15.0	Short traffic delays
C	15.1	to	25.0	Average traffic delays
D	25.1	to	35.0	Long traffic delays
E	35.1	to	50.0	Very long traffic delays
F		>	50.0	Severe congestion

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This Level of Service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits. LOS F may also appear in the form on side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

In most cases at Two-Way Stop Controlled (TWSC) intersections, the critical movement is the minor-street left-turn movement. As such, the minor-street left-turn movement can generally be considered the primary factor affecting overall intersection performance. The lower threshold for LOS F is set at 50 seconds of delay per vehicle. There are many instances, particularly in urban areas, in which the delay equations will predict delays of 50 seconds (LOS F) or more for minor-street movements under very low volume conditions on the minor street (less than 25 vehicle/hour). Since the first term of the equation is a function only of the capacity, the LOS F threshold of 50 sec/vehicle is reached with a movement capacity of approximately 85 vehicle/hour or less.

This procedure assumes random arrivals on the major street. For a typical four-lane arterial with average daily traffic volumes in the range of 15,000 to 20,000 vehicles per day (peak hour, 1,500 to 2,000 vehicle/hour), the delay equation used in the TWSC capacity analysis procedure will predict 50 seconds of delay or more (LOS F) for many urban TWSC intersections that allow minor-street left-turn movements. **The LOS F threshold will be reached regardless of the volume of minor-street left-turn traffic.** Not-withstanding this fact, most low-volume minor-street approaches would not meet any of the volume or delay warrants for signalization of the *Manual on Uniform Traffic Control Devices* (MUTCD) since the warrants define an asymptote at 100 vehicle/hour on the minor approach. As a result, many public agencies that use the HCM 6 Level of Service thresholds to determine the design adequacy of TWSC intersections may be forced to eliminate the minor-street left-turn movement, even when the movement may not present any operational problem, such as the formation of long queues on the minor street or driveway approach.

APPENDIX D

SYNCHRO ANALYSIS WORKSHEETS – EXISTING

Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	31	11	47	23	30	5	219	74	26	84	3
Future Vol, veh/h	8	31	11	47	23	30	5	219	74	26	84	3
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	38	13	57	28	37	6	267	90	32	102	4
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	9.4	10.2	13.6	9.1
HCM LOS	A	B	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	16%	47%	100%	0%	0%
Vol Thru, %	0%	75%	62%	23%	0%	100%	0%
Vol Right, %	0%	25%	22%	30%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	293	50	100	26	84	3
LT Vol	5	0	8	47	26	0	0
Through Vol	0	219	31	23	0	84	0
RT Vol	0	74	11	30	0	0	3
Lane Flow Rate	6	357	61	122	32	102	4
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.01	0.521	0.101	0.202	0.052	0.155	0.005
Departure Headway (Hd)	5.931	5.249	5.988	5.977	5.935	5.43	4.724
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	598	679	602	604	598	654	748
Service Time	3.716	3.034	3.691	3.677	3.729	3.224	2.516
HCM Lane V/C Ratio	0.01	0.526	0.101	0.202	0.054	0.156	0.005
HCM Control Delay, s/veh	8.8	13.7	9.4	10.2	9.1	9.2	7.5
HCM Lane LOS	A	B	A	B	A	A	A
HCM 95th-tile Q	0	3	0.3	0.8	0.2	0.5	0

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	125	91	9	26	9
Future Vol, veh/h	6	125	91	9	26	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	152	111	11	32	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	284	116
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	167	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1465	-	-	-	707	936
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	862	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1465	-	-	-	703	936
Mov Cap-2 Maneuver	-	-	-	-	703	-
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	862	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.34	0	10.08
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	82	-	-	-	751
HCM Lane V/C Ratio	0.005	-	-	-	0.057
HCM Control Delay (s/veh)	7.5	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	148	97	10	30	3
Future Vol, veh/h	3	148	97	10	30	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	185	121	13	38	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	134	0	-	0	320	128
Stage 1	-	-	-	-	128	-
Stage 2	-	-	-	-	193	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1451	-	-	-	673	923
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	840	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1451	-	-	-	672	923
Mov Cap-2 Maneuver	-	-	-	-	672	-
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	840	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.15	0	10.56
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	36	-	-	-	689
HCM Lane V/C Ratio	0.003	-	-	-	0.06
HCM Control Delay (s/veh)	7.5	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	169	100	43	32	7
Future Vol, veh/h	9	169	100	43	32	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	188	111	48	36	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	159	0	-	0	343	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	208	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1421	-	-	-	653	914
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	827	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1421	-	-	-	648	914
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	827	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.38	0	10.62
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	91	-	-	-	684
HCM Lane V/C Ratio	0.007	-	-	-	0.063
HCM Control Delay (s/veh)	7.6	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	169	32	66	98	45	138
Future Vol, veh/h	169	32	66	98	45	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	188	36	73	109	50	153

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	223	0	461	206
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1345	-	559	835
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1345	-	526	835
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	741	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	3.15	11.83
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	730	-	-	724	-
HCM Lane V/C Ratio	0.279	-	-	0.055	-
HCM Control Delay (s/veh)	11.8	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	284	146	194	281	18
Future Vol, veh/h	23	284	146	194	281	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	309	159	211	305	20
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	14.2	13.8	15.4
HCM LOS	B	B	C

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	0%	94%
Vol Thru, %	93%	43%	0%
Vol Right, %	0%	57%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	307	340	299
LT Vol	23	0	281
Through Vol	284	146	0
RT Vol	0	194	18
Lane Flow Rate	334	370	325
Geometry Grp	1	1	1
Degree of Util (X)	0.51	0.526	0.531
Departure Headway (Hd)	5.506	5.127	5.884
Convergence, Y/N	Yes	Yes	Yes
Cap	654	702	611
Service Time	3.554	3.174	3.929
HCM Lane V/C Ratio	0.511	0.527	0.532
HCM Control Delay, s/veh	14.2	13.8	15.4
HCM Lane LOS	B	B	C
HCM 95th-tile Q	2.9	3.1	3.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	617	0	49	0	0	0	78	373	0	0	179	323
Future Volume (veh/h)	617	0	49	0	0	0	78	373	0	0	179	323
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	636	0	51	0	0	0	80	385	0	0	185	333
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	720	0	641	0	3	0	103	791	0	3	537	455
Arrive On Green	0.40	0.00	0.40	0.00	0.00	0.00	0.06	0.42	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Grp Volume(v), veh/h	636	0	51	0	0	0	80	385	0	0	185	333
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Q Serve(g_s), s	22.0	0.0	1.3	0.0	0.0	0.0	2.9	10.0	0.0	0.0	5.2	12.6
Cycle Q Clear(g_c), s	22.0	0.0	1.3	0.0	0.0	0.0	2.9	10.0	0.0	0.0	5.2	12.6
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	720	0	641	0	3	0	103	791	0	3	537	455
V/C Ratio(X)	0.88	0.00	0.08	0.00	0.00	0.00	0.77	0.49	0.00	0.00	0.34	0.73
Avail Cap(c_a), veh/h	851	0	757	0	281	0	182	791	0	134	537	455
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	12.2	0.0	0.0	0.0	30.9	14.0	0.0	0.0	18.8	21.4
Incr Delay (d2), s/veh	9.6	0.0	0.1	0.0	0.0	0.0	4.6	2.1	0.0	0.0	1.8	10.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.2	0.0	0.4	0.0	0.0	0.0	1.3	3.9	0.0	0.0	2.2	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.0	0.0	12.3	0.0	0.0	0.0	35.5	16.1	0.0	0.0	20.5	31.4
LnGrp LOS	C		B				D	B			C	C
Approach Vol, veh/h		687			0			465			518	
Approach Delay, s/veh		26.8			0.0			19.4			27.5	
Approach LOS		C						B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	25.4		32.1	0.0	34.5		0.0
Change Period (Y+Rc), s	5.2	6.3		5.2	5.2	* 6.3		5.6
Max Green Setting (Gmax), s	6.8	19.1		31.8	5.0	* 21		10.0
Max Q Clear Time (g_c+I1), s	4.9	14.6		24.0	0.0	12.0		0.0
Green Ext Time (p_c), s	0.0	1.1		2.9	0.0	1.9		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	25.0
HCM 7th LOS	C

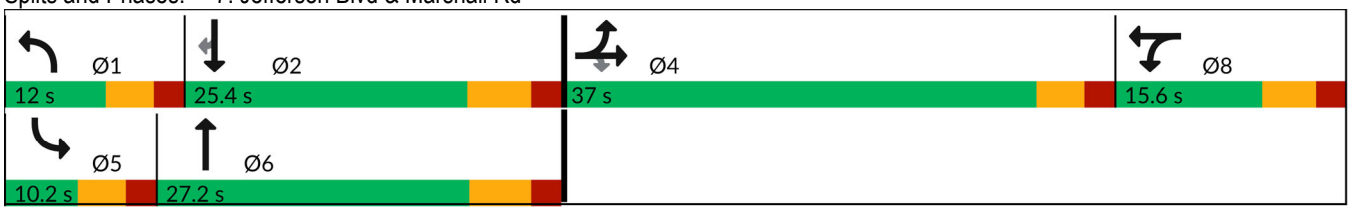
Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Phase Number	1	2	4	5	6	8
Movement	NBL	SBT	EBTL	SBL	NBT	WBTL
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize						
Recall Mode	None	Max	None	None	Max	None
Maximum Split (s)	12	25.4	37	10.2	27.2	15.6
Maximum Split (%)	13.3%	28.2%	41.1%	11.3%	30.2%	17.3%
Minimum Split (s)	10.2	16.3	10.2	10.2	16.2	15.6
Yellow Time (s)	3.2	4.3	3.2	3.2	4.2	3.6
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	5	10	5	5	10	10
Vehicle Extension (s)	2	3.5	3	2	4	4
Minimum Gap (s)	2	3.5	3	2	4	4
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)						
Flash Don't Walk (s)						
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	37.4	0	10.2	74.4
End Time (s)	12	37.4	74.4	10.2	37.4	0
Yield/Force Off (s)	6.8	31.1	69.2	5	31.2	84.4
Yield/Force Off 170(s)	6.8	31.1	69.2	5	31.2	84.4
Local Start Time (s)	78	0	25.4	78	88.2	62.4
Local Yield (s)	84.8	19.1	57.2	83	19.2	72.4
Local Yield 170(s)	84.8	19.1	57.2	83	19.2	72.4

Intersection Summary	
Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 7: Jefferson Blvd & Marshall Rd



Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	17	6	87	39	21	5	82	50	37	169	7
Future Vol, veh/h	2	17	6	87	39	21	5	82	50	37	169	7
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	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	20	7	100	45	24	6	94	57	43	194	8
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	8.7	10.7	9.8	9.8
HCM LOS	A	B	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	8%	59%	100%	0%	0%
Vol Thru, %	0%	62%	68%	27%	0%	100%	0%
Vol Right, %	0%	38%	24%	14%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	132	25	147	37	169	7
LT Vol	5	0	2	87	37	0	0
Through Vol	0	82	17	39	0	169	0
RT Vol	0	50	6	21	0	0	7
Lane Flow Rate	6	152	29	169	43	194	8
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.01	0.228	0.045	0.27	0.068	0.285	0.01
Departure Headway (Hd)	6.192	5.42	5.629	5.749	5.779	5.275	4.569
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	574	657	630	622	618	678	778
Service Time	3.968	3.195	3.417	3.518	3.537	3.033	2.327
HCM Lane V/C Ratio	0.01	0.231	0.046	0.272	0.07	0.286	0.01
HCM Control Delay, s/veh	9	9.8	8.7	10.7	9	10.1	7.4
HCM Lane LOS	A	A	A	B	A	B	A
HCM 95th-tile Q	0	0.9	0.1	1.1	0.2	1.2	0

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	103	143	24	25	4
Future Vol, veh/h	1	103	143	24	25	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	110	152	26	27	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	178	0	-	0	277	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	112	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1398	-	-	-	713	880
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	913	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1398	-	-	-	713	880
Mov Cap-2 Maneuver	-	-	-	-	713	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	913	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.07	0	10.14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	17	-	-	-	732
HCM Lane V/C Ratio	0.001	-	-	-	0.042
HCM Control Delay (s/veh)	7.6	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	125	164	14	10	3
Future Vol, veh/h	3	125	164	14	10	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	128	167	14	10	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	182	0	-	0	308	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	134	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1394	-	-	-	684	869
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	893	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1394	-	-	-	682	869
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.18	0	10.11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	42	-	-	-	718
HCM Lane V/C Ratio	0.002	-	-	-	0.018
HCM Control Delay (s/veh)	7.6	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	133	173	25	11	5
Future Vol, veh/h	2	133	173	25	11	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	145	188	27	12	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	215	0	-	0	351	202
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1355	-	-	-	647	839
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1355	-	-	-	646	839
Mov Cap-2 Maneuver	-	-	-	-	646	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	879	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.11	0	10.31
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	27	-	-	-	696
HCM Lane V/C Ratio	0.002	-	-	-	0.025
HCM Control Delay (s/veh)	7.7	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	127	17	99	192	6	70
Future Vol, veh/h	127	17	99	192	6	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	137	18	106	206	6	75

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	155	0	565	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	419	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1425	-	486	901
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	663	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1425	-	445	901
Mov Cap-2 Maneuver	-	-	-	-	445	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	607	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	2.63	9.79
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	834	-	-	612	-
HCM Lane V/C Ratio	0.098	-	-	0.075	-
HCM Control Delay (s/veh)	9.8	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	193	284	191	188	7
Future Vol, veh/h	4	193	284	191	188	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	205	302	203	200	7
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	10.5	15.5	11.7
HCM LOS	B	C	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	0%	96%
Vol Thru, %	98%	60%	0%
Vol Right, %	0%	40%	4%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	197	475	195
LT Vol	4	0	188
Through Vol	193	284	0
RT Vol	0	191	7
Lane Flow Rate	210	505	207
Geometry Grp	1	1	1
Degree of Util (X)	0.304	0.64	0.335
Departure Headway (Hd)	5.224	4.556	5.81
Convergence, Y/N	Yes	Yes	Yes
Cap	692	783	622
Service Time	3.224	2.648	3.819
HCM Lane V/C Ratio	0.303	0.645	0.333
HCM Control Delay, s/veh	10.5	15.5	11.7
HCM Lane LOS	B	C	B
HCM 95th-tile Q	1.3	4.7	1.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	361	0	66	0	0	0	53	254	0	1	333	470
Future Volume (veh/h)	361	0	66	0	0	0	53	254	0	1	333	470
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	380	0	69	0	0	0	56	267	0	1	351	495
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	475	0	423	0	3	0	89	883	0	3	792	671
Arrive On Green	0.27	0.00	0.27	0.00	0.00	0.00	0.05	0.47	0.00	0.00	0.42	0.42
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Grp Volume(v), veh/h	380	0	69	0	0	0	56	267	0	1	351	495
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Q Serve(g_s), s	12.3	0.0	2.1	0.0	0.0	0.0	1.9	5.4	0.0	0.0	8.2	16.1
Cycle Q Clear(g_c), s	12.3	0.0	2.1	0.0	0.0	0.0	1.9	5.4	0.0	0.0	8.2	16.1
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	475	0	423	0	3	0	89	883	0	3	792	671
V/C Ratio(X)	0.80	0.00	0.16	0.00	0.00	0.00	0.63	0.30	0.00	0.35	0.44	0.74
Avail Cap(c_a), veh/h	766	0	682	0	304	0	168	883	0	145	792	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	0.0	17.3	0.0	0.0	0.0	28.7	10.0	0.0	30.7	12.6	14.9
Incr Delay (d2), s/veh	3.2	0.0	0.2	0.0	0.0	0.0	2.7	0.9	0.0	24.4	1.8	7.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	0.7	0.0	0.0	0.0	0.8	1.9	0.0	0.0	3.1	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.2	0.0	17.5	0.0	0.0	0.0	31.4	10.9	0.0	55.1	14.4	22.0
LnGrp LOS	C		B				C	B		E	B	C
Approach Vol, veh/h		449			0			323			847	
Approach Delay, s/veh		23.2			0.0			14.4			18.9	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	32.4		20.9	5.3	35.4		0.0
Change Period (Y+Rc), s	5.2	6.3		4.5	5.2	* 6.3		5.6
Max Green Setting (Gmax), s	5.8	26.1		26.5	5.0	* 27		10.0
Max Q Clear Time (g_c+I1), s	3.9	18.1		14.3	2.0	7.4		0.0
Green Ext Time (p_c), s	0.0	2.9		2.2	0.0	1.8		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	19.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Phase Number	1	2	4	5	6	8
Movement	NBL	SBT	EBTL	SBL	NBT	WBTL
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize			Yes			
Recall Mode	None	Max	None	None	Max	None
Maximum Split (s)	11	32.4	31	10.2	33.2	15.6
Maximum Split (%)	12.2%	36.0%	34.4%	11.3%	36.9%	17.3%
Minimum Split (s)	10.2	16.3	10.2	10.2	16.2	15.6
Yellow Time (s)	3.2	4.3	3.5	3.2	4.2	3.6
All-Red Time (s)	2	2	1	2	2	2
Minimum Initial (s)	5	10	5	5	10	10
Vehicle Extension (s)	2	3.5	3	2	4	4
Minimum Gap (s)	2	3.5	3	2	4	4
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)						
Flash Don't Walk (s)						
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	11	43.4	0	10.2	74.4
End Time (s)	11	43.4	74.4	10.2	43.4	0
Yield/Force Off (s)	5.8	37.1	69.9	5	37.2	84.4
Yield/Force Off 170(s)	5.8	37.1	69.9	5	37.2	84.4
Local Start Time (s)	79	0	32.4	79	89.2	63.4
Local Yield (s)	84.8	26.1	58.9	84	26.2	73.4
Local Yield 170(s)	84.8	26.1	58.9	84	26.2	73.4

Intersection Summary	
Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	75

Splits and Phases: 7: Jefferson Blvd & Marshall Rd



APPENDIX E

SYNCHRO ANALYSIS WORKSHEETS – EXISTING+PROJECT

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	31	11	50	23	46	5	219	75	32	84	3
Future Vol, veh/h	8	31	11	50	23	46	5	219	75	32	84	3
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	38	13	61	28	56	6	267	91	39	102	4
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	9.5	10.5	14.3	9.3
HCM LOS	A	B	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	16%	42%	100%	0%	0%
Vol Thru, %	0%	74%	62%	19%	0%	100%	0%
Vol Right, %	0%	26%	22%	39%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	294	50	119	32	84	3
LT Vol	5	0	8	50	32	0	0
Through Vol	0	219	31	23	0	84	0
RT Vol	0	75	11	46	0	0	3
Lane Flow Rate	6	359	61	145	39	102	4
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.01	0.542	0.103	0.239	0.066	0.16	0.005
Departure Headway (Hd)	6.124	5.438	6.072	5.931	6.128	5.622	4.914
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	587	667	591	607	587	641	731
Service Time	3.829	3.144	3.804	3.66	3.836	3.33	2.622
HCM Lane V/C Ratio	0.01	0.538	0.103	0.239	0.066	0.159	0.005
HCM Control Delay, s/veh	8.9	14.4	9.5	10.5	9.3	9.4	7.6
HCM Lane LOS	A	B	A	B	A	A	A
HCM 95th-tile Q	0	3.3	0.3	0.9	0.2	0.6	0

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	129	3	6	103	9	7	0	18	26	0	9
Future Vol, veh/h	6	129	3	6	103	9	7	0	18	26	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	92	92	82	82	92	92	92	82	92	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	157	3	7	126	11	8	0	20	32	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	161	0	0	312	323	159	316	319	131
Stage 1	-	-	-	-	-	-	174	174	-	144	144	-
Stage 2	-	-	-	-	-	-	139	150	-	172	175	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1447	-	-	1419	-	-	640	594	886	637	597	918
Stage 1	-	-	-	-	-	-	828	755	-	859	778	-
Stage 2	-	-	-	-	-	-	864	773	-	830	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1447	-	-	1419	-	-	626	588	886	616	591	918
Mov Cap-2 Maneuver	-	-	-	-	-	-	626	588	-	616	591	-
Stage 1	-	-	-	-	-	-	824	751	-	854	774	-
Stage 2	-	-	-	-	-	-	850	770	-	807	750	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.33	0.34	9.7	10.71
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	794	78	-	-	81	-	-	673
HCM Lane V/C Ratio	0.034	0.005	-	-	0.005	-	-	0.063
HCM Control Delay (s/veh)	9.7	7.5	0	-	7.5	0	-	10.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	168	2	14	109	10	6	0	40	30	0	3
Future Vol, veh/h	3	168	2	14	109	10	6	0	40	30	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	92	92	80	80	92	92	92	80	92	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	210	2	15	136	13	7	0	43	38	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	149	0	0	212	0	0	385	398	211	390	393	143
Stage 1	-	-	-	-	-	-	219	219	-	173	173	-
Stage 2	-	-	-	-	-	-	167	179	-	218	220	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1433	-	-	1358	-	-	573	540	829	569	543	905
Stage 1	-	-	-	-	-	-	784	722	-	829	756	-
Stage 2	-	-	-	-	-	-	835	751	-	785	721	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1433	-	-	1358	-	-	562	532	829	531	535	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	562	532	-	531	535	-
Stage 1	-	-	-	-	-	-	781	720	-	819	746	-
Stage 2	-	-	-	-	-	-	822	742	-	741	719	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.13	0.71	9.93	12.06
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	781	31	-	-	164	-	-	551
HCM Lane V/C Ratio	0.064	0.003	-	-	0.011	-	-	0.075
HCM Control Delay (s/veh)	9.9	7.5	0	-	7.7	0	-	12.1
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	229	126	43	32	7
Future Vol, veh/h	9	229	126	43	32	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	254	140	48	36	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	188	0	-	0	438	164
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	274	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1386	-	-	-	576	881
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	772	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1386	-	-	-	571	881
Mov Cap-2 Maneuver	-	-	-	-	571	-
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	772	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.29	0	11.36
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	68	-	-	-	609
HCM Lane V/C Ratio	0.007	-	-	-	0.071
HCM Control Delay (s/veh)	7.6	0	-	-	11.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	227	34	83	119	50	187
Future Vol, veh/h	227	34	83	119	50	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	252	38	92	132	56	208

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	290	0	588	271
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	317	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1272	-	472	768
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	739	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1272	-	435	768
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	681	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	3.31	14.01
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	661	-	-	740	-
HCM Lane V/C Ratio	0.399	-	-	0.073	-
HCM Control Delay (s/veh)	14	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.9	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	18.8
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	391	184	194	281	18
Future Vol, veh/h	23	391	184	194	281	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	425	200	211	305	20
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	21.4	17.1	17.5
HCM LOS	C	C	C

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	0%	94%
Vol Thru, %	94%	49%	0%
Vol Right, %	0%	51%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	414	378	299
LT Vol	23	0	281
Through Vol	391	184	0
RT Vol	0	194	18
Lane Flow Rate	450	411	325
Geometry Grp	1	1	1
Degree of Util (X)	0.708	0.62	0.57
Departure Headway (Hd)	5.666	5.432	6.311
Convergence, Y/N	Yes	Yes	Yes
Cap	635	661	569
Service Time	3.737	3.507	4.383
HCM Lane V/C Ratio	0.709	0.622	0.571
HCM Control Delay, s/veh	21.4	17.1	17.5
HCM Lane LOS	C	C	C
HCM 95th-tile Q	5.8	4.3	3.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	716	0	57	0	0	0	81	373	0	0	179	358
Future Volume (veh/h)	716	0	57	0	0	0	81	373	0	0	179	358
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	738	0	59	0	0	0	84	385	0	0	185	369
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	779	0	693	0	3	0	108	751	0	2	501	425
Arrive On Green	0.44	0.00	0.44	0.00	0.00	0.00	0.06	0.40	0.00	0.00	0.27	0.27
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Grp Volume(v), veh/h	738	0	59	0	0	0	84	385	0	0	185	369
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Q Serve(g_s), s	28.4	0.0	1.6	0.0	0.0	0.0	3.3	11.1	0.0	0.0	5.7	15.8
Cycle Q Clear(g_c), s	28.4	0.0	1.6	0.0	0.0	0.0	3.3	11.1	0.0	0.0	5.7	15.8
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	779	0	693	0	3	0	108	751	0	2	501	425
V/C Ratio(X)	0.95	0.00	0.09	0.00	0.00	0.00	0.78	0.51	0.00	0.00	0.37	0.87
Avail Cap(c_a), veh/h	795	0	707	0	262	0	170	751	0	125	501	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.3	0.0	11.7	0.0	0.0	0.0	33.0	16.1	0.0	0.0	21.2	24.9
Incr Delay (d2), s/veh	20.0	0.0	0.1	0.0	0.0	0.0	4.5	2.5	0.0	0.0	2.1	20.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	0.0	0.5	0.0	0.0	0.0	1.5	4.5	0.0	0.0	2.5	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.3	0.0	11.8	0.0	0.0	0.0	37.5	18.6	0.0	0.0	23.3	45.7
LnGrp LOS	D		B				D	B			C	D
Approach Vol, veh/h		797			0			469			554	
Approach Delay, s/veh		37.3			0.0			22.0			38.2	
Approach LOS		D						C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	25.4		36.4	0.0	34.9		0.0
Change Period (Y+Rc), s	5.2	6.3		5.2	5.2	* 6.3		5.6
Max Green Setting (Gmax), s	6.8	19.1		31.8	5.0	* 21		10.0
Max Q Clear Time (g_c+I1), s	5.3	17.8		30.4	0.0	13.1		0.0
Green Ext Time (p_c), s	0.0	0.4		0.8	0.0	1.7		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	33.6
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	3	1	195	102	15
Future Vol, veh/h	42	3	1	195	102	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	46	3	1	212	111	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	333	119	127	0	-	0
Stage 1	119	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	662	933	1459	-	-	-
Stage 1	906	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	661	933	1459	-	-	-
Mov Cap-2 Maneuver	661	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	822	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	10.76	0.04	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	9	-	674	-	-
HCM Lane V/C Ratio	0.001	-	0.073	-	-
HCM Control Delay (s/veh)	7.5	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	4	1	184	101	4
Future Vol, veh/h	12	4	1	184	101	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	4	1	200	110	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	314	112	114	0	-	0
Stage 1	112	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	679	941	1475	-	-	-
Stage 1	913	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	678	941	1475	-	-	-
Mov Cap-2 Maneuver	678	-	-	-	-	-
Stage 1	912	-	-	-	-	-
Stage 2	832	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	10.06	0.04	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	10	-	729	-	-
HCM Lane V/C Ratio	0.001	-	0.024	-	-
HCM Control Delay (s/veh)	7.4	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	17	6	89	39	32	5	82	53	55	169	7
Future Vol, veh/h	2	17	6	89	39	32	5	82	53	55	169	7
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	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	20	7	102	45	37	6	94	61	63	194	8
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	8.8	10.9	10	9.9
HCM LOS	A	B	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	8%	56%	100%	0%	0%
Vol Thru, %	0%	61%	68%	24%	0%	100%	0%
Vol Right, %	0%	39%	24%	20%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	135	25	160	55	169	7
LT Vol	5	0	2	89	55	0	0
Through Vol	0	82	17	39	0	169	0
RT Vol	0	53	6	32	0	0	7
Lane Flow Rate	6	155	29	184	63	194	8
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.01	0.237	0.046	0.294	0.102	0.287	0.01
Departure Headway (Hd)	6.286	5.503	5.716	5.754	5.831	5.327	4.621
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	565	647	620	620	611	670	768
Service Time	4.071	3.287	3.514	3.528	3.598	3.093	2.387
HCM Lane V/C Ratio	0.011	0.24	0.047	0.297	0.103	0.29	0.01
HCM Control Delay, s/veh	9.1	10	8.8	10.9	9.3	10.2	7.4
HCM Lane LOS	A	A	A	B	A	B	A
HCM 95th-tile Q	0	0.9	0.1	1.2	0.3	1.2	0

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	117	7	22	151	24	5	0	13	25	0	4
Future Vol, veh/h	1	117	7	22	151	24	5	0	13	25	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	92	92	94	94	92	92	92	94	92	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	124	8	24	161	26	5	0	14	27	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	186	0	0	132	0	0	339	364	128	348	355	173
Stage 1	-	-	-	-	-	-	130	130	-	221	221	-
Stage 2	-	-	-	-	-	-	208	234	-	127	134	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1388	-	-	1453	-	-	615	564	922	607	570	870
Stage 1	-	-	-	-	-	-	873	788	-	781	720	-
Stage 2	-	-	-	-	-	-	794	711	-	877	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1388	-	-	1453	-	-	600	553	922	586	559	870
Mov Cap-2 Maneuver	-	-	-	-	-	-	600	553	-	586	559	-
Stage 1	-	-	-	-	-	-	872	788	-	767	707	-
Stage 2	-	-	-	-	-	-	775	698	-	863	785	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.06	0.86	9.6	11.18
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	802	14	-	-	199	-	-	614
HCM Lane V/C Ratio	0.024	0.001	-	-	0.016	-	-	0.05
HCM Control Delay (s/veh)	9.6	7.6	0	-	7.5	0	-	11.2
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	144	8	46	189	14	5	0	27	10	0	3
Future Vol, veh/h	3	144	8	46	189	14	5	0	27	10	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	92	92	98	98	92	92	92	98	92	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	147	9	50	193	14	5	0	29	10	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	207	0	0	156	0	0	450	465	151	453	462	200
Stage 1	-	-	-	-	-	-	157	157	-	300	300	-
Stage 2	-	-	-	-	-	-	293	307	-	153	162	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1364	-	-	1424	-	-	519	495	895	517	497	841
Stage 1	-	-	-	-	-	-	845	767	-	709	666	-
Stage 2	-	-	-	-	-	-	715	661	-	849	764	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1364	-	-	1424	-	-	495	474	895	479	476	841
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	474	-	479	476	-
Stage 1	-	-	-	-	-	-	843	766	-	681	639	-
Stage 2	-	-	-	-	-	-	684	635	-	819	762	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.15	1.48	9.74	11.94
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	795	34	-	-	345	-	-	532
HCM Lane V/C Ratio	0.044	0.002	-	-	0.035	-	-	0.025
HCM Control Delay (s/veh)	9.7	7.6	0	-	7.6	0	-	11.9
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	179	244	25	11	5
Future Vol, veh/h	2	179	244	25	11	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	195	265	27	12	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	292	0	-	0	478	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1269	-	-	-	546	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1269	-	-	-	545	760
Mov Cap-2 Maneuver	-	-	-	-	545	-
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	835	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.09	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	20	-	-	-	598
HCM Lane V/C Ratio	0.002	-	-	-	0.029
HCM Control Delay (s/veh)	7.8	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	167	23	156	260	9	103
Future Vol, veh/h	167	23	156	260	9	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	180	25	168	280	10	111

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	204	0	807	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	615	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1367	-	351	850
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1367	-	300	850
Mov Cap-2 Maneuver	-	-	-	-	300	-
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	3	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	741	-	-	675	-
HCM Lane V/C Ratio	0.163	-	-	0.123	-
HCM Control Delay (s/veh)	10.8	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.4	-

Intersection	
Intersection Delay, s/veh	22.7
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	266	409	191	188	7
Future Vol, veh/h	4	266	409	191	188	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	283	435	203	200	7
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	12.7	30.3	13
HCM LOS	B	D	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	0%	96%
Vol Thru, %	99%	68%	0%
Vol Right, %	0%	32%	4%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	270	600	195
LT Vol	4	0	188
Through Vol	266	409	0
RT Vol	0	191	7
Lane Flow Rate	287	638	207
Geometry Grp	1	1	1
Degree of Util (X)	0.436	0.862	0.365
Departure Headway (Hd)	5.467	4.86	6.341
Convergence, Y/N	Yes	Yes	Yes
Cap	658	747	566
Service Time	3.509	2.892	4.388
HCM Lane V/C Ratio	0.436	0.854	0.366
HCM Control Delay, s/veh	12.7	30.3	13
HCM Lane LOS	B	D	B
HCM 95th-tile Q	2.2	10.3	1.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	429	0	71	0	0	0	62	254	0	1	333	586
Future Volume (veh/h)	429	0	71	0	0	0	62	254	0	1	333	586
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	452	0	75	0	0	0	65	267	0	1	351	617
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	538	0	479	0	3	0	94	844	0	3	748	634
Arrive On Green	0.30	0.00	0.30	0.00	0.00	0.00	0.05	0.45	0.00	0.00	0.40	0.40
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Grp Volume(v), veh/h	452	0	75	0	0	0	65	267	0	1	351	617
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1870	0	1781	1870	1585
Q Serve(g_s), s	15.5	0.0	2.3	0.0	0.0	0.0	2.3	6.0	0.0	0.0	9.1	25.0
Cycle Q Clear(g_c), s	15.5	0.0	2.3	0.0	0.0	0.0	2.3	6.0	0.0	0.0	9.1	25.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	538	0	479	0	3	0	94	844	0	3	748	634
V/C Ratio(X)	0.84	0.00	0.16	0.00	0.00	0.00	0.69	0.32	0.00	0.37	0.47	0.97
Avail Cap(c_a), veh/h	723	0	643	0	286	0	158	844	0	136	748	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	0.0	16.7	0.0	0.0	0.0	30.4	11.5	0.0	32.6	14.5	19.3
Incr Delay (d2), s/veh	6.6	0.0	0.2	0.0	0.0	0.0	3.3	1.0	0.0	27.9	2.1	29.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	0.8	0.0	0.0	0.0	1.0	2.2	0.0	0.0	3.6	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.9	0.0	16.8	0.0	0.0	0.0	33.7	12.4	0.0	60.5	16.6	49.1
LnGrp LOS	C		B				C	B		E	B	D
Approach Vol, veh/h		527			0			332			969	
Approach Delay, s/veh		26.4			0.0			16.6			37.3	
Approach LOS		C						B			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.7	32.4		24.2	5.3	35.8		0.0
Change Period (Y+Rc), s	5.2	6.3		4.5	5.2	* 6.3		5.6
Max Green Setting (Gmax), s	5.8	26.1		26.5	5.0	* 27		10.0
Max Q Clear Time (g_c+I1), s	4.3	27.0		17.5	2.0	8.0		0.0
Green Ext Time (p_c), s	0.0	0.0		2.2	0.0	1.8		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	30.4
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	2	3	84	130	49
Future Vol, veh/h	28	2	3	84	130	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	2	3	91	141	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	266	168	195	0	-	0
Stage 1	168	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	723	876	1379	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	926	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	722	876	1379	-	-	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	10.16	0.26	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	62	-	730	-	-
HCM Lane V/C Ratio	0.002	-	0.045	-	-
HCM Control Delay (s/veh)	7.6	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	2	5	79	118	14
Future Vol, veh/h	8	2	5	79	118	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	2	5	86	128	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	233	136	143	0	-	0
Stage 1	136	-	-	-	-	-
Stage 2	97	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	756	913	1439	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	927	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	753	913	1439	-	-	-
Mov Cap-2 Maneuver	753	-	-	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	927	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.68	0.45	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	107	-	780	-	-
HCM Lane V/C Ratio	0.004	-	0.014	-	-
HCM Control Delay (s/veh)	7.5	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

APPENDIX F

CITY OF WEST SACRAMENTO *MARSHALL & HIGGINS PUBLIC SAFETY AND TRAFFIC CALMING PROJECT* STUDY

FROM:	Jimmy Fong TE, City of West Sacramento, Community Development Department – Transportation and Mobility Division
DATE:	January 29, 2024
SUBJECT:	Marshall & Higgins Public Safety and Traffic Calming Project – Existing Traffic Operations and Proposed Traffic Control Modifications

The City of West Sacramento, Community Development Department, Transportation and Mobility Division is managing the Marshall and Higgins Public Safety and Traffic Calming Project (CIP 16014).

This memorandum summarizes the traffic operations along the Marshall Road corridor under existing conditions, and with the inclusion of the proposed Brar Farms residential development at the southwest corner of Marshall Road and Otis Avenue. Additionally, this memorandum summarizes the analysis of traffic control options at key intersections along the corridor to address traffic operations, safety, and traffic calming improvements along the corridor.

A separate memorandum will be prepared summarizing the analysis of proposed infrastructure improvements for Marshall Road and the study area under future long-term conditions, which may include additional development densification for parcels along Marshall Road, nearby developments such as River Park, and additional major roadway connections (primarily Enterprise Bridge) that may introduce new travel patterns along the corridor.

Additional truck traffic management solutions will be analyzed and presented in a separate memorandum that documents infrastructure improvements to limit truck traffic in this residential area. Those solutions may include roadway design element changes to further reinforce areas where trucks are not allowed, including adjustment of lane widths, adjustment of intersection approaches, addition of median curbs, and shortening of curb turning radii.

Introduction

Background

The goal of the Marshall & Higgins Public Safety and Traffic Calming Project is to develop safety, traffic calming improvements, bicycle/pedestrian infrastructure improvements consistent with Complete Streets objectives. This corridor has regularly received requests from residents regarding speeding issues, pedestrian and bicycle facility gaps, and is a reoccurring location for police enforcement of traffic and transportation issues. This study looks to analyze transportation improvements along corridor to address these issues, meet the demand of future development, address City of West Sacramento traffic operations goals, and provide safety and traffic calming improvements to support bicycle and pedestrian travel.

Study Intersections

For this memorandum, all intersections along Marshall Road between Southport Parkway and Jefferson Boulevard are included as study intersections, as presented in **Table 1**. The existing traffic control type for each intersection is also presented. The study location and intersections are presented in **Figure 1**.

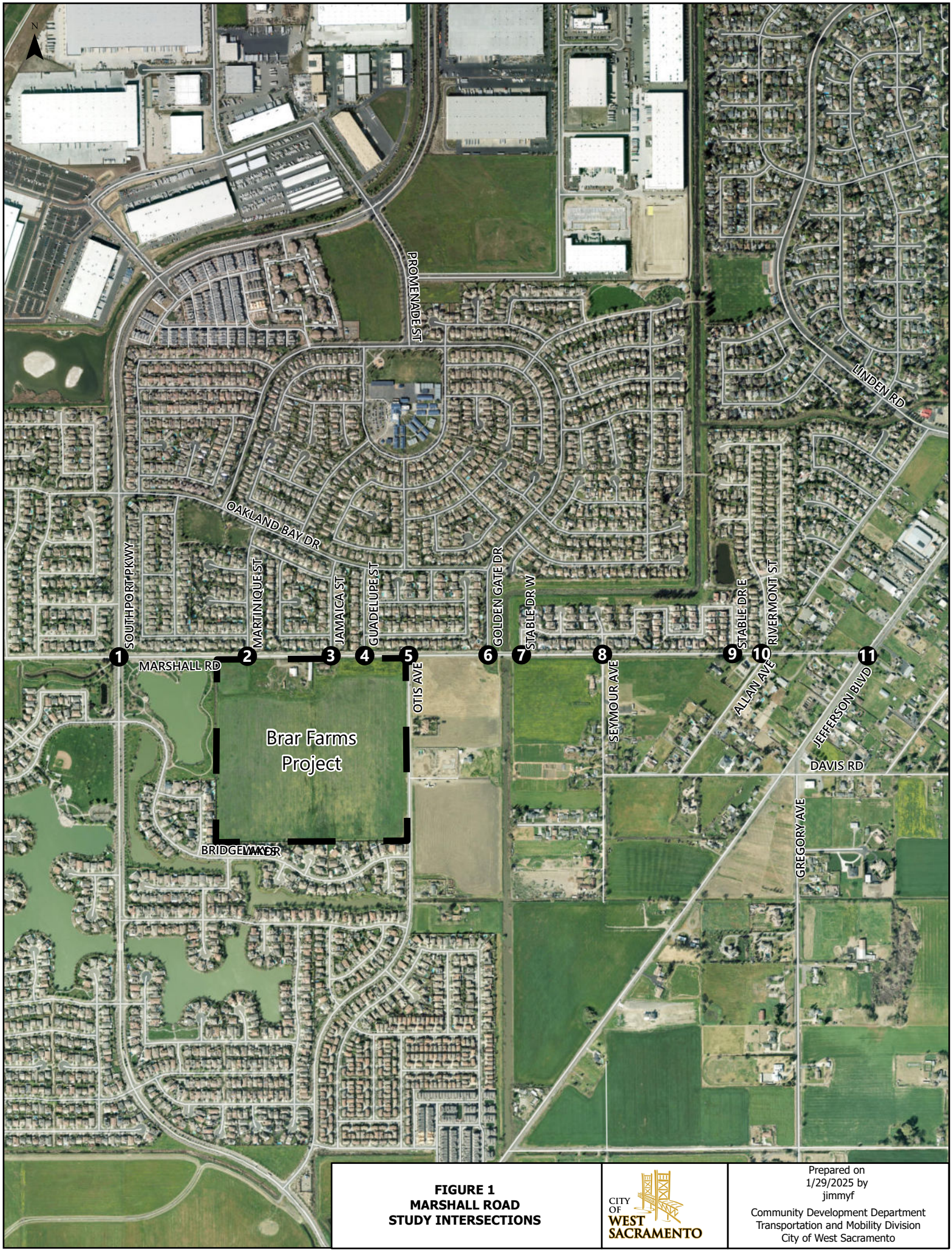


FIGURE 1
MARSHALL ROAD
STUDY INTERSECTIONS

CITY OF WEST SACRAMENTO

Prepared on
1/29/2025 by
jimmyf
Community Development Department
Transportation and Mobility Division
City of West Sacramento

Table 1: Study Intersections	
Intersection	**Existing Traffic Control Type**
1. Marshall Road / Southport Parkway	All-Way Stop Control
2. Marshall Road / Martinique Street	Side-Street Stop Control
3. Marshall Road / Jamaica Street	Side-Street Stop Control
4. Marshall Road / Guadelupe Street	Side-Street Stop Control
5. Marshall Road / Otis Avenue	Side-Street Stop Control
6. Marshall Road / Golden Gate Drive	All-Way Stop Control
7. Marshall Road / Stable Drive (West)	Side-Street Stop Control
8. Marshall Road / Seymour Avenue	Roundabout
9. Marshall Road / Stable Drive (East)	Side-Street Stop Control
10. Marshall Road / Rivermont Street / Allan Avenue	Side-Street Stop Control
11. Marshall Road / Jefferson Boulevard	Signal

Data Collection

Traffic count data at the study intersections (expect for intersections 4, 7, and 9) was collected as part of the Marshall and Higgins Public Safety and Traffic Calming Project on Thursday, November 7, 2024, when nearby schools were in session. Counts were collected during the AM peak period between 7 – 9 AM, and PM peak period between 3 – 6 PM, and include collection of heavy vehicles, bicycles, and pedestrians.

City staff also performed field observations along with the traffic count data collection to observe traffic operations and vehicle queuing along the corridor.

Traffic count data at the intersection 4 (Marshall Road / Guadelupe Street) uses intersection turning movement data from the initial Brar Farms (3425 Marshall Road Residential) Transportation Study, conducted on Wednesday, October 2, 2024.

Traffic volumes for intersections 7 and 9 were calculated based on the balance of traffic volumes between adjacent intersections.

Speed survey data along the corridor was most recently conducted between 2021 and 2022.

Analysis Methodology

Study Scenarios

The following scenarios were analyzed in this study:

- Existing Conditions
- Existing Plus Brar Farms Project – represents existing conditions plus the proposed Brar Farms development. Also referred to as Corridor Traffic Control Alternative A.

Additional scenarios looked at evaluating various traffic control options (side-street stop control, all-way stop control, roundabout) at key intersections along the Marshall Road corridor based on

traffic volumes from Existing Plus Brar Farms Project. Key intersections were selected based on expected traffic volumes and spacing between adjacent intersections.

- Corridor Traffic Control Alternative B – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (all-way stop control), Jamaica Street (all-way stop control), Otis Avenue (all-way stop control), and Rivermont Street/Allan Avenue (all-way stop control)
- Corridor Traffic Control Alternative C – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (roundabout), and Rivermont Street/Allan Avenue (roundabout)
- Corridor Traffic Control Alternative D – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (all-way stop control), Golden Gate Drive (roundabout), and Rivermont Street/Allan Avenue (roundabout)

Following evaluation of the Corridor Traffic Control Alternatives analysis, City staff developed and analyzed the preferred treatments presented in the Corridor Traffic Control Preferred Alternative section. This scenario represents Existing Plus Bar Farms Project traffic volumes, plus proposed modifications to enhanced pedestrian crossing at Martinque Street (keeping side-street stop control), and proposed modifications to traffic control at Jamaica Street (all-way stop control), Otis Avenue (roundabout), and Rivermont Street/Allan Avenue (all-way stop control).

Table 2 summarizes the traffic control type at the key intersections along Marshall Road for each of the traffic control alternatives. This is not an exhaustive list of all combinations of traffic control options for the Marshall corridor intersections; however, should provide insight into the expected impact of each control type of traffic operations, vehicle queueing, and corridor travel speed. Alternatives A through D were initially analyzed and reviewed by City Staff prior to development and analysis of the Preferred Alternative.

Table 2: Marshall Road Traffic Control Alternatives

Scenario	Martinique St	Jamaica St	Otis Ave	Golden Gate Dr	Seymore Ave	Rivermont St / Allan Dr
Existing	SSSC	SSSC	SSSC	AWSC	Roundabout	SSSC
Existing Plus Brar Farms (Alternative A)	SSSC	SSSC	SSSC	AWSC	Roundabout	SSSC
Corridor Traffic Control Alternative B	AWSC	AWSC	AWSC	AWSC	Roundabout	AWSC
Corridor Traffic Control Alternative C	Roundabout	SSSC	Roundabout	AWSC	Roundabout	Roundabout
Corridor Traffic Control Alternative D	Roundabout	SSSC	AWSC	Roundabout	Roundabout	Roundabout
Corridor Traffic Control Preferred Alternative	SSSC	AWSC	Roundabout	AWSC	Roundabout	AWSC

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Study Periods

The study analyzes traffic operations during the weekday AM and PM peak hours. Based on the traffic data collection, the AM peak hour along the Marshall Road corridor occurs between 7:30 AM – 8:30 AM. The PM peak hour occurs between 4:45 PM – 5:45 PM.

Intersection Operations

Intersections were analyzed during the study periods following the methodology contained in the *Highway Capacity Manual, 7th Edition* (HCM 7).

The *Highway Capacity Manual* procedures describe traffic operating conditions from a driver's perspective based on the concept of level of service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades provide an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. Perspectives from other roadway network users such as bicyclists and pedestrians are not accounted for in this methodology.

Table 3 displays the average control delay per vehicle for each LOS threshold for signalized and unsignalized intersections. For signalized, roundabout, and all-way stop-controlled intersections the LOS is based on the average control delay of all vehicles traveling through the intersection. For side-street stop-controlled intersections, the delay and LOS for the movement with the greatest average delay is reported along with the average delay for the entire intersection.

Table 3: Intersection Level of Service Definitions

Level of Service	Average Delay (seconds/vehicle)	
	Signalized	**Unsignalized**
A	≤ 10	≤ 10
B	> 10 to 20	> 10 to 15
C	> 20 to 35	> 15 to 25
D	> 35 to 55	> 25 to 35
E	> 55 to 80	> 35 to 50
F	> 80	> 50

Source: *Highway Capacity Manual 7th Edition* (Transportation Research Board, 2022)

These methodologies were applied using the SimTraffic microsimulation software program, which considers the effects of lane utilization, turn pocket storage lengths, upstream/downstream queue spillbacks, coordinated signal timings, pedestrian crossing activity, and other conditions on intersection and overall corridor operations. Utilization of SimTraffic microsimulation analysis is appropriate given the presence of closely spaced intersections, and overall levels of traffic and vehicle queuing along the Marshall Road corridor. Reported results are based on an average of 10 runs. The following procedures and assumptions were applied in the development of the SimTraffic model.

- Roadway geometric data were gathered using aerial photographs and field observations.
- Peak-hour traffic volumes were entered into the model according to the peak hour of the study corridor.
- Signal phasing and timings were based on the latest signal timing plans from the City of West Sacramento.

- The peak hour factor (PHF) of 0.93 during both the AM and PM peak hours for the study corridor, based on the existing traffic counts. Under Near Term conditions, the peak hour factor is not expected to change from existing conditions.
- The heavy vehicle percentage of 2 percent during both the AM and PM peak hours for the study corridor, based on the existing traffic counts. Under Near Term conditions, the heavy vehicle percentage is expected to remain consistent from existing conditions.

Corridor Speeds

This study looked at the speeds along the Marshall corridor, primarily since speeding and desire for traffic calming elements are ongoing reported issues.

The traffic operations SimTraffic model network included input of the 85th percentile speed surveys, which for the segment of Marshall Road between Southport Parkway and Golden Gate Drive is 45 miles per hour, and between Golden Gate Drive and Jefferson Boulevard is 40 miles per hour.

SimTraffic outputs for Arterial Level of Service report the average arterial speed between each intersection, and for average travel speed along the entire Marshall Road corridor.

All-Way Stop Warrants

Intersections along the Marshall Road corridor that currently have side-street stop control were analyzed with the Existing Plus Brar Farms Project traffic volumes and overall network conditions to determine if they meet the criteria in the *California Manual on Uniform Traffic Control Devices* (MUTCD), Section 2B.07 Multi-Way Stop Applications, that warrants all-way stop control.

The all-way stop warrant analysis may also provide insight into appropriate locations for roundabouts as an alternative to meet the needs for both traffic operations and traffic calming.

Policy Considerations

The *City of West Sacramento General Plan Mobility Element* outlines the relevant traffic operations goals for this study area:

Goal M-3.2 Automobile Level of Service

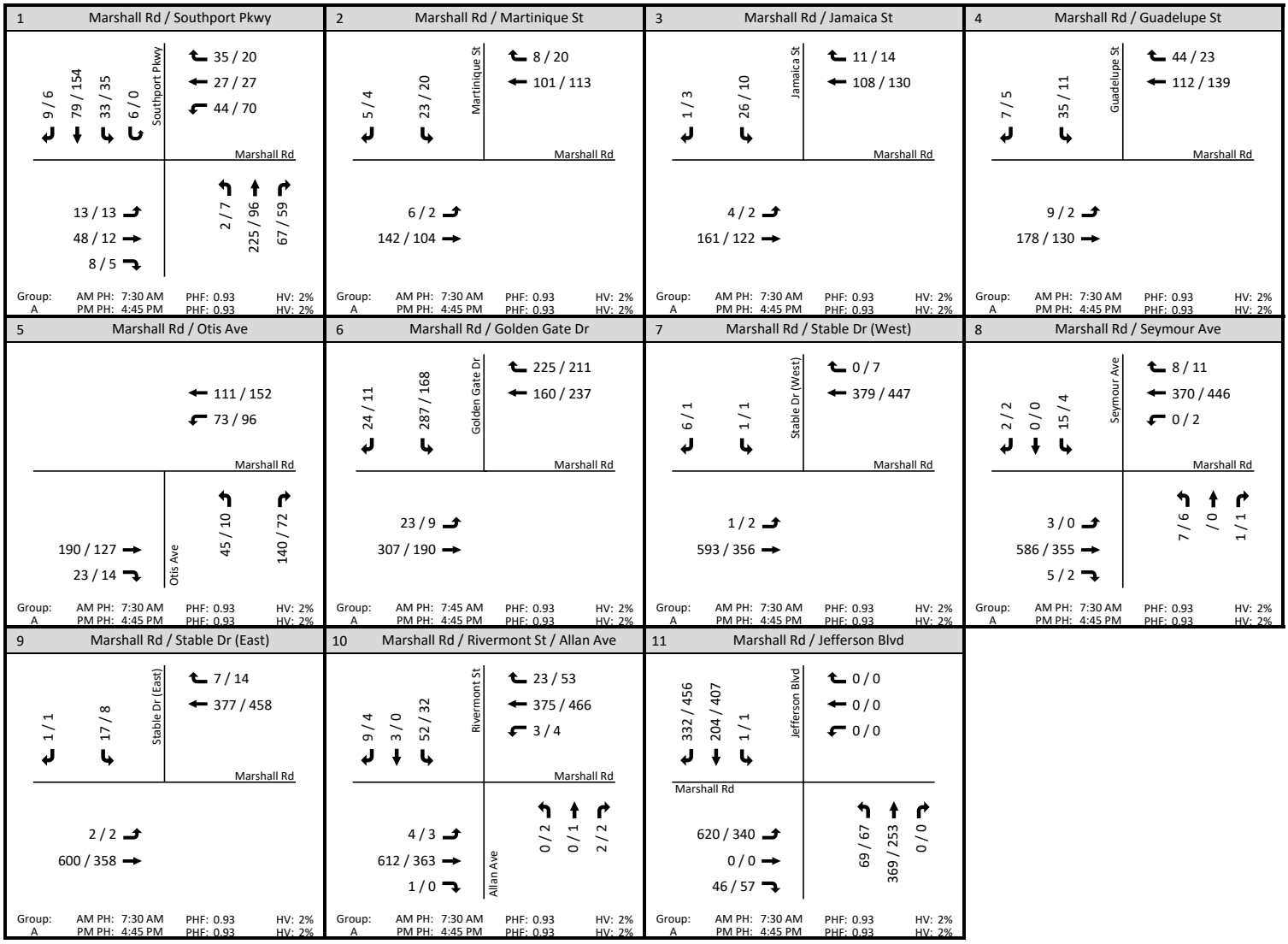
> For planning purposes, the City shall endeavor to maintain a Level of Service "C" on all streets within the City, except at intersections and on roadway segments within one-quarter mile of a freeway interchange or bridge crossing of the Deep Water Ship Channel, barge canal, or Sacramento River, where a Level of Service "D" shall be deemed acceptable, and within pedestrian oriented, high density, mixed-use areas, such as the Bridge District Specific Plan area, the Washington Specific Plan area, and West Capitol Avenue from Harbor Blvd. east, where a Level of Service "E" shall be deemed acceptable.

Based on the description, the entire Marshall Road corridor has Level of Service C threshold for acceptable traffic operations.

Existing Conditions

Existing Traffic Volumes

The existing intersection turning movement traffic volumes during the AM and PM peak hours are presented in **Figure 2**.



Intersection AM / PM Peak Hour Vehicle Volumes

Figure 2
Existing Conditions

Existing Intersection Operations

Table 4 displays the traffic operations under existing conditions.

Table 4: Existing Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.9 6.1	A A
2. Marshall Road / Martinique Street	SSSC	AM PM	1.5 (4.7 SB) 1.0 (4.3 SB)	A (A) A (A)
3. Marshall Road / Jamaica Street	SSSC	AM PM	0.8 (5.0 SB) 0.4 (4.3 SB)	A (A) A (A)
4. Marshall Road / Guadelupe Street	SSSC	AM PM	1.0 (5.3 SB) 0.5 (4.5 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	SSSC	AM PM	3.2 (4.8 NB) 3.1 (4.7 WB)	A (A) A (A)
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	8.8 (11.4 EB) 7.3 (9.1 EB)	A (B) A (A)
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.1 (4.2 SB) 1.8 (4.9 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	6.5 6.1	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	0.8 (10.0 SB) 0.5 (6.5 SB)	A A
10. Marshall Road / Rivermont Street / Allan Avenue	SSSC	AM PM	1.5 (12.0 SB) 1.4 (9.3)	A (B) A (A)
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	24.9 21.4	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

All intersections operate at acceptable LOS C or better. City staff conducted field observations of traffic operations and queuing conditions and noted that the eastbound queue from Marshall Road / Jefferson Boulevard spilled back close to the Marshall Road / Rivermont Street / Allan Avenue intersection during the AM peak hour, often making it difficult for southbound left turning drivers from finding the appropriate gap in traffic to enter onto Marshall Road.

Existing Corridor Speeds

Table 5 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard.

Table 5: Existing Marshall Road Corridor Vehicle Speeds

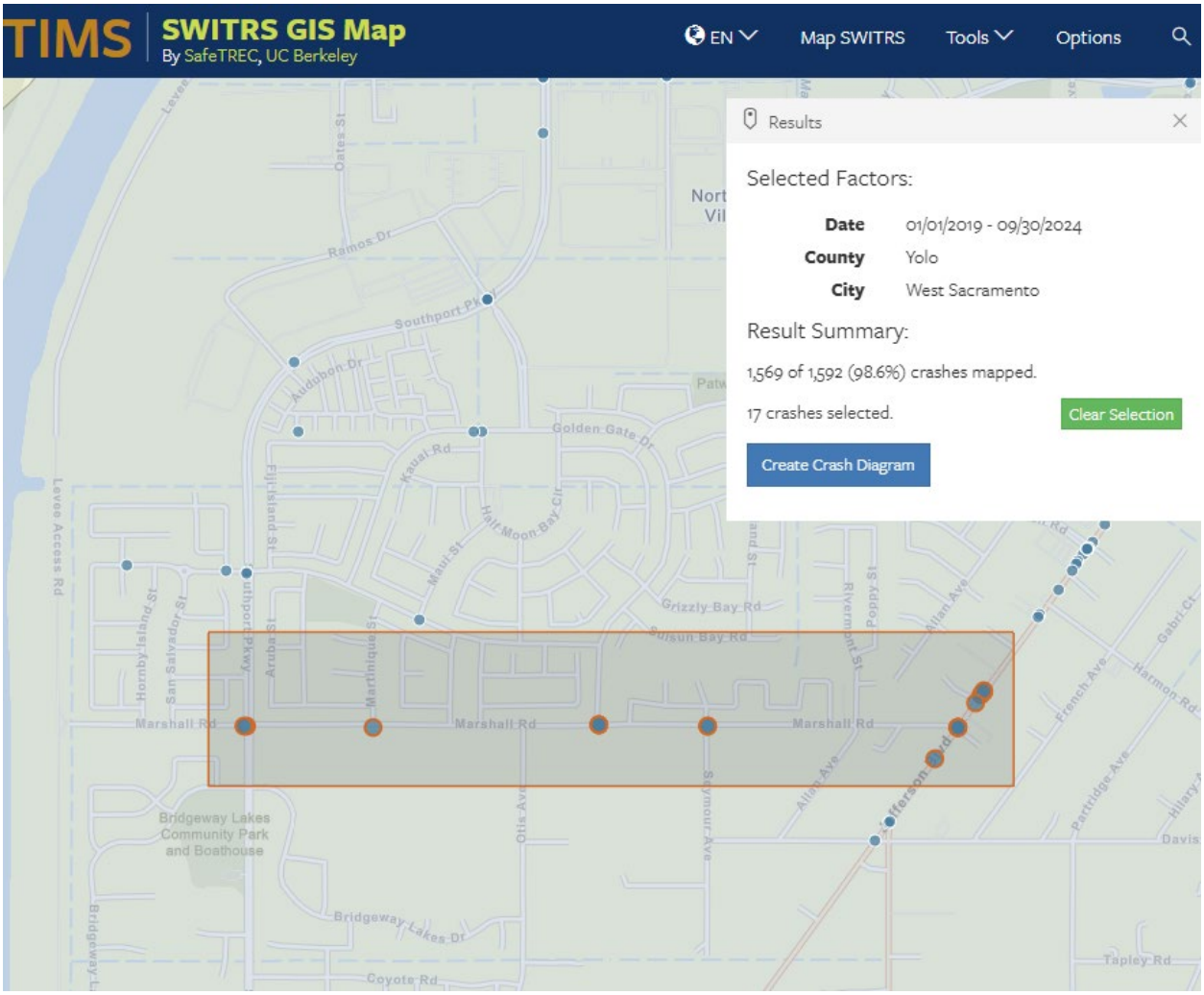
Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.2	24	24.1	31
		PM	18.1	25	24.5	31
2. Martinique Street	SSSC	AM	20.7	36	11.0	44
		PM	20.4	37	11.2	43
3. Jamaica Street	SSSC	AM	11.1	44	4.6	41
		PM	10.8	45	4.5	42
4. Guadelupe Street	SSSC	AM	4.4	42	6.3	42
		PM	4.3	44	6.1	43
5. Otis Avenue	SSSC	AM	6.6	40	15.1	30
		PM	6.1	42	15.2	30
6. Golden Gate Drive	AWSC	AM	22.3	20	14.9	13
		PM	19.6	23	14.2	14
7. Stable Drive (West)	SSSC	AM	8.8	22	17.2	27
		PM	8.5	23	17.4	27
8. Seymour Avenue	Roundabout	AM	18.1	26	25.0	30
		PM	16.9	28	25.5	30
9. Stable Drive (East)	SSSC	AM	24.0	31	4.7	38
		PM	23.6	32	4.9	37
10. Rivermont Street / Allan Avenue	SSSC	AM	4.9	37	0.6	-
		PM	4.6	39	0.0	
11. Jefferson Boulevard	Signal	AM	50.7	12	-	-
		PM	46.7	13		
Corridor Total	–	AM	190.9	25	123.4	35
		PM	179.8	27	123.4	35

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to traffic control devices (stop control, roundabout, and traffic signal), traffic volumes, and vehicle queuing reduces the average vehicle speed below the free flow speed of the roadway. In the eastbound direction, due to the lack of traffic control devices between Southport Parkway and Golden Gate Drive, the maximum speed reaches 45 miles per hour approaching Jamaica Street. In the westbound direction, the maximum speed reaches 44 mph approaching Martinque Street.

Existing Collision History

The TIMS SWITRS database was used to summarize the reported collisions that occurred along Marshall Road from 2019 to the latest available data in September 2024 (approximately 6 years of data). There were 17 reported crashes along the corridor during that period, with the main location at Marshall Road / Jefferson Boulevard intersection (7 reported collisions). No specific locations had 5 or more collisions during a 12-month period.



Existing Plus Brar Farms Project (Corridor Traffic Control Alternative A)

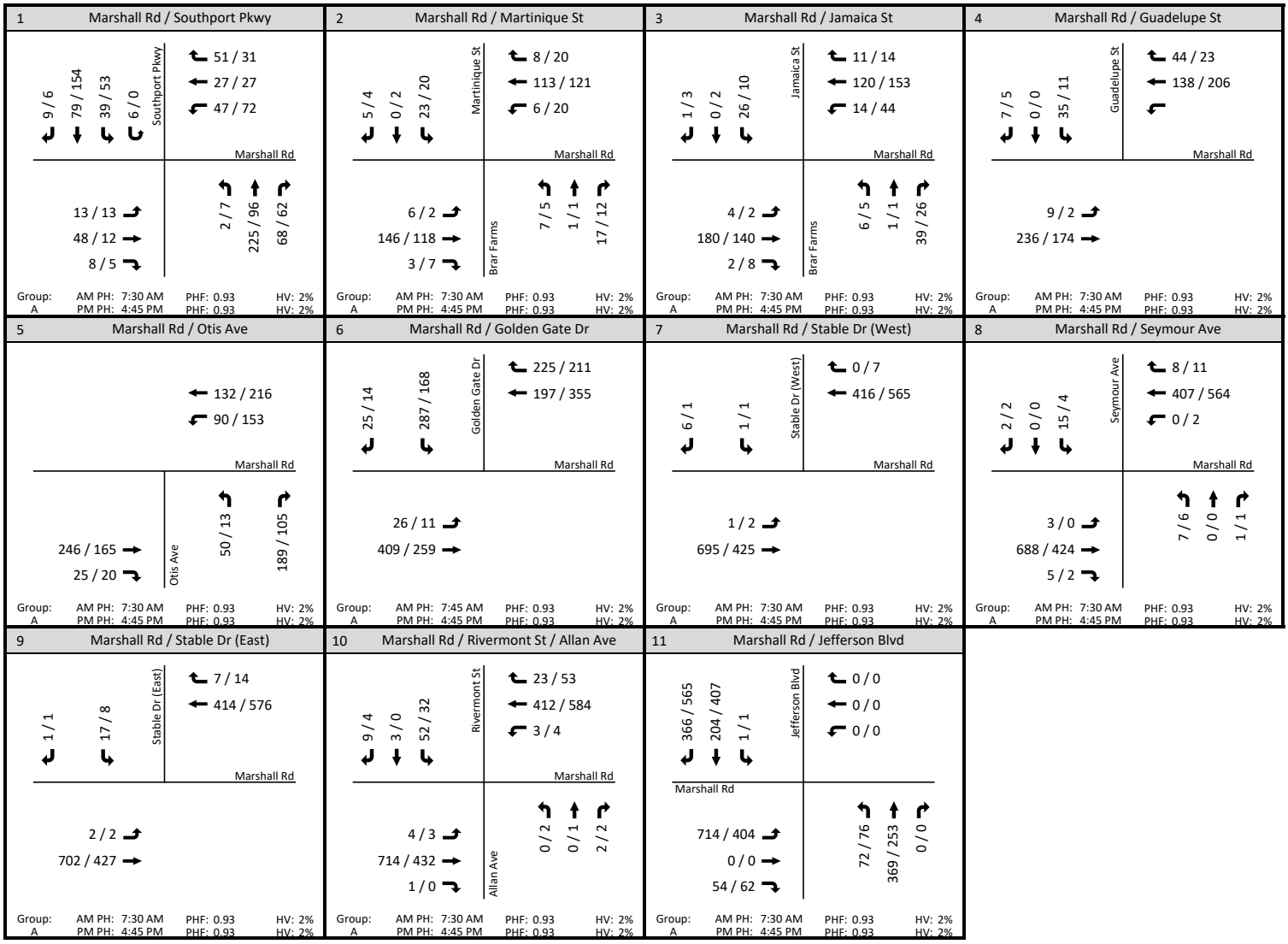
Proposed Brar Farms Project

The Brar Farms Project proposes development of 259 single family dwelling units located at 3425 Marshall Road, which is located on the southwest corner of Marshall Road / Otis Avenue intersection. Access would be provided with two driveways on Marshall Road (at Martinque Street and at Jamaica Street), and two driveways on Otis Avenue (new intersections).

The *Brar Farms (3425 Marshall Road Residential) Transportation Study* documents details regarding the proposed project trip generation, trip distribution and assignment, and project traffic volumes through the study area.

Existing Plus Brar Farms Project Traffic Volumes

Existing plus Brar Farms intersection turning movement traffic volumes during the AM and PM peak hours are presented in **Figure 3**.



Intersection AM / PM Peak Hour Vehicle Volumes

Figure 3
Existing Plus Brar Farms Project

Existing Plus Brar Farms Intersection Operations

Table 6 displays the traffic operations under Existing Plus Brar Farms conditions.

Table 6: Existing Plus Brar Farms (Corridor Traffic Control Alternative A) Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.1	A A
2. Marshall Road / Martinique Street	SSSC	AM PM	1.6 (5.0 SB) 1.3 (4.8 SB)	A (A) A (A)
3. Marshall Road / Jamaica Street	SSSC	AM PM	1.3 (5.9 SB) 1.1 (5.5 SB)	A (A) A (A)
4. Marshall Road / Guadelupe Street	SSSC	AM PM	1.1 (5.6 SB) 0.7 (5.1 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	SSSC	AM PM	4.0 (6.2 NB) 3.8 (5.4 WB)	A (A) A (A)
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	10.5 8.8	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.4 (8.2 SB) 2.2 (5.3 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.2 (7.5 EB) 6.8 (7.6 WB)	A (A) A (A)
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	2.4 (16.3 SB) 0.6 (8.5 SB)	A (C) A (A)
10. Marshall Road / Rivermont Street / Allan Avenue	SSSC	AM PM	7.3 (87.5 SB) 1.6 (11.7 SB)	A (F) A (B)
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	33.6 33.0	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The proposed Brar Farms development would add trips to Marshall Road, primarily adding traffic and vehicle delay closer to the Marshall Road / Jefferson Boulevard signalized intersection, which would remain within the high range of acceptable LOS C conditions. The added trips on Marshall Road would create fewer gaps in traffic for the side-street stop controlled approaches, notably Rivermont Street results in LOS F conditions during the AM peak hour.

Existing Plus Brar Farms Corridor Speeds

Table 7 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Existing Plus Brar Farms conditions.

Table 7: Existing Plus Brar Farms (Corridor Traffic Control Alternative A) Marshall Road Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.4	24	25.4	30
		PM	18.6	25	22.8	33
2. Martinique Street	SSSC	AM	20.9	36	11.1	44
		PM	18.5	41	11.4	42
3. Jamaica Street	SSSC	AM	11.3	43	4.8	39
		PM	11.1	44	4.9	38
4. Guadelupe Street	SSSC	AM	4.6	41	6.4	40
		PM	4.4	42	6.4	41
5. Otis Avenue	SSSC	AM	6.9	38	15.4	29
		PM	6.4	41	15.9	28
6. Golden Gate Drive	AWSC	AM	24.6	18	16.1	12
		PM	20.5	22	15.6	13
7. Stable Drive (West)	SSSC	AM	8.9	22	17.4	27
		PM	8.4	23	17.7	27
8. Seymour Avenue	Roundabout	AM	18.9	25	25.5	30
		PM	17.2	27	26.3	29
9. Stable Drive (East)	SSSC	AM	26.5	28	4.8	38
		PM	23.7	32	5.0	36
10. Rivermont Street / Allan Avenue	SSSC	AM	7.4	24	-	-
		PM	4.7	39		
11. Jefferson Boulevard	Signal	AM	69.4	9	-	-
		PM	50.5	12		
Corridor Total	–	AM	218.8	22	126.9	34
		PM	183.9	26	126.1	35

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to traffic control devices (stop control, roundabout, and traffic signal), traffic volumes plus trips associated with Brar Farms development, and vehicle queuing reduces the average vehicle speed below the free flow speed of the roadway.

In the eastbound direction, due to the lack of traffic control devices between Southport Parkway and Golden Gate Drive, the maximum speed reaches 44 miles per hour approaching Jamaica Street. In the westbound direction, the maximum speed reaches 44 mph approaching Martinque Street. Overall, the added delay, compared to Existing Conditions, along the corridor increases the eastbound corridor travel time by 28 seconds during the AM peak hour, and less than 5 seconds during the PM peak hour and for all periods in the westbound direction.

Existing Plus Brar Farms All-Way Stop Control Warrants

The all-way stop control warrant analysis was completed following the guidance criteria and optional criteria following the *California Manual on Uniform Traffic Control Devices* (MUTCD), Section 2B.07 Multi-Way Stop Applications. The criteria detail is noted as follows:

Guidance

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
C. Minimum volumes:
    1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
    2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
    3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.
D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Option: Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;
B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and
D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

Table 8 displays the all-way stop control warrants for key intersections on Marshall Road.

Table 8: Existing Plus Brar Farms All-Way Stop Control Warrants

Cross-Street	Guidance Criteria						Option Criteria			
	A	B	C			D	A	B	C	D
			1	2	3					
Marshall Road / Martinique Street	N/A	No	No	No	Yes	No	No	Yes	N/A	No
Marshall Road / Jamaica Street	N/A	No	Yes	No	Yes	No	No	Yes	N/A	No
Marshall Road / Otis Avenue	N/A	No	Yes	No	Yes	No	No	Yes	N/A	Yes
Marshall Road / Rivermont Street / Allan Avenue	N/A	No	Yes	Yes	Yes	No	Yes	Yes	N/A	No

Marshall Road / Martinique Street intersection does not meet any of the guidance criteria primarily based on traffic volumes and vehicle delay; however, does meet one of the optional criteria to provide safe crossing of Marshall Road due to anticipated demand for pedestrians connecting to school (Bridgeway Island Elementary) and other destinations (Bridgeway Lakes Community Park).

Marshall Road / Jamaica Street intersection meets one of the guidance criteria based on traffic volumes, in addition to meeting the same optional criteria based on providing safe crossing for pedestrians

Marshall Road / Otis Avenue intersection meets one of the guidance criteria based on traffic volumes, and two optional criteria based on pedestrian access and crossing safety, and the two roadways having the similar design and operating characteristics.

Marshall Road / Rivermont Street / Allan Avenue intersection meets two guidance criteria based on both traffic volumes and vehicle delay, and two optional criteria based on pedestrian access and crossing safety, and need to control left turn volumes.

As previously described, intersections meeting criteria for all-way stop warrant may also be appropriate locations for roundabouts as an alternative to meet the needs for both traffic operations and traffic calming, considering roundabouts would provide traffic control for all approaches to an intersection.

Corridor Traffic Control Alternative B

Corridor Traffic Control Alternative B represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (all-way stop control), Jamaica Street (all-way stop control), Otis Avenue (all-way stop control), and Rivermont Street/Allan Avenue (all-way stop control).

Corridor Traffic Control Alternative B Intersection Operations

Table 9 displays the traffic operations under Corridor Traffic Control Alternative B.

Table 9: Corridor Traffic Control Alternative B Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	7.5 6.9	A A
2. Marshall Road / Martinique Street	**AWSC**	AM PM	9.4 9.0	A A
3. Marshall Road / Jamaica Street	**AWSC**	AM PM	8.6 8.2	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	3.5 (6.0 SB) 3.7 (5.1 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**AWSC**	AM PM	8.3 9.2	A A
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	11.6 9.1	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	3.0 (17.6 SB) 2.1 (12.8 SB)	A (C) A (B)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	9.7 6.2	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	14.2 (65.7 SB) 2.8 (14.1 SB)	B (F) A (B)
10. Marshall Road / Rivermont Street / Allan Avenue	**AWSC**	AM PM	14.3 11.6	B B
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	35.7 32.1	D C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The change in intersection 10 (Marshall Road / Rivermont Street / Allan Avenue) would allow the intersection to operate at LOS B, allowing movements from Rivermont Street or Allan Avenue to enter the intersection without waiting for gaps in traffic from Marshall Road. This may shift some of the delay to intersection 11 (Marshall Road / Jefferson Boulevard) which would just enter LOS D conditions. Also, the presence of a stop control at Rivermont Street / Allan Avenue may shift vehicle queuing to create fewer gaps in traffic for vehicles from intersection 9 (Stable Drive East) from entering Marshall Road, potentially creating LOS F conditions for the side-street movement; however, the low traffic volumes and the alternative route to enter at Seymour Avenue may provide acceptable conditions.

Corridor Traffic Control Alternative B Speeds

Table 10 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Corridor Traffic Control Alternative B.

Table 10: Corridor Traffic Control Alternative B Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.1	24	28.4	26
		PM	19.5	24	27.2	28
2. Martinique Street	**AWSC**	AM	29.0	26	22.9	21
		PM	25.4	29	22.9	21
3. Jamaica Street	**AWSC**	AM	23.4	21	12.2	15
		PM	23.0	21	12.4	15
4. Guadelupe Street	SSSC	AM	8.2	23	10.1	26
		PM	8.0	23	10.0	26
5. Otis Avenue	**AWSC**	AM	15.5	17	23.2	20
		PM	14.5	18	23.7	19
6. Golden Gate Drive	AWSC	AM	28.7	16	15.5	13
		PM	23.9	19	15.3	13
7. Stable Drive (West)	SSSC	AM	9.9	20	17.2	27
		PM	8.4	24	17.6	27
8. Seymour Avenue	Roundabout	AM	23.7	20	24.6	31
		PM	17.2	27	25.3	30
9. Stable Drive (East)	SSSC	AM	42.5	18	7.8	23
		PM	24.8	30	8.0	23
10. Rivermont Street / Allan Avenue	**AWSC**	AM	21.3	9	-	-
		PM	12.9	14		
11. Jefferson Boulevard	Signal	AM	73.4	8	-	-
		PM	50.3	12		
Corridor Total	–	AM	294.6	16	161.9	27
		PM	228.0	21	162.4	27

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to added stop control along Marshall Road would increase vehicle delay and reduce vehicle speed along the corridor.

In the eastbound direction, adding all-way stop control at multiple intersections on Marshall Road would reduce the maximum speed to 29 miles per hour approaching Martinique Street. In the westbound direction, the maximum speed reaches 31 mph approaching Seymour Avenue.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 75 seconds during the AM peak hour, and 44 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 35 seconds during both the AM and PM peak hours.

Corridor Traffic Control Alternative C

Corridor Traffic Control Alternative C represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (roundabout), and Rivermont Street/Allan Avenue (roundabout).

Corridor Traffic Control Alternative C Intersection Operations

Table 11 displays the traffic operations under Corridor Traffic Control Alternative C.

Table 11: Corridor Traffic Control Alternative C Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.0	A A
2. Marshall Road / Martinique Street	**Roundabout**	AM PM	4.9 4.4	A A
3. Marshall Road / Jamaica Street	**Roundabout**	AM PM	1.2 1.0	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	1.1 (5.4 SB) 0.6 (4.9 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**Roundabout**	AM PM	5.4 6.3	A A
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	10.5 8.7	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.3 (4.0 SB) 2.2 (12.1 SB)	A (A) A (B)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.1 6.4	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	3.5 (40.0 SB) 1.0 (12.0 SB)	A (D) A (B)
10. Marshall Road / Rivermont Street / Allan Avenue	**Roundabout**	AM PM	7.2 6.6	A A
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	32.1 32.6	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The change in intersection 10 (Marshall Road / Rivermont Street / Allan Avenue) would allow the intersection to operate at LOS A, allowing movements from Rivermont Street or Allan Avenue to enter the intersection without waiting for gaps in traffic from Marshall Road. The presence of a roundabout at Rivermont Street / Allan Avenue may shift vehicle queuing to create fewer gaps in traffic for vehicles from intersection 9 (Stable Drive East) from entering Marshall Road, potentially creating LOS D conditions for the side-street movement; however, the low traffic volumes and the alternative route to enter at Seymour Avenue may provide acceptable conditions.

Corridor Traffic Control Alternative C Speeds

Table 12 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Corridor Traffic Control Alternative C.

Table 12: Corridor Traffic Control Alternative C Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.4	24	28.3	26
		PM	18.4	25	28.8	26
2. Martinique Street	**Roundabout**	AM	25.3	30	15.1	32
		PM	22.1	34	15.3	32
3. Jamaica Street	**Roundabout**	AM	16.2	30	4.8	39
		PM	16.1	30	5.0	38
4. Guadelupe Street	SSSC	AM	4.9	38	11.1	23
		PM	4.6	40	10.9	24
5. Otis Avenue	**Roundabout**	AM	11.0	24	18.8	24
		PM	10.6	25	19.4	23
6. Golden Gate Drive	AWSC	AM	28.7	16	15.6	13
		PM	24.5	18	15.6	13
7. Stable Drive (West)	SSSC	AM	8.9	22	17.2	27
		PM	8.5	23	17.7	27
8. Seymour Avenue	Roundabout	AM	19.3	24	24.9	30
		PM	17.3	27	25.7	29
9. Stable Drive (East)	SSSC	AM	27.4	27	8.9	20
		PM	24.7	31	9.0	20
10. Rivermont Street / Allan Avenue	**Roundabout**	AM	11.9	15	-	-
		PM	9.0	20		
11. Jefferson Boulevard	Signal	AM	68.8	15	-	-
		PM	53.0	20		
Corridor Total	–	AM	241.8	9	144.7	30
		PM	208.8	12	147.4	30

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to added roundabouts along Marshall Road would increase vehicle delay and reduce vehicle speed along the corridor.

In the eastbound direction, adding roundabouts at multiple intersections on Marshall Road would reduce the maximum speed to 40 miles per hour approaching Guadelupe Street. In the westbound direction, the maximum speed may reach 39 mph approaching Jamaica Street.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 23 seconds during the AM peak hour, and 25 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 18 seconds during the AM peak hour, and 21 seconds during the PM peak hour.

Corridor Traffic Control Alternative D

Corridor Traffic Control Alternative D – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (all-way stop control), Golden Gate Drive (roundabout), and Rivermont Street/Allan Avenue (roundabout).

Corridor Traffic Control Alternative D Intersection Operations

Table 13 displays the traffic operations under Corridor Traffic Control Alternative D.

Table 13: Corridor Traffic Control Alternative D Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.1	A A
2. Marshall Road / Martinique Street	**Roundabout**	AM PM	4.9 4.4	A A
3. Marshall Road / Jamaica Street	**Roundabout**	AM PM	1.3 1.1	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	2.2 (5.9 SB) 2.5 (5.4 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**AWSC**	AM PM	7.3 7.4	A A
6. Marshall Road / Golden Gate Drive	**Roundabout**	AM PM	6.7 5.4	A A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	1.2 (4.4 SB) 1.2 (4.9 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.7 6.5	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	5.0 (54.7 SB) 1.0 (15.6 SB)	A (E) A (C)
10. Marshall Road / Rivermont Street / Allan Avenue	**Roundabout**	AM PM	7.7 6.6	A A
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	33.0 34.5	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

This alternative is primarily consistent with Alternative C; however, swaps all-way stop control to be located at Otis Avenue, and a roundabout at Golden Gate Drive. No notable changes in traffic operations compared to Alternative C is noted.

Corridor Traffic Control Alternative D Speeds

Table 14 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Existing Plus Brar Farms conditions.

Table 14: Corridor Traffic Control Alternative D Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.2	24	28.7	26
		PM	19.2	24	28.8	26
2. Martinique Street	**AWSC**	AM	25.3	30	15.1	32
		PM	22.2	34	15.2	32
3. Jamaica Street	**AWSC**	AM	16.2	30	4.8	39
		PM	16.1	30	4.9	38
4. Guadelupe Street	SSSC	AM	5.0	37	9.9	26
		PM	4.8	39	9.7	27
5. Otis Avenue	**AWSC**	AM	15.2	17	24.1	19
		PM	14.4	18	24.7	18
6. Golden Gate Drive	**Roundabout**	AM	21.8	21	9.7	20
		PM	19.6	23	10.0	20
7. Stable Drive (West)	SSSC	AM	10.2	19	17.0	28
		PM	9.7	20	17.4	27
8. Seymour Avenue	Roundabout	AM	20.2	23	24.9	30
		PM	17.3	27	25.7	29
9. Stable Drive (East)	SSSC	AM	29.4	26	8.9	20
		PM	24.7	30	9.0	20
10. Rivermont Street / Allan Avenue	**AWSC**	AM	12.7	14	-	-
		PM	9.0	20		
11. Jefferson Boulevard	Signal	AM	70.9	9	-	-
		PM	53.2	12		
Corridor Total	–	AM	246.0	20	143.1	30
		PM	210.2	23	145.4	30

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to added roundabouts along Marshall Road would increase vehicle delay and reduce vehicle speed along the corridor.

In the eastbound direction, adding roundabouts at multiple intersections on Marshall Road would reduce the maximum speed to 39 miles per hour approaching Guadelupe Street. In the westbound direction, the maximum speed may reach 39 mph approaching Jamaica Street.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 27 seconds during the AM peak hour, and 26 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 16 seconds during the AM peak hour, and 19 seconds during the PM peak hour.

Corridor Traffic Control Preferred Alternative

Corridor Traffic Control Preferred Alternative Intersection Operations

Table 15 displays the traffic operations under Corridor Traffic Control Preferred Alternative.

Table 15: Corridor Traffic Control Preferred Alternative Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.1	A A
2. Marshall Road / Martinique Street	SSSC	AM PM	2.7 (5.0 SB) 2.7 (4.8 SB)	A (A) A (A)
3. Marshall Road / Jamaica Street	**AWSC**	AM PM	6.9 6.7	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	2.2 (5.6 SB) 1.7 (5.3 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**Roundabout**	AM PM	5.2 5.9	A A
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	10.4 8.3	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.3 (6.1 SB) 2.1 (8.8 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.0 6.3	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	12.0 (57.3 SB) 2.8 (17.1 SB)	B (F) A (C)
10. Marshall Road / Rivermont Street / Allan Avenue	**AWSC**	AM PM	13.9 11.5	B B
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	34.3 37.7	C D

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The change in intersection 10 (Marshall Road / Rivermont Street / Allan Avenue) would allow the intersection to operate at LOS B, allowing movements from Rivermont Street or Allan Avenue to enter the intersection without waiting for gaps in traffic from Marshall Road. This may shift some of the delay to intersection 11 (Marshall Road / Jefferson Boulevard) which would just enter LOS D conditions. Also, the presence of a stop control at Rivermont Street / Allan Avenue may shift vehicle queuing to create fewer gaps in traffic for vehicles from intersection 9 (Stable Drive East) from entering Marshall Road, potentially creating LOS F conditions for the side-street movement; however, the low traffic volumes and the alternative route to enter at Seymour Avenue may provide acceptable conditions.

All other intersections would operate acceptably at LOS A conditions.

Corridor Traffic Control Preferred Alternative Speeds

Table 16 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Corridor Traffic Control Preferred Alternative.

Table 16: Corridor Traffic Control Preferred Alternative Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.3	24	25.6	29
		PM	18.7	25	25.8	29
2. Martinique Street	SSSC	AM	22.8	33	15.3	32
		PM	21.1	36	15.5	31
3. Jamaica Street	**AWSC**	AM	20.3	24	12.2	15
		PM	20.0	24	12.4	15
4. Guadelupe Street	SSSC	AM	8.2	23	11.5	23
		PM	8.0	23	11.3	23
5. Otis Avenue	**Roundabout**	AM	11.4	23	19.1	24
		PM	11.0	24	19.6	23
6. Golden Gate Drive	AWSC	AM	29.2	16	15.3	13
		PM	24.6	18	15.3	13
7. Stable Drive (West)	SSSC	AM	8.9	22	17.2	27
		PM	8.5	23	17.6	27
8. Seymour Avenue	Roundabout	AM	19.1	25	24.6	31
		PM	17.3	27	25.4	30
9. Stable Drive (East)	SSSC	AM	39.4	19	7.8	23
		PM	24.9	30	8.0	23
10. Rivermont Street / Allan Avenue	**AWSC**	AM	20.8	9	-	-
		PM	12.9	14		
11. Jefferson Boulevard	Signal	AM	70.7	9	-	-
		PM	52.1	12		
Corridor Total	–	AM	270.0	18	148.8	29
		PM	219.1	22	150.8	29

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

In the eastbound direction, adding two stop controls and one roundabouts intersections on Marshall Road would reduce the maximum speed to 36 miles per hour approaching Martinique Street. In the westbound direction, the maximum speed may reach 32 mph approaching Martinique Street.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 51 seconds during the AM peak hour, and 35 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 22 seconds during the AM peak hour, and 25 seconds during the PM peak hour.

Summary and Recommendations

Overall, meeting the multiple transportation and safety goals along the Marshall Road corridor requires review of multiple factors.

The addition of trips associated with the proposed Brar Farms development would create unacceptable traffic operations conditions for the side-street movements at Rivermont Street / Allan Avenue. This intersection would meet the criteria for an all-way stop control warrant.

Traffic control options for other intersections along the Marshall Road corridor may look to focus on addressing the needs for safe pedestrian crossings and management of vehicle travel speed, while not significantly adding vehicle delay along the corridor. The Corridor Traffic Control Preferred Alternative addresses each of the various factors and potential limitations. **Table 17** presents the preferred control type at each of the study intersections, and details the considerations for any modification.

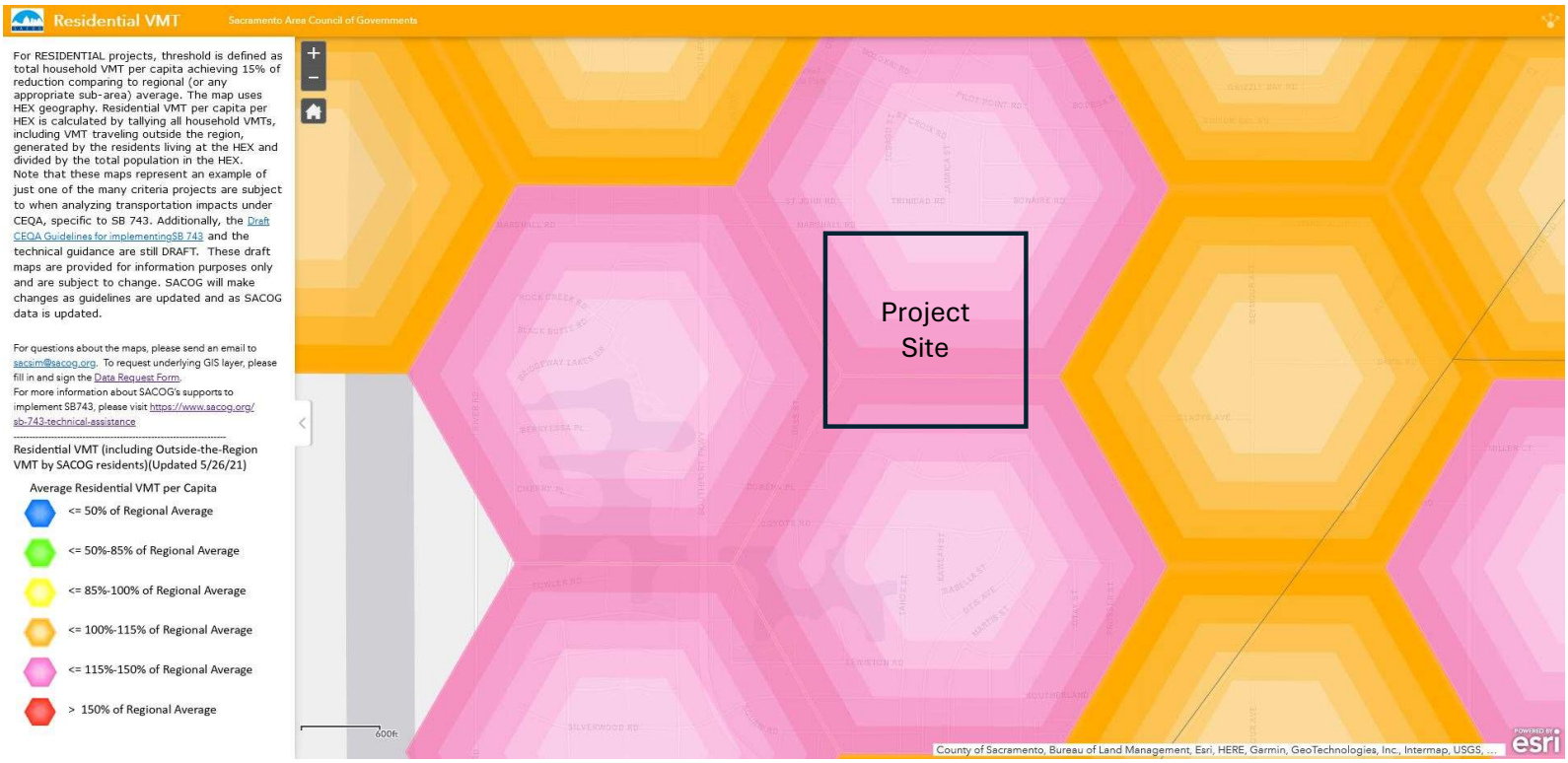
Table 17: Corridor Traffic Control Preferred Alternative Corridor Vehicle Speeds

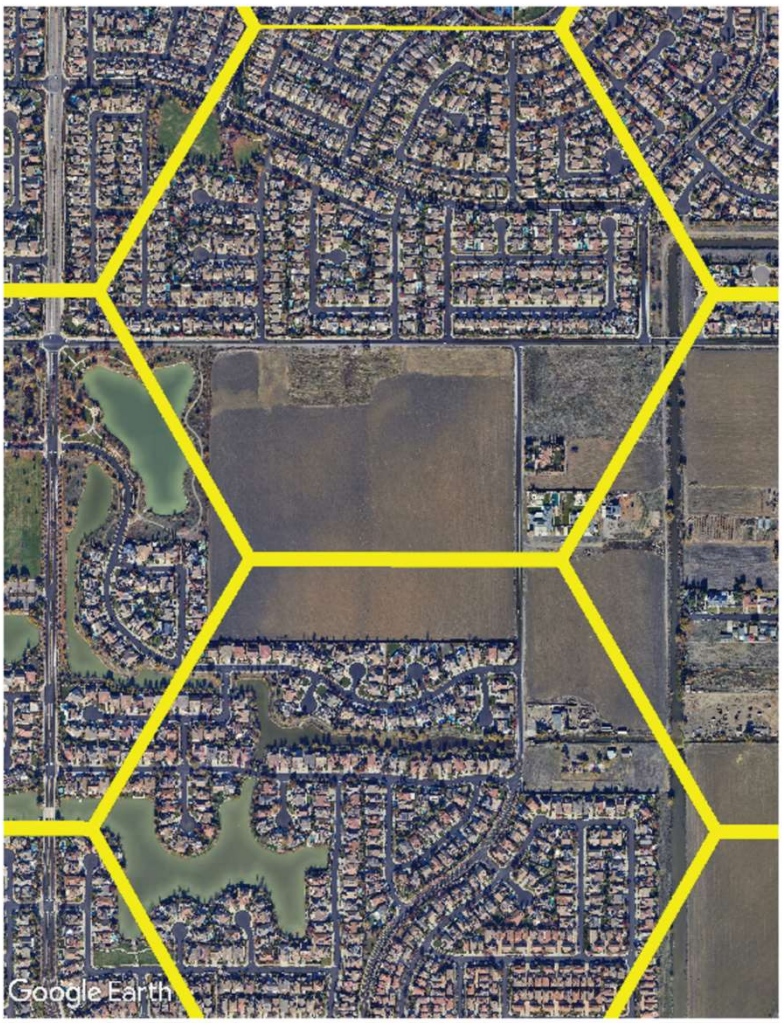
Cross-Street	Preferred Control Type	Control Type Modification Details
1. Marshall Road / Southport Parkway	AWSC	No proposed change necessary.
2. Marshall Road / Martinique Street	SSSC	No change to traffic control type necessary; however, addition of high visibility crosswalk with rectangular rapid flashing beacon (RRFB) crossing Marshall Road due to need for speed reduction mechanism, and future demand for pedestrian travel between residential areas, parks, and Bridgeway Island Elementary school.
3. Marshall Road / Jamaica Street	**AWSC**	Change from side-street stop to all-way stop control. Will meet the criteria for all-way stop warrant due to traffic volumes and need for controlled pedestrian crossing of Marshall Road. Roundabout analyzed but likely not feasible due to right-of-way constraints and distance to adjacent intersection with Guadelupe Street.
4. Marshall Road / Guadelupe Street	SSSC	No proposed change necessary.
5. Marshall Road / Otis Avenue	**Roundabout**	Change from side-street stop to roundabout. Will meet the criteria for all-way stop warrant due to traffic volumes, need for controlled pedestrian crossing of Marshall Road, and intersection of roadways with similar design and operating characteristics. Meets need for speed reduction mechanism, while not impacting vehicle delay along the corridor as much as all-way stop control.
6. Marshall Road / Golden Gate Drive	AWSC	No proposed change is recommended. Roundabout analyzed but likely not feasible due to right-of-way constraints and distance to Main Canal and adjacent intersection with Stable Drive West.
7. Marshall Road / Stable Drive (West)	SSSC	No proposed change necessary.

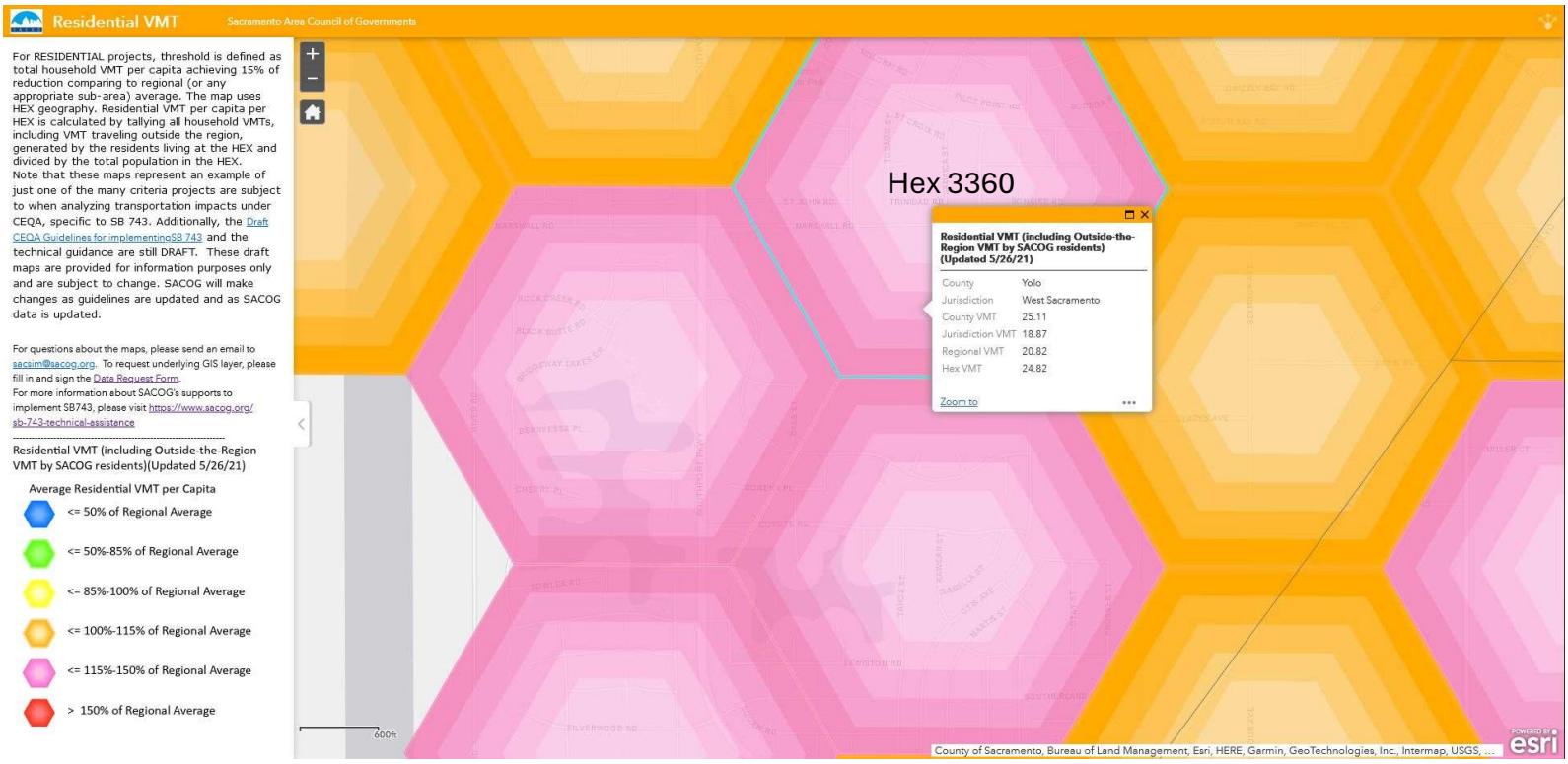
8. Marshall Road / Seymour Avenue	Roundabout	No proposed change necessary.
9. Marshall Road / Stable Drive (East)	SSSC	No proposed change necessary. Some analyzed alternatives to traffic control modifications at Rivermont Street / Allan Avenue may impact traffic operations for the side-street approach here; however, there is an alternative route for entering onto Marshall Road at Seymour Avenue.
10. Marshall Road / Rivermont Street / Allan Avenue	**AWSC**	Change from side-street stop to all-way stop control. Addition of Brar Farms trips would create unacceptable level of service conditions for the side-streets approaches. Also meets criteria for all-way stop warrant due to traffic volumes, vehicle delay, and need for controlled pedestrian crossing of Marshall Road. Roundabout analyzed but likely not feasible due to right-of-way constraints, existing bus stop locations, and distance to adjacent intersection with Stable Drive East.
11. Marshall Road / Jefferson Boulevard	Signal	No proposed change analyzed. Future impacts to the intersection will require Jefferson Boulevard to be widened from 2 to 4 travel lanes (primarily attributed to Yarborough development), which will increase capacity of vehicles through this intersection. Trips associated with Brar Farms may require need to contribute fair share portion for future improvements to the intersection.
Notes: SSSC = side-street stop control; AWSC = all-way stop control.		

APPENDIX G

HEX VMT DATA


Residential VMT
Sacramento Area Council of Governments
For RESIDENTIAL projects, threshold is defined as total household VMT per capita achieving 15% of reduction comparing to regional (or any appropriate sub-area) average. The map uses HEX geography. Residential VMT per capita per HEX is calculated by tallying all household VMTs, including VMT traveling outside the region, generated by the residents living at the HEX and divided by the total population in the HEX.
Note that these maps represent an example of just one of the many criteria projects are subject to when analyzing transportation impacts under CEQA, specific to SB 743. Additionally, the Draft CEQA Guidelines for implementingSB 743 and the technical guidance are still DRAFT. These draft maps are provided for information purposes only and are subject to change. SACOG will make changes as guidelines are updated and as SACOG data is updated.
For questions about the maps, please send an email to sacgim@sacog.org. To request underlying GIS layer, please fill in and sign the Data Request Form.
For more information about SACOG's supports to implement SB743, please visit https://www.sacog.org/sb-743-technical-assistance
Residential VMT (including Outside-the-Region VMT by SACOG residents)(Updated 5/26/21)
Average Residential VMT per Capita
<= 50% of Regional Average
<= 50%-85% of Regional Average
<= 85%-100% of Regional Average
<= 100%-115% of Regional Average
<= 115%-150% of Regional Average
> 150% of Regional Average
Project Site
600ft
County of Sacramento, Bureau of Land Management, Esri, HERE, Garmin, GeoTechnologies, Inc., Intermap, USGS, ...
esri


Google Earth


Residential VMT
Sacramento Area Council of Governments
For RESIDENTIAL projects, threshold is defined as total household VMT per capita achieving 15% of reduction comparing to regional (or any appropriate sub-area) average. The map uses HEX geography. Residential VMT per capita per HEX is calculated by tallying all household VMTs, including VMT traveling outside the region, generated by the residents living at the HEX and divided by the total population in the HEX.
Note that these maps represent an example of just one of the many criteria projects are subject to when analyzing transportation impacts under CEQA, specific to SB 743. Additionally, the Draft CEQA Guidelines for implementingSB 743 and the technical guidance are still DRAFT. These draft maps are provided for information purposes only and are subject to change. SACOG will make changes as guidelines are updated and as SACOG data is updated.
For questions about the maps, please send an email to sacsim@sacog.org. To request underlying GIS layer, please fill in and sign the Data Request Form.
For more information about SACOG's supports to implement SB743, please visit https://www.sacog.org/sb-743-technical-assistance
Residential VMT (including Outside-the-Region VMT by SACOG residents)(Updated 5/26/21)
Average Residential VMT per Capita
<= 50% of Regional Average
<= 50%-85% of Regional Average
<= 85%-100% of Regional Average
<= 100%-115% of Regional Average
<= 115%-150% of Regional Average
> 150% of Regional Average
Hex 3360
Residential VMT (including Outside-the-Region VMT by SACOG residents) (Updated 5/26/21)
County Yolo
Jurisdiction West Sacramento
County VMT 25.11
Jurisdiction VMT 18.87
Regional VMT 20.82
Hex VMT 24.82
Zoom to
600ft
County of Sacramento, Bureau of Land Management, Esri, HERE, Garmin, GeoTechnologies, Inc., Intermap, USGS, ...
esri

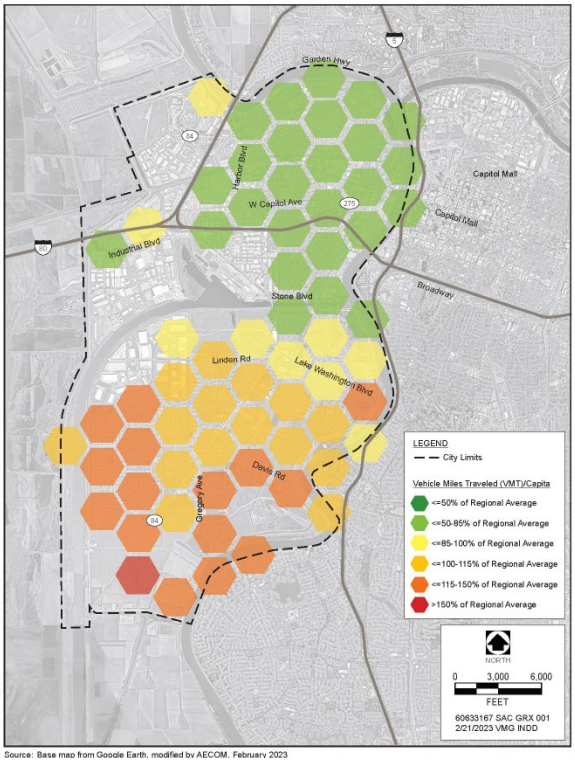
APPENDIX H

TABLE 3-5 MOBILITY IMPLEMENTATION PROGRAMS – MOBILITY IMPLEMENTATION PROGRAM #14

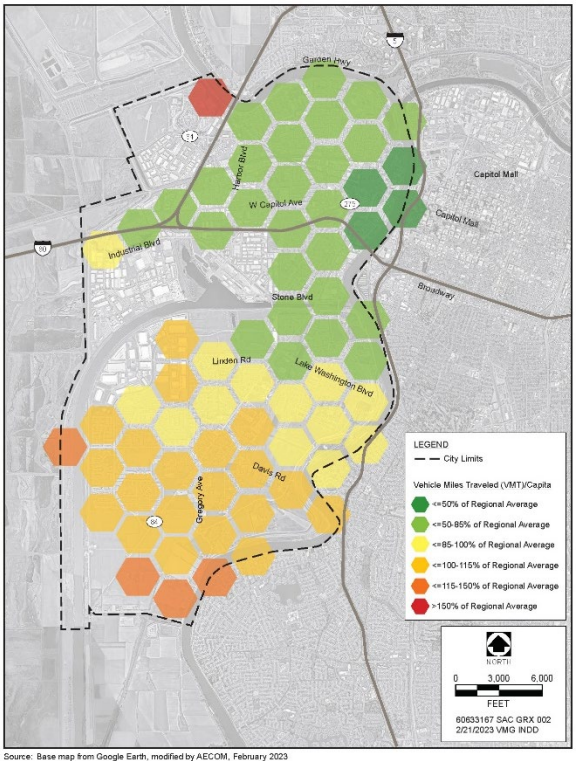
Table 3-5 Mobility Implementation Programs		2023-2025	2026-2028	2029-2040	Annual	Ongoing
Mobility Implementation Program 14. The City shall develop and implement a VMT Reduction Program that includes VMT-reduction strategies. Projects and plans in Transit Priority Areas and in low-VMT areas are exempt from this VMT Reduction Program. Low-VMT areas for the purpose of this program are those identified by the City or by the Sacramento Area Council of Governments to produce VMT per capita or per employee that is 85 percent or less of the existing or future VMT rate for the City or the region. Figures M-2 and M-3 show in green examples of relatively low-VMT locations in West Sacramento, though the most up-to-date available information should be used to determine project sites that are not subject to the City's VMT reduction program. Residential projects that provide at least 50 percent of proposed units as deed-restricted for lower-income households and/or that can demonstrate project-level VMT is 15% below regional average are exempt from this VMT reduction program. Public facilities and infrastructure projects, active transportation projects, and projects that would generate or attract fewer than 110 trips per day are exempt from the VMT Reduction Program. Local serving retail and commercial services of less than 50,000 square feet in gross building area are also exempt. The City's VMT Reduction Program will require proposed land development projects to incorporate, as feasible, reasonable, and applicable, the below listed strategies to reduce travel demand and associated adverse physical environmental impacts, such as greenhouse gas emissions and transportation-related noise. Quantified VMT reductions should be based on the guidance in this Implementation Program and an assessment of specific characteristics of future projects relative to guidance available in academic literature. The below list of VMT reduction measures are not exhaustive, and other measures that reduce VMT could be developed on a case-by-case basis. This project-focused VMT Reduction Program will complement VMT reduction Actions pursued by the City in the Climate Action Plan, such as allocating funding to expand the active transportation and micro-mobility network. Enforcement for non-physical reduction strategies below could include requiring project applicants to make publicly available (i.e., permanent signage at the site or on a website) VMT reduction measure commitments.		✗				
VMT REDUCTION MEASURE	**EFFICACY**					
14-1. Employer Commute Trip Reduction Program. Employer provides information, coordination, and marketing for incentives and services that discourage single occupancy vehicle trips and encourage carpooling, taking transit, walking, and biking. Implement a marketing strategy to promote the Commute Trip Reduction Program - employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking. Employer provides platform for coordinating carpooling and a guaranteed ride home.	Up to 4 percent reduction in commute-related VMT.					
14-2. Employer Ridesharing Program. Involves transportation management association with funding requirements for employers. Encourages carpooled vehicle trips in place of single-occupied vehicle trips, with designated preferred parking spaces for ridesharing vehicles, adequate passenger loading and unloading and waiting areas for ridesharing vehicles, and an app or website for coordinating rides.	Up to 8 percent reduction in commute-related VMT.					
14-3. Subsidized Transit Program. Employer or multi-family property owner provides subsidized transit – either reduced cost or free for employees and/or residents.	Up to 5.5 percent reduction in commute related VMT – either residential or employee VMT or both in a mixed-use project.					
14-4. Employer End-of-Trip Bicycle Facilities. Install and maintain bike parking, bike lockers, showers, and personal lockers. Provide in proportion to commuting bicyclists. Including marketing to encourage use of facilities and on-site bicycle repair tools. Post signage and information on how to use secure parking and personal lockers.	Up to 4.4 percent reduction in commute-related VMT.					
14-5. Employer-Sponsored Vanpool Program. Provide vehicle/s for 5 to 15 people and either hired dedicated drivers or incentives for employees to serve in this capacity. Focus on groups of employees	Up to 20.4 percent reduction in commute-related VMT.					

Table 3-5 Mobility Implementation Programs		2023-2025	2026-2028	2029-2040	Annual	Ongoing
that have a similar origin and destination. Provide preferred parking for employees that vanpool.						
14-6. Employee Parking Cash Out Program. Program would provide "cash out" for employees that agree not to use employer provided parking in exchange for a monthly payout of the avoided cost of that parking place.	Up to 12 percent reduction in commute-related VMT.					
14-7. Price Workplace Parking. Charge employees to park at place of work and validate parking only for guests. Provide marketing and education regarding available alternatives to driving to work. Ensure that other transportation options are available, convenient, and have competitive travel times. Combine with other VMT Reduction Measures, as needed, to ensure viable alternatives.	Up to 20.0 percent reduction in commute-related VMT.					
14-8. Implement Reduced Parking Supply Strategy. For new residential projects, or residential portion of a mixed-use projects, provide off-street parking in an amount that is less than, for example, what would be the calculated demand using the ITE Parking Generation Manual, which would range from 1 space per unit for 1-bedroom, multi-family units to 2.6 spaces per unit for 3-bedroom, single-family units. For new Commercial/Employment uses, provide parking in an amount no more than 0.7 spaces per 1,000 sq. ft. of new development. Further, design parking areas to provide "preferential" parking spaces for carpools and vanpools.	Up to 13.7 percent reduction in household-generated VMT.					
14-9. Unbundled Residential Parking. Separate parking costs from total rent for a multi-family residential property requiring those who wish to purchase parking spaces to do so at an additional cost. Ensure viable alternatives for travel to meet daily needs for residents that opt out of on-site parking.	Up to 15.7 percent reduction in household-generated VMT.					
14-10. Pro-Rata Contribution. Projects may also contribute impact fees at a level necessary to reduce a project's net VMT per capita or per employee to 85 percent or less than the citywide or regional average. This would require the City to develop a nexus and range of project types that would reduce VMT within West Sacramento, though impact fees contributed for a project do not need to reduce VMT in the same area as the project site. The City may also allow projects to construct and dedicate to the City or other public agency facilities shown to reduce VMT, such as active transportation projects, projects to fill sidewalk gaps in West Sacramento near important destinations, projects that would construct high-quality bicycle facilities that would eliminate a cycling barrier between homes and destinations, and other VMT-reducing facilities.	To be determined by the City.					
14-11. Improve Network Connectivity. This measure could be relevant to infill developments or new developments with property subdivisions, and involves a relatively more connected transportation network that allows multiple routes between homes and nearby destinations. In general, a grid street network or modified grid is the ideal arrangement for a highly connected transportation network. The degree of connectivity is measured according to intersection density, but would also involve relatively short block lengths.	Up to 17 percent reduction in VMT, based on intersection density within project site and immediately adjacent intersections. VMT reduction would range from approximately 1 percent for 40 intersections per square mile to 17 percent for 87 intersections per square mile.					
14-12. Increase Housing Density. For new or redevelopment housing projects, design an improved project with relatively higher density of dwelling units in an area that supports bicycle, pedestrian, and/or transit access to reach daily destinations.	Up to a 30-percent reduction, with a 1-percent reduction awarded for 9 units per acre and a 30-percent reduction for 40 units per acre.					
14-13. Increase Employment Density. For new or redevelopment projects, design an improved project with higher density of jobs when compared to the average job density within 0.5-mile radius to encourage shorter and fewer commute trips.	Up to a 30-percent reduction in VMT with a 1-percent reduction at 22 jobs per acre and 30-percent reduction at 70 jobs per acre.					
14-14. Land Use Mix. For new or redevelopment projects, include a variety of land uses such as residential, office, retail, services,	Up to a 30-percent reduction in VMT, based on the relative degree of land use mix. One way to calculate the VMT					

Table 3-5 Mobility Implementation Programs		2023-2025	2026-2028	2029-2040	Annual	Ongoing
recreation, and education, mixed in close proximity (within ¼ mile). Or, propose a project that would diversify the existing land use mix within a ¼ mile area by, for example, adding compact housing that is walkable to existing employment, retail, and commercial services.	reduction associated with land use mix would be to use a land use index of 0.09 to 1, where 0.09 is a single land use and 1 is the full suite of complementary land uses, which would generally include single-family residential, multi-family residential, retail, services, recreation, and institutional. VMT reduction would range from 8 percent for a project or walkable area with 90 percent single-family residential and 10 percent multi-family residential to 30 percent for a project or walkable area that includes 25 percent single-family residential 25 percent multi-family residential, 25 percent retail, and 25 percent institutional uses.					



Source: Base map from Google Earth, modified by AECOM, February 2023



Source: Base map from Google Earth, modified by AECOM, February 2023

Figure M-2: **Existing VMT per Capita, Household-Generated VMT Figure M-3: 2040 VMT per Capita, Household-Generated VMT**

Implements Which Policy(ies)	M-1.1, M-1.2, M-1.3, M-1.4, M-1.8, M-1.9, M-1.10, M-1.11, M-1.12, M-1.13, M-1.14, M-2.1, M-2.2, M-2.4, M-2.5, M-2.7, M-2.8, M-2.9, M-2.10, M-2.12, M-3.1, M-3.6, M-3.7, M-4.1, M-4.3, M-4.4, M-4.5, M-4.7, M-4.8, M-4.9, M-4.15, M-5.1, M-5.2, M-5.3, M-5.4, M-5.5, M-5.6, M-5.8, M-5.9, M-5.10, M-6.1, M-6.2, M-6.3, M-6.4, M-6.5, M-6.6, M-6.10, M-7.5, M-7.6, M-7.7, M-7.11, M-7.12, M-8.1, M-8.2, M-8.3, M-8.5, M-8.6, M-8.7
Responsible Department(s)	Community Development
Supporting Department(s)	Public Works

APPENDIX I

CAPCOA VMT CALCULATION WORKSHEET

CAPCOA 2025 Handbook
VMT Reduction Calculation Worksheets

Measure T-17. Improve Street Connectivity	
Subsector	Land Use
Measure Scale	Plan/Community
Maximum Reduction	30.0%

Project VMT Reduction Due to Improving Street Connectivity		
B	Intersection density in project site with measure (int. per sq. mi.)	191
C	Average intersection density (int. per sq. mi.)	152
D	Elasticity of VMT with respect to intersection density	-0.14
A	VMT Reduction = ([B - C]/C) * D	3.6%
	VMT Reduction	***3.6%***

Average intersection density (C) is caculated as follows:
Existing HEX Data in which the Project site lay:
- 38 intersections
- 0.25 square mile area
Density = 38/0.25 = 152

Project Site density (B) is calculated as follows:
- 18 intersections
- 0.094 square mile area
Density = 18/0.094 = 191

APPENDIX B

BRAR FARMS CUMULATIVE TRANSPORTATION ANALYSIS REQUIREMENTS MEMORANDUM

CITY OF WEST SACRAMENTO

FROM: Jimmy Fong TE, City of West Sacramento, Community Development Department – Transportation and Mobility Division

DATE: November 26, 2025

SUBJECT: Brar Farms Cumulative Transportation Analysis Requirements

This memorandum outlines the City of West Sacramento requirements and methodology details for cumulative transportation impact analysis of the proposed Brar Farms development.

Study Area / Locations

The study area shall consist of the following intersections identified in Table 1. Please note that under all cumulative scenarios, the intersection control type/configuration shall be assumed as noted.

Table 1: Study Intersections

Intersection	Cumulative Traffic Control Type
1. Marshall Road / Southport Parkway	Signal – Modified lane configurations from Existing Conditions to include second northbound-through, and conversion of southbound right-turn to second southbound-through lane.
2. Marshall Road / Martinique Street (Project Access)	Side-Street Stop Control
3. Marshall Road / Jamaica Street (Project Access)	Side-Street Stop Control (under No Project scenarios) All-Way Stop Control (under Plus Project scenarios)
4. Marshall Road / Otis Avenue	Roundabout
5. Marshall Road / Golden Gate Drive	All-Way Stop Control
6. Marshall Road / Seymour Avenue	Roundabout
7. Marshall Road / Rivermont Street / Allan Avenue	All-Way Stop Control
8. Marshall Road / Jefferson Boulevard	Signal – modified lane configuration from Existing Conditions to include second northbound-through and second southbound-through lane.
9. Otis Avenue / Project Driveway #3	Side-Street Stop Control
10. Otis Avene / Project Driveway #4	Side-Street Stop Control

Study Scenarios

Analysis of Existing Conditions and Existing Plus Project conditions was completed as part of the original transportation study. Therefore, this study should analyze the following scenarios:

1. Cumulative No Enterprise Crossing, No Project Conditions– represents transportation conditions and planned land use development growth anticipated by 2050; however, does not assume the Enterprise Crossing (between Southport Parkway and Enterprise Boulevard) is in place.
2. Cumulative No Enterprise Crossing, Plus Project Conditions – represents Cumulative No Enterprise Crossing, No Project Conditions, plus the changes to these conditions with inclusion of the proposed project.
3. Cumulative Plus Enterprise Crossing, No Project Conditions – represents transportation conditions and planned land use development growth anticipated by 2050, and includes the assumption that Enterprise Crossing is in place.
4. Cumulative Plus Enterprise Crossing, Plus Project Conditions – represents Cumulative Plus Enterprise Crossing, No Project Conditions, plus the changes to these conditions with the inclusion of the proposed project.

Study Periods

The study periods analyzed shall be the same as the original transportation study.

- Weekday morning peak hour within the period between 7:00 AM – 9:00 AM
- Weekday evening peak hour within the period between 4:00 PM – 6:00 PM

Travel Modeling and Forecasts

The City is currently in the process of various travel demand model update efforts, including coordination of a model update associated with the Enterprise Crossing project.

The current City Travel Demand Model developed as part of the Mobility Element Update is not refined within this study area to provide accurate forecasts for project level traffic impacts under Cumulative Conditions; therefore, reliance on travel modeling and forecasts shall use the Enterprise Crossing model.

The Enterprise Crossing Model starts with SACOG's SACSIM23 model, with further refinements throughout the City (included the Brar Farms study area) to the TAZ boundaries, model roadway network, and growth assumptions between a refined base year 2023, and future year 2050 (which should account for growth associated with Yarbrough, Liberty, and River Park Master Plans). Future year scenarios both include a version without and with Enterprise Crossing. The City is currently working with the consultant HDR on this model update effort and have been informed the base and future model is expected to be submitted to the City for initial review the week of December 8, 2025. The City expects to be able to share the complete model files after initial review the following week of December 15, 2025; however, may be able to share initial model files earlier (e.g. TAZ boundaries, Base Roadway Network).

The consultant shall review the land use growth assumptions in the model and coordinate with the City for the final land use inputs for this transportation analysis. This is expected to reflect full buildout of approved General Plan land uses.

For study scenarios 1 and 3, the consultant shall develop intersection turning movement forecasts for the study intersection by adding the increment of growth between the base and future model scenarios, added on-top of the existing traffic counts conducted as part of the original transportation study. For study locations not included within the model, travel forecast volumes may be balanced along the corridor to match intersections that are included within the model.

For development of Cumulative Plus Project intersection turning movement forecasts (as part of study scenarios 2 and 4), the consultant shall use information from travel model to develop the expected project trip distribution under each cumulative condition. The trip distribution methodology and summary shall be presented to the City for review and approval prior to continuing with the traffic operations analysis. Project trip generation can remain the same as established in the original transportation study. After confirmation with the City, the Consultant may follow the process to add project trips on-top of the travel forecasts presented in Scenarios 1 and 3.

Intersection Traffic Operations

Intersection traffic operations for these study scenarios and periods shall be conducted following the same methodology completed from the original transportation study for Existing and Existing Plus Project Conditions. This includes utilizing the Highway Capacity Manual, 7th Edition methodology with the use of Synchro (version 12) traffic operations software. Summary of average vehicle delay and level of service (LOS), and comparison to the City's Level of Service policy consideration from the General Plan Mobility Element, shall be presented.

CEQA Cumulative Transportation Impact Assessment

The consultant shall prepare a qualitative summary describing if there are any notable changes in the CEQA transportation impact assessment criteria under Cumulative Conditions compared to the assessment under Existing Plus Project conditions summarized in the original transportation study.

APPENDIX C

MARSHALL & HIGGINS PUBLIC SAFETY AND TRAFFIC CALMING PROJECT MEMORANDUM

FROM:	Jimmy Fong TE, City of West Sacramento, Community Development Department – Transportation and Mobility Division
DATE:	January 29, 2024
SUBJECT:	Marshall & Higgins Public Safety and Traffic Calming Project – Existing Traffic Operations and Proposed Traffic Control Modifications

The City of West Sacramento, Community Development Department, Transportation and Mobility Division is managing the Marshall and Higgins Public Safety and Traffic Calming Project (CIP 16014).

This memorandum summarizes the traffic operations along the Marshall Road corridor under existing conditions, and with the inclusion of the proposed Brar Farms residential development at the southwest corner of Marshall Road and Otis Avenue. Additionally, this memorandum summarizes the analysis of traffic control options at key intersections along the corridor to address traffic operations, safety, and traffic calming improvements along the corridor.

A separate memorandum will be prepared summarizing the analysis of proposed infrastructure improvements for Marshall Road and the study area under future long-term conditions, which may include additional development densification for parcels along Marshall Road, nearby developments such as River Park, and additional major roadway connections (primarily Enterprise Bridge) that may introduce new travel patterns along the corridor.

Additional truck traffic management solutions will be analyzed and presented in a separate memorandum that documents infrastructure improvements to limit truck traffic in this residential area. Those solutions may include roadway design element changes to further reinforce areas where trucks are not allowed, including adjustment of lane widths, adjustment of intersection approaches, addition of median curbs, and shortening of curb turning radii.

Introduction

Background

The goal of the Marshall & Higgins Public Safety and Traffic Calming Project is to develop safety, traffic calming improvements, bicycle/pedestrian infrastructure improvements consistent with Complete Streets objectives. This corridor has regularly received requests from residents regarding speeding issues, pedestrian and bicycle facility gaps, and is a reoccurring location for police enforcement of traffic and transportation issues. This study looks to analyze transportation improvements along corridor to address these issues, meet the demand of future development, address City of West Sacramento traffic operations goals, and provide safety and traffic calming improvements to support bicycle and pedestrian travel.

Study Intersections

For this memorandum, all intersections along Marshall Road between Southport Parkway and Jefferson Boulevard are included as study intersections, as presented in **Table 1**. The existing traffic control type for each intersection is also presented. The study location and intersections are presented in **Figure 1**.

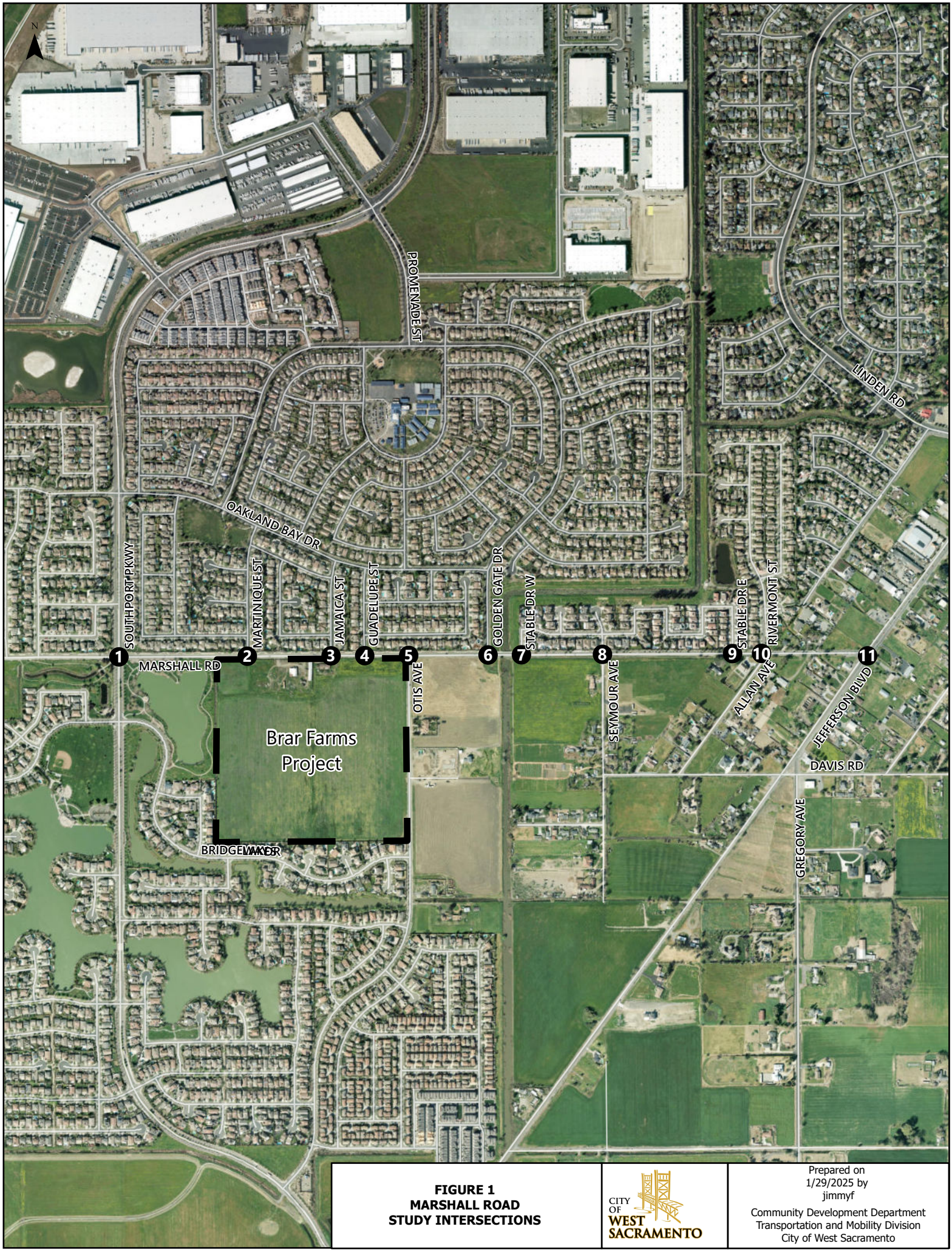


FIGURE 1
MARSHALL ROAD
STUDY INTERSECTIONS

CITY OF WEST SACRAMENTO

Prepared on
1/29/2025 by
jimmyf
Community Development Department
Transportation and Mobility Division
City of West Sacramento

Table 1: Study Intersections	
Intersection	**Existing Traffic Control Type**
1. Marshall Road / Southport Parkway	All-Way Stop Control
2. Marshall Road / Martinique Street	Side-Street Stop Control
3. Marshall Road / Jamaica Street	Side-Street Stop Control
4. Marshall Road / Guadelupe Street	Side-Street Stop Control
5. Marshall Road / Otis Avenue	Side-Street Stop Control
6. Marshall Road / Golden Gate Drive	All-Way Stop Control
7. Marshall Road / Stable Drive (West)	Side-Street Stop Control
8. Marshall Road / Seymour Avenue	Roundabout
9. Marshall Road / Stable Drive (East)	Side-Street Stop Control
10. Marshall Road / Rivermont Street / Allan Avenue	Side-Street Stop Control
11. Marshall Road / Jefferson Boulevard	Signal

Data Collection

Traffic count data at the study intersections (expect for intersections 4, 7, and 9) was collected as part of the Marshall and Higgins Public Safety and Traffic Calming Project on Thursday, November 7, 2024, when nearby schools were in session. Counts were collected during the AM peak period between 7 – 9 AM, and PM peak period between 3 – 6 PM, and include collection of heavy vehicles, bicycles, and pedestrians.

City staff also performed field observations along with the traffic count data collection to observe traffic operations and vehicle queuing along the corridor.

Traffic count data at the intersection 4 (Marshall Road / Guadelupe Street) uses intersection turning movement data from the initial Brar Farms (3425 Marshall Road Residential) Transportation Study, conducted on Wednesday, October 2, 2024.

Traffic volumes for intersections 7 and 9 were calculated based on the balance of traffic volumes between adjacent intersections.

Speed survey data along the corridor was most recently conducted between 2021 and 2022.

Analysis Methodology

Study Scenarios

The following scenarios were analyzed in this study:

- Existing Conditions
- Existing Plus Brar Farms Project – represents existing conditions plus the proposed Brar Farms development. Also referred to as Corridor Traffic Control Alternative A.

Additional scenarios looked at evaluating various traffic control options (side-street stop control, all-way stop control, roundabout) at key intersections along the Marshall Road corridor based on

traffic volumes from Existing Plus Brar Farms Project. Key intersections were selected based on expected traffic volumes and spacing between adjacent intersections.

- Corridor Traffic Control Alternative B – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (all-way stop control), Jamaica Street (all-way stop control), Otis Avenue (all-way stop control), and Rivermont Street/Allan Avenue (all-way stop control)
- Corridor Traffic Control Alternative C – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (roundabout), and Rivermont Street/Allan Avenue (roundabout)
- Corridor Traffic Control Alternative D – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (all-way stop control), Golden Gate Drive (roundabout), and Rivermont Street/Allan Avenue (roundabout)

Following evaluation of the Corridor Traffic Control Alternatives analysis, City staff developed and analyzed the preferred treatments presented in the Corridor Traffic Control Preferred Alternative section. This scenario represents Existing Plus Bar Farms Project traffic volumes, plus proposed modifications to enhanced pedestrian crossing at Martinque Street (keeping side-street stop control), and proposed modifications to traffic control at Jamaica Street (all-way stop control), Otis Avenue (roundabout), and Rivermont Street/Allan Avenue (all-way stop control).

Table 2 summarizes the traffic control type at the key intersections along Marshall Road for each of the traffic control alternatives. This is not an exhaustive list of all combinations of traffic control options for the Marshall corridor intersections; however, should provide insight into the expected impact of each control type of traffic operations, vehicle queueing, and corridor travel speed. Alternatives A through D were initially analyzed and reviewed by City Staff prior to development and analysis of the Preferred Alternative.

Table 2: Marshall Road Traffic Control Alternatives

Scenario	Martinique St	Jamaica St	Otis Ave	Golden Gate Dr	Seymore Ave	Rivermont St / Allan Dr
Existing	SSSC	SSSC	SSSC	AWSC	Roundabout	SSSC
Existing Plus Brar Farms (Alternative A)	SSSC	SSSC	SSSC	AWSC	Roundabout	SSSC
Corridor Traffic Control Alternative B	AWSC	AWSC	AWSC	AWSC	Roundabout	AWSC
Corridor Traffic Control Alternative C	Roundabout	SSSC	Roundabout	AWSC	Roundabout	Roundabout
Corridor Traffic Control Alternative D	Roundabout	SSSC	AWSC	Roundabout	Roundabout	Roundabout
Corridor Traffic Control Preferred Alternative	SSSC	AWSC	Roundabout	AWSC	Roundabout	AWSC

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Study Periods

The study analyzes traffic operations during the weekday AM and PM peak hours. Based on the traffic data collection, the AM peak hour along the Marshall Road corridor occurs between 7:30 AM – 8:30 AM. The PM peak hour occurs between 4:45 PM – 5:45 PM.

Intersection Operations

Intersections were analyzed during the study periods following the methodology contained in the *Highway Capacity Manual, 7th Edition* (HCM 7).

The *Highway Capacity Manual* procedures describe traffic operating conditions from a driver's perspective based on the concept of level of service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades provide an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. Perspectives from other roadway network users such as bicyclists and pedestrians are not accounted for in this methodology.

Table 3 displays the average control delay per vehicle for each LOS threshold for signalized and unsignalized intersections. For signalized, roundabout, and all-way stop-controlled intersections the LOS is based on the average control delay of all vehicles traveling through the intersection. For side-street stop-controlled intersections, the delay and LOS for the movement with the greatest average delay is reported along with the average delay for the entire intersection.

Table 3: Intersection Level of Service Definitions

Level of Service	Average Delay (seconds/vehicle)	
	Signalized	**Unsignalized**
A	≤ 10	≤ 10
B	> 10 to 20	> 10 to 15
C	> 20 to 35	> 15 to 25
D	> 35 to 55	> 25 to 35
E	> 55 to 80	> 35 to 50
F	> 80	> 50

Source: *Highway Capacity Manual 7th Edition* (Transportation Research Board, 2022)

These methodologies were applied using the SimTraffic microsimulation software program, which considers the effects of lane utilization, turn pocket storage lengths, upstream/downstream queue spillbacks, coordinated signal timings, pedestrian crossing activity, and other conditions on intersection and overall corridor operations. Utilization of SimTraffic microsimulation analysis is appropriate given the presence of closely spaced intersections, and overall levels of traffic and vehicle queuing along the Marshall Road corridor. Reported results are based on an average of 10 runs. The following procedures and assumptions were applied in the development of the SimTraffic model.

- Roadway geometric data were gathered using aerial photographs and field observations.
- Peak-hour traffic volumes were entered into the model according to the peak hour of the study corridor.
- Signal phasing and timings were based on the latest signal timing plans from the City of West Sacramento.

- The peak hour factor (PHF) of 0.93 during both the AM and PM peak hours for the study corridor, based on the existing traffic counts. Under Near Term conditions, the peak hour factor is not expected to change from existing conditions.
- The heavy vehicle percentage of 2 percent during both the AM and PM peak hours for the study corridor, based on the existing traffic counts. Under Near Term conditions, the heavy vehicle percentage is expected to remain consistent from existing conditions.

Corridor Speeds

This study looked at the speeds along the Marshall corridor, primarily since speeding and desire for traffic calming elements are ongoing reported issues.

The traffic operations SimTraffic model network included input of the 85th percentile speed surveys, which for the segment of Marshall Road between Southport Parkway and Golden Gate Drive is 45 miles per hour, and between Golden Gate Drive and Jefferson Boulevard is 40 miles per hour.

SimTraffic outputs for Arterial Level of Service report the average arterial speed between each intersection, and for average travel speed along the entire Marshall Road corridor.

All-Way Stop Warrants

Intersections along the Marshall Road corridor that currently have side-street stop control were analyzed with the Existing Plus Brar Farms Project traffic volumes and overall network conditions to determine if they meet the criteria in the *California Manual on Uniform Traffic Control Devices* (MUTCD), Section 2B.07 Multi-Way Stop Applications, that warrants all-way stop control.

The all-way stop warrant analysis may also provide insight into appropriate locations for roundabouts as an alternative to meet the needs for both traffic operations and traffic calming.

Policy Considerations

The *City of West Sacramento General Plan Mobility Element* outlines the relevant traffic operations goals for this study area:

Goal M-3.2 Automobile Level of Service

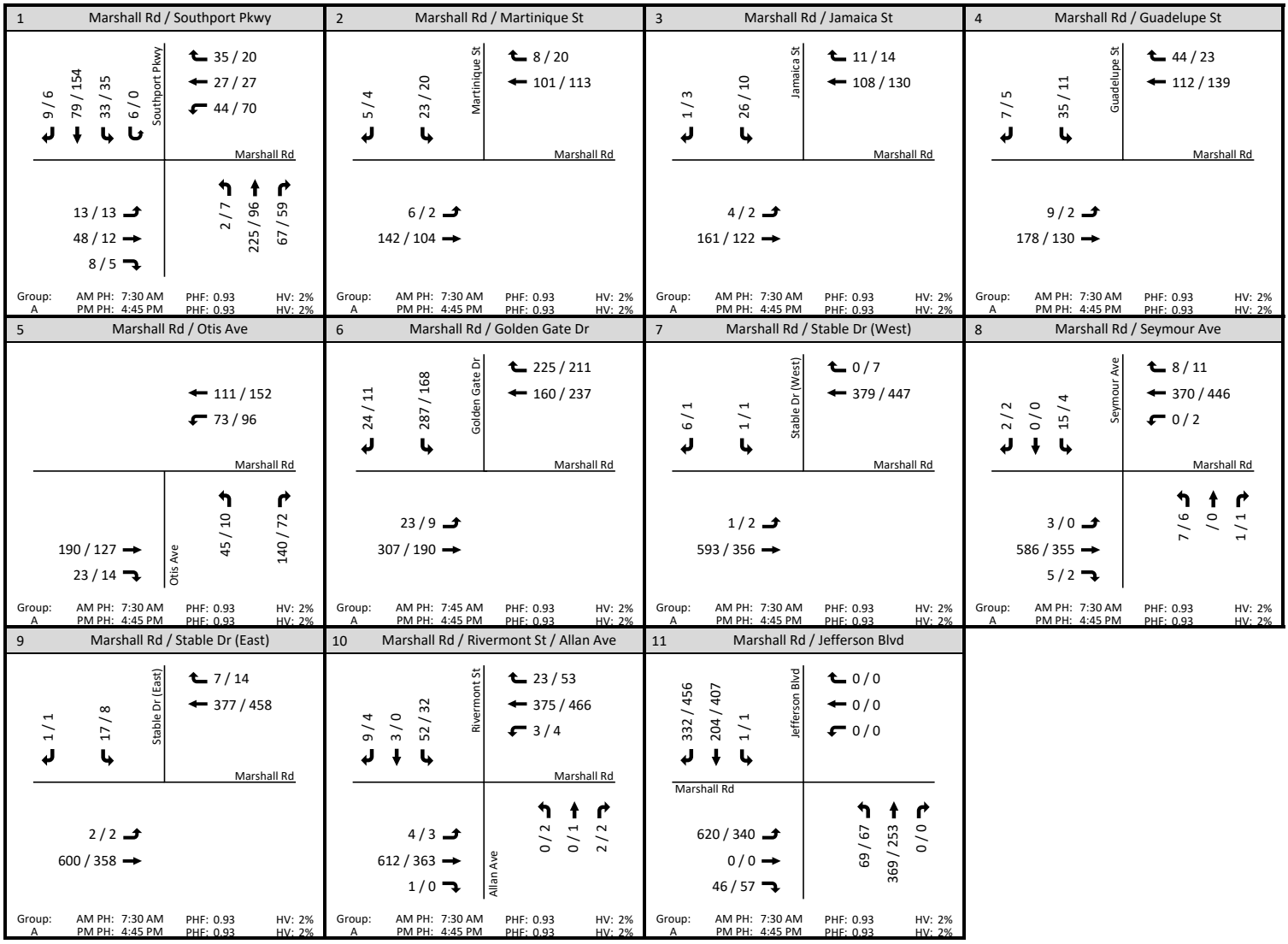
> For planning purposes, the City shall endeavor to maintain a Level of Service "C" on all streets within the City, except at intersections and on roadway segments within one-quarter mile of a freeway interchange or bridge crossing of the Deep Water Ship Channel, barge canal, or Sacramento River, where a Level of Service "D" shall be deemed acceptable, and within pedestrian oriented, high density, mixed-use areas, such as the Bridge District Specific Plan area, the Washington Specific Plan area, and West Capitol Avenue from Harbor Blvd. east, where a Level of Service "E" shall be deemed acceptable.

Based on the description, the entire Marshall Road corridor has Level of Service C threshold for acceptable traffic operations.

Existing Conditions

Existing Traffic Volumes

The existing intersection turning movement traffic volumes during the AM and PM peak hours are presented in **Figure 2**.



Intersection AM / PM Peak Hour Vehicle Volumes

Figure 2
Existing Conditions

Existing Intersection Operations

Table 4 displays the traffic operations under existing conditions.

Table 4: Existing Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.9 6.1	A A
2. Marshall Road / Martinique Street	SSSC	AM PM	1.5 (4.7 SB) 1.0 (4.3 SB)	A (A) A (A)
3. Marshall Road / Jamaica Street	SSSC	AM PM	0.8 (5.0 SB) 0.4 (4.3 SB)	A (A) A (A)
4. Marshall Road / Guadelupe Street	SSSC	AM PM	1.0 (5.3 SB) 0.5 (4.5 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	SSSC	AM PM	3.2 (4.8 NB) 3.1 (4.7 WB)	A (A) A (A)
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	8.8 (11.4 EB) 7.3 (9.1 EB)	A (B) A (A)
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.1 (4.2 SB) 1.8 (4.9 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	6.5 6.1	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	0.8 (10.0 SB) 0.5 (6.5 SB)	A A
10. Marshall Road / Rivermont Street / Allan Avenue	SSSC	AM PM	1.5 (12.0 SB) 1.4 (9.3)	A (B) A (A)
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	24.9 21.4	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

All intersections operate at acceptable LOS C or better. City staff conducted field observations of traffic operations and queuing conditions and noted that the eastbound queue from Marshall Road / Jefferson Boulevard spilled back close to the Marshall Road / Rivermont Street / Allan Avenue intersection during the AM peak hour, often making it difficult for southbound left turning drivers from finding the appropriate gap in traffic to enter onto Marshall Road.

Existing Corridor Speeds

Table 5 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard.

Table 5: Existing Marshall Road Corridor Vehicle Speeds

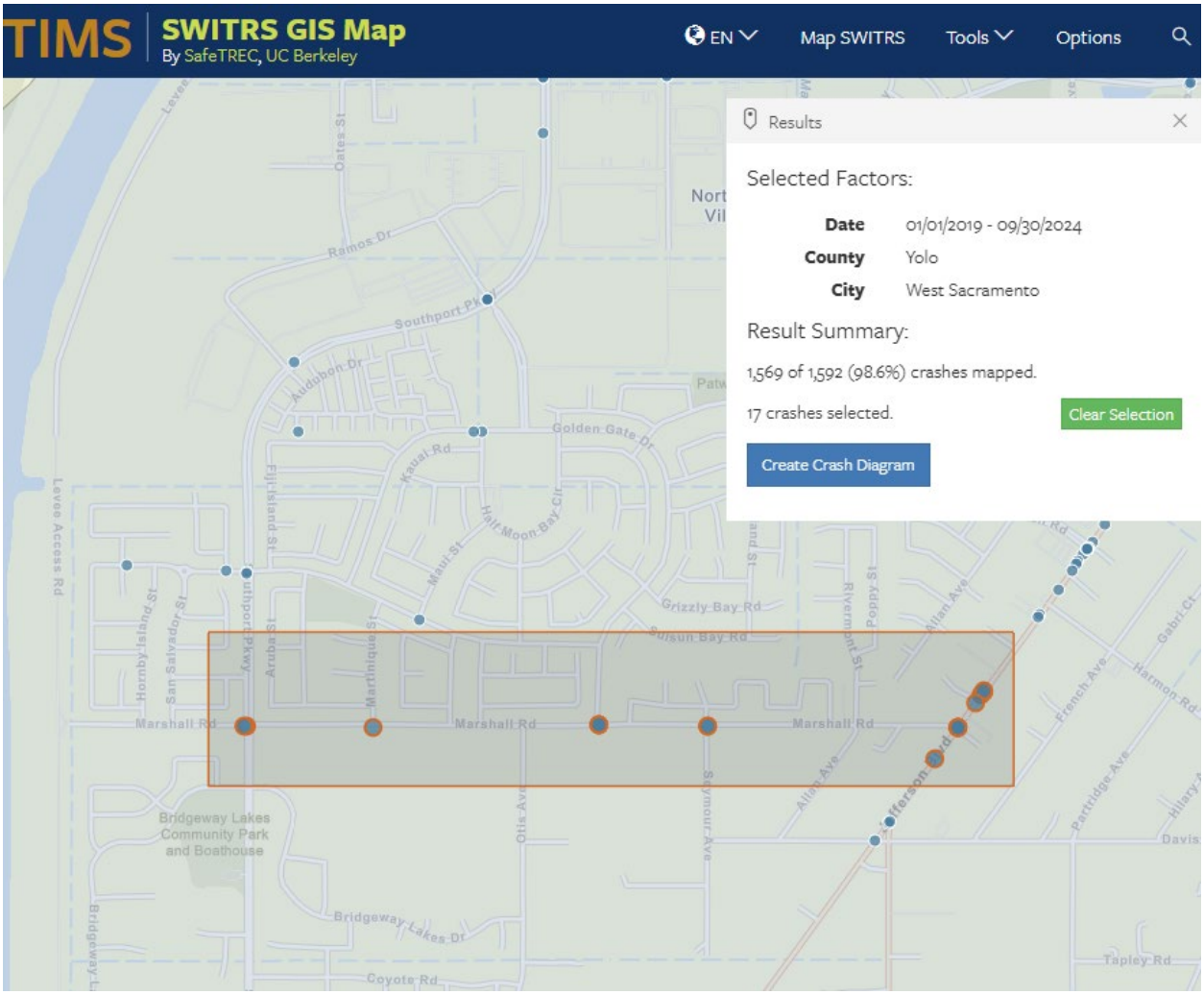
Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.2	24	24.1	31
		PM	18.1	25	24.5	31
2. Martinique Street	SSSC	AM	20.7	36	11.0	44
		PM	20.4	37	11.2	43
3. Jamaica Street	SSSC	AM	11.1	44	4.6	41
		PM	10.8	45	4.5	42
4. Guadelupe Street	SSSC	AM	4.4	42	6.3	42
		PM	4.3	44	6.1	43
5. Otis Avenue	SSSC	AM	6.6	40	15.1	30
		PM	6.1	42	15.2	30
6. Golden Gate Drive	AWSC	AM	22.3	20	14.9	13
		PM	19.6	23	14.2	14
7. Stable Drive (West)	SSSC	AM	8.8	22	17.2	27
		PM	8.5	23	17.4	27
8. Seymour Avenue	Roundabout	AM	18.1	26	25.0	30
		PM	16.9	28	25.5	30
9. Stable Drive (East)	SSSC	AM	24.0	31	4.7	38
		PM	23.6	32	4.9	37
10. Rivermont Street / Allan Avenue	SSSC	AM	4.9	37	0.6	-
		PM	4.6	39	0.0	
11. Jefferson Boulevard	Signal	AM	50.7	12	-	-
		PM	46.7	13		
Corridor Total	–	AM	190.9	25	123.4	35
		PM	179.8	27	123.4	35

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to traffic control devices (stop control, roundabout, and traffic signal), traffic volumes, and vehicle queuing reduces the average vehicle speed below the free flow speed of the roadway. In the eastbound direction, due to the lack of traffic control devices between Southport Parkway and Golden Gate Drive, the maximum speed reaches 45 miles per hour approaching Jamaica Street. In the westbound direction, the maximum speed reaches 44 mph approaching Martinque Street.

Existing Collision History

The TIMS SWITRS database was used to summarize the reported collisions that occurred along Marshall Road from 2019 to the latest available data in September 2024 (approximately 6 years of data). There were 17 reported crashes along the corridor during that period, with the main location at Marshall Road / Jefferson Boulevard intersection (7 reported collisions). No specific locations had 5 or more collisions during a 12-month period.



Existing Plus Brar Farms Project (Corridor Traffic Control Alternative A)

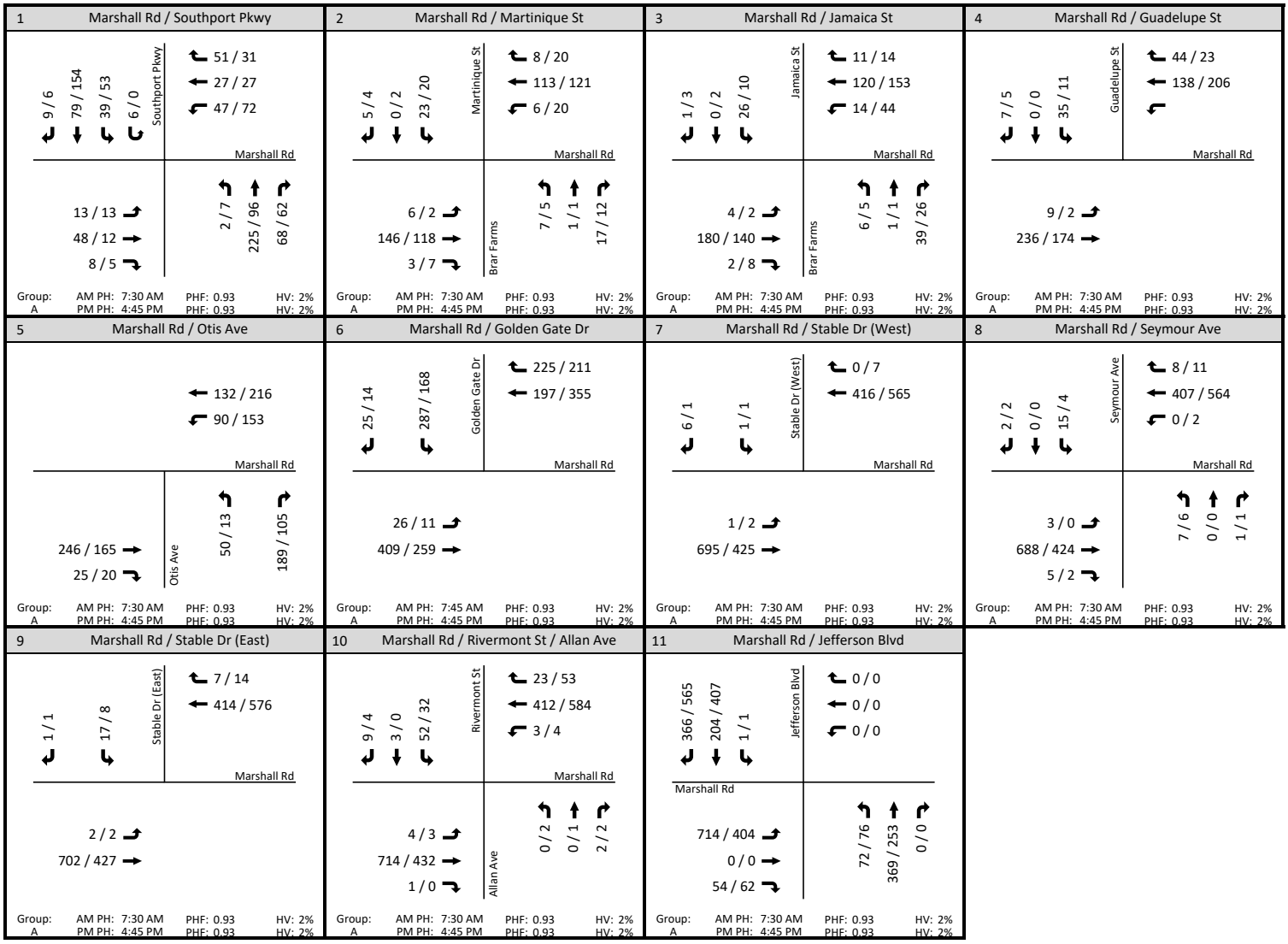
Proposed Brar Farms Project

The Brar Farms Project proposes development of 259 single family dwelling units located at 3425 Marshall Road, which is located on the southwest corner of Marshall Road / Otis Avenue intersection. Access would be provided with two driveways on Marshall Road (at Martinque Street and at Jamaica Street), and two driveways on Otis Avenue (new intersections).

The *Brar Farms (3425 Marshall Road Residential) Transportation Study* documents details regarding the proposed project trip generation, trip distribution and assignment, and project traffic volumes through the study area.

Existing Plus Brar Farms Project Traffic Volumes

Existing plus Brar Farms intersection turning movement traffic volumes during the AM and PM peak hours are presented in **Figure 3**.



Intersection AM / PM Peak Hour Vehicle Volumes

Figure 3
Existing Plus Brar Farms Project

Existing Plus Brar Farms Intersection Operations

Table 6 displays the traffic operations under Existing Plus Brar Farms conditions.

Table 6: Existing Plus Brar Farms (Corridor Traffic Control Alternative A) Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.1	A A
2. Marshall Road / Martinique Street	SSSC	AM PM	1.6 (5.0 SB) 1.3 (4.8 SB)	A (A) A (A)
3. Marshall Road / Jamaica Street	SSSC	AM PM	1.3 (5.9 SB) 1.1 (5.5 SB)	A (A) A (A)
4. Marshall Road / Guadelupe Street	SSSC	AM PM	1.1 (5.6 SB) 0.7 (5.1 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	SSSC	AM PM	4.0 (6.2 NB) 3.8 (5.4 WB)	A (A) A (A)
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	10.5 8.8	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.4 (8.2 SB) 2.2 (5.3 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.2 (7.5 EB) 6.8 (7.6 WB)	A (A) A (A)
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	2.4 (16.3 SB) 0.6 (8.5 SB)	A (C) A (A)
10. Marshall Road / Rivermont Street / Allan Avenue	SSSC	AM PM	7.3 (87.5 SB) 1.6 (11.7 SB)	A (F) A (B)
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	33.6 33.0	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The proposed Brar Farms development would add trips to Marshall Road, primarily adding traffic and vehicle delay closer to the Marshall Road / Jefferson Boulevard signalized intersection, which would remain within the high range of acceptable LOS C conditions. The added trips on Marshall Road would create fewer gaps in traffic for the side-street stop controlled approaches, notably Rivermont Street results in LOS F conditions during the AM peak hour.

Existing Plus Brar Farms Corridor Speeds

Table 7 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Existing Plus Brar Farms conditions.

Table 7: Existing Plus Brar Farms (Corridor Traffic Control Alternative A) Marshall Road Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.4	24	25.4	30
		PM	18.6	25	22.8	33
2. Martinique Street	SSSC	AM	20.9	36	11.1	44
		PM	18.5	41	11.4	42
3. Jamaica Street	SSSC	AM	11.3	43	4.8	39
		PM	11.1	44	4.9	38
4. Guadelupe Street	SSSC	AM	4.6	41	6.4	40
		PM	4.4	42	6.4	41
5. Otis Avenue	SSSC	AM	6.9	38	15.4	29
		PM	6.4	41	15.9	28
6. Golden Gate Drive	AWSC	AM	24.6	18	16.1	12
		PM	20.5	22	15.6	13
7. Stable Drive (West)	SSSC	AM	8.9	22	17.4	27
		PM	8.4	23	17.7	27
8. Seymour Avenue	Roundabout	AM	18.9	25	25.5	30
		PM	17.2	27	26.3	29
9. Stable Drive (East)	SSSC	AM	26.5	28	4.8	38
		PM	23.7	32	5.0	36
10. Rivermont Street / Allan Avenue	SSSC	AM	7.4	24	-	-
		PM	4.7	39		
11. Jefferson Boulevard	Signal	AM	69.4	9	-	-
		PM	50.5	12		
Corridor Total	–	AM	218.8	22	126.9	34
		PM	183.9	26	126.1	35

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to traffic control devices (stop control, roundabout, and traffic signal), traffic volumes plus trips associated with Brar Farms development, and vehicle queuing reduces the average vehicle speed below the free flow speed of the roadway.

In the eastbound direction, due to the lack of traffic control devices between Southport Parkway and Golden Gate Drive, the maximum speed reaches 44 miles per hour approaching Jamaica Street. In the westbound direction, the maximum speed reaches 44 mph approaching Martinque Street. Overall, the added delay, compared to Existing Conditions, along the corridor increases the eastbound corridor travel time by 28 seconds during the AM peak hour, and less than 5 seconds during the PM peak hour and for all periods in the westbound direction.

Existing Plus Brar Farms All-Way Stop Control Warrants

The all-way stop control warrant analysis was completed following the guidance criteria and optional criteria following the *California Manual on Uniform Traffic Control Devices* (MUTCD), Section 2B.07 Multi-Way Stop Applications. The criteria detail is noted as follows:

Guidance

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
C. Minimum volumes:
    1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
    2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
    3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.
D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Option: Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;
B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and
D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

Table 8 displays the all-way stop control warrants for key intersections on Marshall Road.

Table 8: Existing Plus Brar Farms All-Way Stop Control Warrants

Cross-Street	Guidance Criteria						Option Criteria			
	A	B	C			D	A	B	C	D
			1	2	3					
Marshall Road / Martinique Street	N/A	No	No	No	Yes	No	No	Yes	N/A	No
Marshall Road / Jamaica Street	N/A	No	Yes	No	Yes	No	No	Yes	N/A	No
Marshall Road / Otis Avenue	N/A	No	Yes	No	Yes	No	No	Yes	N/A	Yes
Marshall Road / Rivermont Street / Allan Avenue	N/A	No	Yes	Yes	Yes	No	Yes	Yes	N/A	No

Marshall Road / Martinique Street intersection does not meet any of the guidance criteria primarily based on traffic volumes and vehicle delay; however, does meet one of the optional criteria to provide safe crossing of Marshall Road due to anticipated demand for pedestrians connecting to school (Bridgeway Island Elementary) and other destinations (Bridgeway Lakes Community Park).

Marshall Road / Jamaica Street intersection meets one of the guidance criteria based on traffic volumes, in addition to meeting the same optional criteria based on providing safe crossing for pedestrians

Marshall Road / Otis Avenue intersection meets one of the guidance criteria based on traffic volumes, and two optional criteria based on pedestrian access and crossing safety, and the two roadways having the similar design and operating characteristics.

Marshall Road / Rivermont Street / Allan Avenue intersection meets two guidance criteria based on both traffic volumes and vehicle delay, and two optional criteria based on pedestrian access and crossing safety, and need to control left turn volumes.

As previously described, intersections meeting criteria for all-way stop warrant may also be appropriate locations for roundabouts as an alternative to meet the needs for both traffic operations and traffic calming, considering roundabouts would provide traffic control for all approaches to an intersection.

Corridor Traffic Control Alternative B

Corridor Traffic Control Alternative B represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (all-way stop control), Jamaica Street (all-way stop control), Otis Avenue (all-way stop control), and Rivermont Street/Allan Avenue (all-way stop control).

Corridor Traffic Control Alternative B Intersection Operations

Table 9 displays the traffic operations under Corridor Traffic Control Alternative B.

Table 9: Corridor Traffic Control Alternative B Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	7.5 6.9	A A
2. Marshall Road / Martinique Street	**AWSC**	AM PM	9.4 9.0	A A
3. Marshall Road / Jamaica Street	**AWSC**	AM PM	8.6 8.2	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	3.5 (6.0 SB) 3.7 (5.1 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**AWSC**	AM PM	8.3 9.2	A A
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	11.6 9.1	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	3.0 (17.6 SB) 2.1 (12.8 SB)	A (C) A (B)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	9.7 6.2	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	14.2 (65.7 SB) 2.8 (14.1 SB)	B (F) A (B)
10. Marshall Road / Rivermont Street / Allan Avenue	**AWSC**	AM PM	14.3 11.6	B B
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	35.7 32.1	D C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The change in intersection 10 (Marshall Road / Rivermont Street / Allan Avenue) would allow the intersection to operate at LOS B, allowing movements from Rivermont Street or Allan Avenue to enter the intersection without waiting for gaps in traffic from Marshall Road. This may shift some of the delay to intersection 11 (Marshall Road / Jefferson Boulevard) which would just enter LOS D conditions. Also, the presence of a stop control at Rivermont Street / Allan Avenue may shift vehicle queuing to create fewer gaps in traffic for vehicles from intersection 9 (Stable Drive East) from entering Marshall Road, potentially creating LOS F conditions for the side-street movement; however, the low traffic volumes and the alternative route to enter at Seymour Avenue may provide acceptable conditions.

Corridor Traffic Control Alternative B Speeds

Table 10 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Corridor Traffic Control Alternative B.

Table 10: Corridor Traffic Control Alternative B Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.1	24	28.4	26
		PM	19.5	24	27.2	28
2. Martinique Street	**AWSC**	AM	29.0	26	22.9	21
		PM	25.4	29	22.9	21
3. Jamaica Street	**AWSC**	AM	23.4	21	12.2	15
		PM	23.0	21	12.4	15
4. Guadelupe Street	SSSC	AM	8.2	23	10.1	26
		PM	8.0	23	10.0	26
5. Otis Avenue	**AWSC**	AM	15.5	17	23.2	20
		PM	14.5	18	23.7	19
6. Golden Gate Drive	AWSC	AM	28.7	16	15.5	13
		PM	23.9	19	15.3	13
7. Stable Drive (West)	SSSC	AM	9.9	20	17.2	27
		PM	8.4	24	17.6	27
8. Seymour Avenue	Roundabout	AM	23.7	20	24.6	31
		PM	17.2	27	25.3	30
9. Stable Drive (East)	SSSC	AM	42.5	18	7.8	23
		PM	24.8	30	8.0	23
10. Rivermont Street / Allan Avenue	**AWSC**	AM	21.3	9	-	-
		PM	12.9	14		
11. Jefferson Boulevard	Signal	AM	73.4	8	-	-
		PM	50.3	12		
Corridor Total	–	AM	294.6	16	161.9	27
		PM	228.0	21	162.4	27

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to added stop control along Marshall Road would increase vehicle delay and reduce vehicle speed along the corridor.

In the eastbound direction, adding all-way stop control at multiple intersections on Marshall Road would reduce the maximum speed to 29 miles per hour approaching Martinique Street. In the westbound direction, the maximum speed reaches 31 mph approaching Seymour Avenue.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 75 seconds during the AM peak hour, and 44 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 35 seconds during both the AM and PM peak hours.

Corridor Traffic Control Alternative C

Corridor Traffic Control Alternative C represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (roundabout), and Rivermont Street/Allan Avenue (roundabout).

Corridor Traffic Control Alternative C Intersection Operations

Table 11 displays the traffic operations under Corridor Traffic Control Alternative C.

Table 11: Corridor Traffic Control Alternative C Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.0	A A
2. Marshall Road / Martinique Street	**Roundabout**	AM PM	4.9 4.4	A A
3. Marshall Road / Jamaica Street	**Roundabout**	AM PM	1.2 1.0	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	1.1 (5.4 SB) 0.6 (4.9 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**Roundabout**	AM PM	5.4 6.3	A A
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	10.5 8.7	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.3 (4.0 SB) 2.2 (12.1 SB)	A (A) A (B)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.1 6.4	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	3.5 (40.0 SB) 1.0 (12.0 SB)	A (D) A (B)
10. Marshall Road / Rivermont Street / Allan Avenue	**Roundabout**	AM PM	7.2 6.6	A A
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	32.1 32.6	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The change in intersection 10 (Marshall Road / Rivermont Street / Allan Avenue) would allow the intersection to operate at LOS A, allowing movements from Rivermont Street or Allan Avenue to enter the intersection without waiting for gaps in traffic from Marshall Road. The presence of a roundabout at Rivermont Street / Allan Avenue may shift vehicle queuing to create fewer gaps in traffic for vehicles from intersection 9 (Stable Drive East) from entering Marshall Road, potentially creating LOS D conditions for the side-street movement; however, the low traffic volumes and the alternative route to enter at Seymour Avenue may provide acceptable conditions.

Corridor Traffic Control Alternative C Speeds

Table 12 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Corridor Traffic Control Alternative C.

Table 12: Corridor Traffic Control Alternative C Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.4	24	28.3	26
		PM	18.4	25	28.8	26
2. Martinique Street	**Roundabout**	AM	25.3	30	15.1	32
		PM	22.1	34	15.3	32
3. Jamaica Street	**Roundabout**	AM	16.2	30	4.8	39
		PM	16.1	30	5.0	38
4. Guadelupe Street	SSSC	AM	4.9	38	11.1	23
		PM	4.6	40	10.9	24
5. Otis Avenue	**Roundabout**	AM	11.0	24	18.8	24
		PM	10.6	25	19.4	23
6. Golden Gate Drive	AWSC	AM	28.7	16	15.6	13
		PM	24.5	18	15.6	13
7. Stable Drive (West)	SSSC	AM	8.9	22	17.2	27
		PM	8.5	23	17.7	27
8. Seymour Avenue	Roundabout	AM	19.3	24	24.9	30
		PM	17.3	27	25.7	29
9. Stable Drive (East)	SSSC	AM	27.4	27	8.9	20
		PM	24.7	31	9.0	20
10. Rivermont Street / Allan Avenue	**Roundabout**	AM	11.9	15	-	-
		PM	9.0	20		
11. Jefferson Boulevard	Signal	AM	68.8	15	-	-
		PM	53.0	20		
Corridor Total	–	AM	241.8	9	144.7	30
		PM	208.8	12	147.4	30

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to added roundabouts along Marshall Road would increase vehicle delay and reduce vehicle speed along the corridor.

In the eastbound direction, adding roundabouts at multiple intersections on Marshall Road would reduce the maximum speed to 40 miles per hour approaching Guadelupe Street. In the westbound direction, the maximum speed may reach 39 mph approaching Jamaica Street.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 23 seconds during the AM peak hour, and 25 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 18 seconds during the AM peak hour, and 21 seconds during the PM peak hour.

Corridor Traffic Control Alternative D

Corridor Traffic Control Alternative D – represents Existing Plus Brar Farms Project, plus proposed modifications to traffic control at Martinque Street (roundabout), Otis Avenue (all-way stop control), Golden Gate Drive (roundabout), and Rivermont Street/Allan Avenue (roundabout).

Corridor Traffic Control Alternative D Intersection Operations

Table 13 displays the traffic operations under Corridor Traffic Control Alternative D.

Table 13: Corridor Traffic Control Alternative D Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.1	A A
2. Marshall Road / Martinique Street	**Roundabout**	AM PM	4.9 4.4	A A
3. Marshall Road / Jamaica Street	**Roundabout**	AM PM	1.3 1.1	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	2.2 (5.9 SB) 2.5 (5.4 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**AWSC**	AM PM	7.3 7.4	A A
6. Marshall Road / Golden Gate Drive	**Roundabout**	AM PM	6.7 5.4	A A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	1.2 (4.4 SB) 1.2 (4.9 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.7 6.5	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	5.0 (54.7 SB) 1.0 (15.6 SB)	A (E) A (C)
10. Marshall Road / Rivermont Street / Allan Avenue	**Roundabout**	AM PM	7.7 6.6	A A
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	33.0 34.5	C C

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

This alternative is primarily consistent with Alternative C; however, swaps all-way stop control to be located at Otis Avenue, and a roundabout at Golden Gate Drive. No notable changes in traffic operations compared to Alternative C is noted.

Corridor Traffic Control Alternative D Speeds

Table 14 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Existing Plus Brar Farms conditions.

Table 14: Corridor Traffic Control Alternative D Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.2	24	28.7	26
		PM	19.2	24	28.8	26
2. Martinique Street	**AWSC**	AM	25.3	30	15.1	32
		PM	22.2	34	15.2	32
3. Jamaica Street	**AWSC**	AM	16.2	30	4.8	39
		PM	16.1	30	4.9	38
4. Guadelupe Street	SSSC	AM	5.0	37	9.9	26
		PM	4.8	39	9.7	27
5. Otis Avenue	**AWSC**	AM	15.2	17	24.1	19
		PM	14.4	18	24.7	18
6. Golden Gate Drive	**Roundabout**	AM	21.8	21	9.7	20
		PM	19.6	23	10.0	20
7. Stable Drive (West)	SSSC	AM	10.2	19	17.0	28
		PM	9.7	20	17.4	27
8. Seymour Avenue	Roundabout	AM	20.2	23	24.9	30
		PM	17.3	27	25.7	29
9. Stable Drive (East)	SSSC	AM	29.4	26	8.9	20
		PM	24.7	30	9.0	20
10. Rivermont Street / Allan Avenue	**AWSC**	AM	12.7	14	-	-
		PM	9.0	20		
11. Jefferson Boulevard	Signal	AM	70.9	9	-	-
		PM	53.2	12		
Corridor Total	–	AM	246.0	20	143.1	30
		PM	210.2	23	145.4	30

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

Delay due to added roundabouts along Marshall Road would increase vehicle delay and reduce vehicle speed along the corridor.

In the eastbound direction, adding roundabouts at multiple intersections on Marshall Road would reduce the maximum speed to 39 miles per hour approaching Guadelupe Street. In the westbound direction, the maximum speed may reach 39 mph approaching Jamaica Street.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 27 seconds during the AM peak hour, and 26 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 16 seconds during the AM peak hour, and 19 seconds during the PM peak hour.

Corridor Traffic Control Preferred Alternative

Corridor Traffic Control Preferred Alternative Intersection Operations

Table 15 displays the traffic operations under Corridor Traffic Control Preferred Alternative.

Table 15: Corridor Traffic Control Preferred Alternative Traffic Operations

Intersection	Control Type	Peak Hour	Delay	LOS
1. Marshall Road / Southport Parkway	AWSC	AM PM	6.8 6.1	A A
2. Marshall Road / Martinique Street	SSSC	AM PM	2.7 (5.0 SB) 2.7 (4.8 SB)	A (A) A (A)
3. Marshall Road / Jamaica Street	**AWSC**	AM PM	6.9 6.7	A A
4. Marshall Road / Guadelupe Street	SSSC	AM PM	2.2 (5.6 SB) 1.7 (5.3 SB)	A (A) A (A)
5. Marshall Road / Otis Avenue	**Roundabout**	AM PM	5.2 5.9	A A
6. Marshall Road / Golden Gate Drive	AWSC	AM PM	10.4 8.3	B A
7. Marshall Road / Stable Drive (West)	SSSC	AM PM	2.3 (6.1 SB) 2.1 (8.8 SB)	A (A) A (A)
8. Marshall Road / Seymour Avenue	Roundabout	AM PM	7.0 6.3	A A
9. Marshall Road / Stable Drive (East)	SSSC	AM PM	12.0 (57.3 SB) 2.8 (17.1 SB)	B (F) A (C)
10. Marshall Road / Rivermont Street / Allan Avenue	**AWSC**	AM PM	13.9 11.5	B B
11. Marshall Road / Jefferson Boulevard	Signal	AM PM	34.3 37.7	C D

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

The change in intersection 10 (Marshall Road / Rivermont Street / Allan Avenue) would allow the intersection to operate at LOS B, allowing movements from Rivermont Street or Allan Avenue to enter the intersection without waiting for gaps in traffic from Marshall Road. This may shift some of the delay to intersection 11 (Marshall Road / Jefferson Boulevard) which would just enter LOS D conditions. Also, the presence of a stop control at Rivermont Street / Allan Avenue may shift vehicle queuing to create fewer gaps in traffic for vehicles from intersection 9 (Stable Drive East) from entering Marshall Road, potentially creating LOS F conditions for the side-street movement; however, the low traffic volumes and the alternative route to enter at Seymour Avenue may provide acceptable conditions.

All other intersections would operate acceptably at LOS A conditions.

Corridor Traffic Control Preferred Alternative Speeds

Table 16 displays the Marshall Road average speed between intersections and for the traveling the entire corridor between Southport Parkway and Jefferson Boulevard under Corridor Traffic Control Preferred Alternative.

Table 16: Corridor Traffic Control Preferred Alternative Corridor Vehicle Speeds

Cross-Street	Control Type	Peak Hour	Eastbound		Westbound	
			Travel Time (s)	Average Speed (mph)	Travel Time (s)	Average Speed (mph)
1. Southport Parkway	AWSC	AM	19.3	24	25.6	29
		PM	18.7	25	25.8	29
2. Martinique Street	SSSC	AM	22.8	33	15.3	32
		PM	21.1	36	15.5	31
3. Jamaica Street	**AWSC**	AM	20.3	24	12.2	15
		PM	20.0	24	12.4	15
4. Guadelupe Street	SSSC	AM	8.2	23	11.5	23
		PM	8.0	23	11.3	23
5. Otis Avenue	**Roundabout**	AM	11.4	23	19.1	24
		PM	11.0	24	19.6	23
6. Golden Gate Drive	AWSC	AM	29.2	16	15.3	13
		PM	24.6	18	15.3	13
7. Stable Drive (West)	SSSC	AM	8.9	22	17.2	27
		PM	8.5	23	17.6	27
8. Seymour Avenue	Roundabout	AM	19.1	25	24.6	31
		PM	17.3	27	25.4	30
9. Stable Drive (East)	SSSC	AM	39.4	19	7.8	23
		PM	24.9	30	8.0	23
10. Rivermont Street / Allan Avenue	**AWSC**	AM	20.8	9	-	-
		PM	12.9	14		
11. Jefferson Boulevard	Signal	AM	70.7	9	-	-
		PM	52.1	12		
Corridor Total	–	AM	270.0	18	148.8	29
		PM	219.1	22	150.8	29

Notes: SSSC = side-street stop control; AWSC = all-way stop control.

In the eastbound direction, adding two stop controls and one roundabouts intersections on Marshall Road would reduce the maximum speed to 36 miles per hour approaching Martinique Street. In the westbound direction, the maximum speed may reach 32 mph approaching Martinique Street.

Overall, the added delay along the corridor, compared to Alternative A, increases the eastbound corridor travel time by 51 seconds during the AM peak hour, and 35 seconds during the PM peak hour. The added delay along the corridor would increase the westbound corridor travel time by approximately 22 seconds during the AM peak hour, and 25 seconds during the PM peak hour.

Summary and Recommendations

Overall, meeting the multiple transportation and safety goals along the Marshall Road corridor requires review of multiple factors.

The addition of trips associated with the proposed Brar Farms development would create unacceptable traffic operations conditions for the side-street movements at Rivermont Street / Allan Avenue. This intersection would meet the criteria for an all-way stop control warrant.

Traffic control options for other intersections along the Marshall Road corridor may look to focus on addressing the needs for safe pedestrian crossings and management of vehicle travel speed, while not significantly adding vehicle delay along the corridor. The Corridor Traffic Control Preferred Alternative addresses each of the various factors and potential limitations. **Table 17** presents the preferred control type at each of the study intersections, and details the considerations for any modification.

Table 17: Corridor Traffic Control Preferred Alternative Corridor Vehicle Speeds

Cross-Street	Preferred Control Type	Control Type Modification Details
1. Marshall Road / Southport Parkway	AWSC	No proposed change necessary.
2. Marshall Road / Martinique Street	SSSC	No change to traffic control type necessary; however, addition of high visibility crosswalk with rectangular rapid flashing beacon (RRFB) crossing Marshall Road due to need for speed reduction mechanism, and future demand for pedestrian travel between residential areas, parks, and Bridgeway Island Elementary school.
3. Marshall Road / Jamaica Street	**AWSC**	Change from side-street stop to all-way stop control. Will meet the criteria for all-way stop warrant due to traffic volumes and need for controlled pedestrian crossing of Marshall Road. Roundabout analyzed but likely not feasible due to right-of-way constraints and distance to adjacent intersection with Guadelupe Street.
4. Marshall Road / Guadelupe Street	SSSC	No proposed change necessary.
5. Marshall Road / Otis Avenue	**Roundabout**	Change from side-street stop to roundabout. Will meet the criteria for all-way stop warrant due to traffic volumes, need for controlled pedestrian crossing of Marshall Road, and intersection of roadways with similar design and operating characteristics. Meets need for speed reduction mechanism, while not impacting vehicle delay along the corridor as much as all-way stop control.
6. Marshall Road / Golden Gate Drive	AWSC	No proposed change is recommended. Roundabout analyzed but likely not feasible due to right-of-way constraints and distance to Main Canal and adjacent intersection with Stable Drive West.
7. Marshall Road / Stable Drive (West)	SSSC	No proposed change necessary.

8. Marshall Road / Seymour Avenue	Roundabout	No proposed change necessary.
9. Marshall Road / Stable Drive (East)	SSSC	No proposed change necessary. Some analyzed alternatives to traffic control modifications at Rivermont Street / Allan Avenue may impact traffic operations for the side-street approach here; however, there is an alternative route for entering onto Marshall Road at Seymour Avenue.
10. Marshall Road / Rivermont Street / Allan Avenue	**AWSC**	Change from side-street stop to all-way stop control. Addition of Brar Farms trips would create unacceptable level of service conditions for the side-streets approaches. Also meets criteria for all-way stop warrant due to traffic volumes, vehicle delay, and need for controlled pedestrian crossing of Marshall Road. Roundabout analyzed but likely not feasible due to right-of-way constraints, existing bus stop locations, and distance to adjacent intersection with Stable Drive East.
11. Marshall Road / Jefferson Boulevard	Signal	No proposed change analyzed. Future impacts to the intersection will require Jefferson Boulevard to be widened from 2 to 4 travel lanes (primarily attributed to Yarborough development), which will increase capacity of vehicles through this intersection. Trips associated with Brar Farms may require need to contribute fair share portion for future improvements to the intersection.
Notes: SSSC = side-street stop control; AWSC = all-way stop control.		

Marshall & Higgins Public Safety and Traffic Calming Project

Existing Traffic Operations and Proposed Traffic Control Modifications

Appendix

SimTraffic Operations, Arterial, Queueing Reports, for all scenarios

CA MUTCD All-Way Stop Control Warrant Analysis

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	UL	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.4
Total Delay (hr)	0.1	0.1	0.0	0.7	0.0	0.2	0.0	1.2
Total Del/Veh (s)	6.7	4.7	3.3	8.1	4.2	7.5	2.0	6.9
Stop Delay (hr)	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Stop Del/Veh (s)	2.8	2.5	2.4	3.2	2.8	2.8	2.1	2.9
Total Stops	71	107	2	296	35	75	11	597
Stop/Veh	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Travel Dist (mi)	8.5	21.8	0.0	83.0	2.2	26.2	2.9	144.7
Travel Time (hr)	0.4	0.7	0.0	3.1	0.1	0.9	0.1	5.5
Avg Speed (mph)	23	30	9	26	17	29	29	27
Fuel Used (gal)	0.2	0.4	0.0	1.9	0.0	0.6	0.1	3.2
Fuel Eff. (mpg)	47.5	50.9	32.2	44.4	59.5	43.3	47.2	45.3
HC Emissions (g)	2	6	0	23	0	11	0	42
CO Emissions (g)	92	161	0	605	8	248	7	1123
NOx Emissions (g)	7	22	0	73	0	33	1	137
Vehicles Entered	71	108	0	297	0	110	12	598
Vehicles Exited	70	108	2	296	35	74	11	597
Hourly Exit Rate	70	108	2	296	35	74	11	597
Density (ft/veh)		1477		469		1491		1625
Occupancy (veh)	0	1	0	3	0	1	0	5

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	1.8	0.2	4.7	1.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.4	0.0	3.3	0.5
Total Stops	1	0	29	30
Stop/Veh	0.01	0.00	1.00	0.10
Travel Dist (mi)	30.4	14.8	2.8	48.0
Travel Time (hr)	0.9	0.3	0.1	1.4
Avg Speed (mph)	34	43	19	34
Fuel Used (gal)	1.5	0.4	0.1	1.9
Fuel Eff. (mpg)	20.9	41.3	45.8	25.6
HC Emissions (g)	30	6	0	36
CO Emissions (g)	1520	178	11	1709
NOx Emissions (g)	98	23	1	123
Vehicles Entered	146	111	29	285
Vehicles Exited	147	110	29	285
Hourly Exit Rate	147	110	29	285
Density (ft/veh)	1214			1651
Occupancy (veh)	1	0	0	1

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.4	0.2	5.0	0.8
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.0	3.1	0.3
Total Stops	0	0	30	30
Stop/Veh	0.00	0.00	0.97	0.10
Travel Dist (mi)	22.1	6.4	3.5	32.1
Travel Time (hr)	0.5	0.2	0.2	0.9
Avg Speed (mph)	41	37	20	36
Fuel Used (gal)	0.6	0.2	0.1	0.9
Fuel Eff. (mpg)	35.9	29.3	44.0	35.0
HC Emissions (g)	11	4	1	15
CO Emissions (g)	381	186	25	592
NOx Emissions (g)	42	13	3	58
Vehicles Entered	165	121	31	315
Vehicles Exited	165	121	30	315
Hourly Exit Rate	165	121	30	315
Density (ft/veh)	1309			1785
Occupancy (veh)	1	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	0.5	0.6	5.3	1.0
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.1	3.6	0.5
Total Stops	2	0	41	43
Stop/Veh	0.01	0.00	1.00	0.11
Travel Dist (mi)	9.9	11.0	4.3	25.2
Travel Time (hr)	0.3	0.4	0.2	0.9
Avg Speed (mph)	35	30	19	29
Fuel Used (gal)	0.3	0.4	0.1	0.9
Fuel Eff. (mpg)	29.8	25.3	43.6	29.1
HC Emissions (g)	6	7	1	15
CO Emissions (g)	254	403	29	687
NOx Emissions (g)	22	24	3	49
Vehicles Entered	192	158	41	390
Vehicles Exited	192	158	41	390
Hourly Exit Rate	192	158	41	390
Density (ft/veh)				1379
Occupancy (veh)	0	0	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.2	0.2	0.5
Total Del/Veh (s)	0.9	4.4	4.8	3.2
Stop Delay (hr)	0.0	0.0	0.2	0.2
Stop Del/Veh (s)	0.1	0.6	3.6	1.4
Total Stops	0	15	180	195
Stop/Veh	0.00	0.08	0.99	0.34
Travel Dist (mi)	15.0	23.5	13.5	52.0
Travel Time (hr)	0.4	0.9	0.8	2.1
Avg Speed (mph)	33	27	17	25
Fuel Used (gal)	0.5	1.3	0.2	2.1
Fuel Eff. (mpg)	27.7	17.6	56.4	24.6
HC Emissions (g)	11	25	2	38
CO Emissions (g)	488	1487	42	2016
NOx Emissions (g)	37	76	5	118
Vehicles Entered	215	184	180	580
Vehicles Exited	215	184	180	579
Hourly Exit Rate	215	184	180	579
Density (ft/veh)		771	508	682
Occupancy (veh)	0	1	1	2

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	1.0	0.8	0.7	2.5
Total Del/Veh (s)	11.4	7.0	8.2	8.8
Stop Delay (hr)	0.4	0.4	0.4	1.3
Stop Del/Veh (s)	4.4	3.7	5.2	4.4
Total Stops	323	392	310	1025
Stop/Veh	0.99	1.00	0.99	0.99
Travel Dist (mi)	40.7	21.3	44.0	105.9
Travel Time (hr)	2.2	1.6	2.3	6.1
Avg Speed (mph)	19	13	19	17
Fuel Used (gal)	1.2	0.4	1.1	2.7
Fuel Eff. (mpg)	35.2	48.9	38.6	38.8
HC Emissions (g)	21	2	15	38
CO Emissions (g)	831	61	439	1331
NOx Emissions (g)	61	6	42	109
Vehicles Entered	325	392	310	1028
Vehicles Exited	324	391	310	1027
Hourly Exit Rate	324	391	310	1027
Density (ft/veh)	307	176	321	279
Occupancy (veh)	2	2	2	6

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.4	0.1	0.0	0.6
Total Del/Veh (s)	2.6	1.3	4.2	2.1
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.6	0.0	4.1	0.4
Total Stops	0	0	7	6
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	32.2	52.2	0.4	84.8
Travel Time (hr)	1.5	1.9	0.0	3.4
Avg Speed (mph)	22	28	16	25
Fuel Used (gal)	2.9	2.3	0.0	5.2
Fuel Eff. (mpg)	11.0	23.2	47.8	16.4
HC Emissions (g)	60	48	0	108
CO Emissions (g)	3301	2452	1	5754
NOx Emissions (g)	187	136	0	323
Vehicles Entered	587	385	7	978
Vehicles Exited	586	386	7	979
Hourly Exit Rate	586	386	7	979
Density (ft/veh)	194	385		402
Occupancy (veh)	1	2	0	3

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.1	0.7	0.0	0.0	1.8
Total Del/Veh (s)	6.7	6.3	4.2	3.5	6.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.2	1.7	1.2	0.2
Total Stops	28	27	3	6	64
Stop/Veh	0.05	0.07	0.33	0.33	0.06
Travel Dist (mi)	73.2	79.1	1.6	1.1	154.9
Travel Time (hr)	3.0	2.7	0.1	0.1	5.8
Avg Speed (mph)	25	29	24	18	27
Fuel Used (gal)	1.4	1.6	0.0	0.0	3.0
Fuel Eff. (mpg)	51.4	50.5	45.6	46.0	50.8
HC Emissions (g)	29	22	0	0	51
CO Emissions (g)	738	493	4	4	1238
NOx Emissions (g)	81	79	1	0	162
Vehicles Entered	587	384	9	17	997
Vehicles Exited	586	384	9	17	996
Hourly Exit Rate	586	384	9	17	996
Density (ft/veh)	223	402			516
Occupancy (veh)	3	3	0	0	6

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.1	0.2
Total Del/Veh (s)	0.8	0.3	10.0	0.8
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	8.3	0.2
Total Stops	1	0	18	19
Stop/Veh	0.00	0.00	1.00	0.02
Travel Dist (mi)	128.6	19.2	1.1	149.0
Travel Time (hr)	4.0	0.5	0.1	4.6
Avg Speed (mph)	32	36	12	32
Fuel Used (gal)	5.0	0.5	0.0	5.6
Fuel Eff. (mpg)	25.5	35.9	39.9	26.6
HC Emissions (g)	98	9	0	107
CO Emissions (g)	4490	306	3	4800
NOx Emissions (g)	308	34	0	342
Vehicles Entered	594	392	18	1003
Vehicles Exited	595	392	18	1004
Hourly Exit Rate	595	392	18	1004
Density (ft/veh)	286	470		374
Occupancy (veh)	4	1	0	5

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.1	0.1	0.0	0.2	0.5
Total Del/Veh (s)	0.5	1.3	4.6	12.0	1.5
Stop Delay (hr)	0.0	0.1	0.0	0.2	0.2
Stop Del/Veh (s)	0.0	0.5	4.6	9.9	0.8
Total Stops	2	2	3	67	74
Stop/Veh	0.00	0.00	1.00	1.00	0.07
Travel Dist (mi)	29.7	67.7	0.3	8.4	106.1
Travel Time (hr)	0.9	2.4	0.0	0.5	3.8
Avg Speed (mph)	35	28	18	16	28
Fuel Used (gal)	0.7	3.2	0.0	0.2	4.2
Fuel Eff. (mpg)	41.7	20.9	43.4	35.5	25.3
HC Emissions (g)	11	63	0	2	76
CO Emissions (g)	296	3051	1	70	3418
NOx Emissions (g)	40	201	0	7	247
Vehicles Entered	609	408	3	67	1084
Vehicles Exited	609	407	3	67	1084
Hourly Exit Rate	609	407	3	67	1084
Density (ft/veh)	297	368		1239	607
Occupancy (veh)	1	2	0	1	4

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.5
Denied Del/Veh (s)								1.1
Total Delay (hr)	5.8	0.0	0.9	2.3	0.0	2.1	0.4	11.5
Total Del/Veh (s)	33.7	2.3	45.1	22.3	25.8	35.6	3.9	24.9
Stop Delay (hr)	4.2	0.0	0.8	1.5	0.0	1.2	0.3	8.2
Stop Del/Veh (s)	24.3	2.0	43.0	14.7	25.1	21.0	3.6	17.7
Total Stops	452	15	64	201	1	160	206	1101
Stop/Veh	0.73	0.33	0.91	0.54	1.00	0.76	0.61	0.66
Travel Dist (mi)	108.3	1.0	4.5	80.7	0.0	131.5	6.4	332.5
Travel Time (hr)	9.2	0.1	1.1	4.1	0.0	5.2	0.8	21.0
Avg Speed (mph)	12	11	4	20	2	25	8	16
Fuel Used (gal)	3.3	0.0	0.3	2.5	0.0	3.2	0.2	9.6
Fuel Eff. (mpg)	33.2	26.6	15.6	32.9	6.1	41.4	26.6	34.8
HC Emissions (g)	28	0	1	36	0	44	1	112
CO Emissions (g)	818	17	58	1512	0	1755	43	4211
NOx Emissions (g)	83	2	3	117	0	152	5	362
Vehicles Entered	660	0	0	437	0	543	0	1641
Vehicles Exited	614	46	68	370	1	205	339	1643
Hourly Exit Rate	614	46	68	370	1	205	339	1643
Density (ft/veh)	94		960	244		256	1688	388
Occupancy (veh)	9	0	1	4	0	5	1	20

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	NB	SB	All
Movements Served	T	T	
Denied Delay (hr)			0.0
Denied Del/Veh (s)			0.0
Total Delay (hr)	0.0	0.0	0.0
Total Del/Veh (s)	0.3	0.2	0.3
Stop Delay (hr)	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.1	0.0
Total Stops	0	0	0
Stop/Veh	0.00	0.00	0.00
Travel Dist (mi)	33.3	7.6	40.9
Travel Time (hr)	1.0	0.3	1.3
Avg Speed (mph)	34	25	32
Fuel Used (gal)	0.7	0.4	1.2
Fuel Eff. (mpg)	44.9	17.1	34.5
HC Emissions (g)	10	8	18
CO Emissions (g)	155	438	594
NOx Emissions (g)	35	23	58
Vehicles Entered	180	97	277
Vehicles Exited	180	97	277
Hourly Exit Rate	180	97	277
Density (ft/veh)	1005		1091
Occupancy (veh)	1	0	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	NB	SB	All
Movements Served	T	T	
Denied Delay (hr)			0.0
Denied Del/Veh (s)			0.1
Total Delay (hr)	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.1	0.2
Stop Delay (hr)	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	0.0
Total Stops	0	0	0
Stop/Veh	0.00	0.00	0.00
Travel Dist (mi)	29.8	18.0	47.8
Travel Time (hr)	0.9	0.5	1.4
Avg Speed (mph)	34	35	34
Fuel Used (gal)	0.7	0.4	1.1
Fuel Eff. (mpg)	41.8	45.2	43.0
HC Emissions (g)	10	5	15
CO Emissions (g)	223	80	303
NOx Emissions (g)	35	18	53
Vehicles Entered	180	97	277
Vehicles Exited	180	96	276
Hourly Exit Rate	180	96	276
Density (ft/veh)	1007	1884	1336
Occupancy (veh)	1	1	1

Total Network Performance

Denied Delay (hr)	0.6
Denied Del/Veh (s)	1.0
Total Delay (hr)	20.6
Total Del/Veh (s)	32.9
Stop Delay (hr)	10.8
Stop Del/Veh (s)	17.3
Total Stops	3184
Stop/Veh	1.42
Travel Dist (mi)	1827.0
Travel Time (hr)	73.5
Avg Speed (mph)	25
Fuel Used (gal)	61.0
Fuel Eff. (mpg)	29.9
HC Emissions (g)	1014
CO Emissions (g)	42079
NOx Emissions (g)	3361
Vehicles Entered	2186
Vehicles Exited	2186
Hourly Exit Rate	2186
Input Volume	11636
% of Volume	19
Density (ft/veh)	501
Occupancy (veh)	73

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.2	19.2	0.1	24
Martinique St	2	4.0	20.7	0.2	36
Jamaica St	3	0.3	11.1	0.1	44
Guadelupe St	4	0.3	4.4	0.1	42
Otis Ave	5	0.9	6.6	0.1	40
Golden Gate Dr	6	12.1	22.3	0.1	20
Stable Dr W	7	3.8	8.8	0.1	22
Seymour Ave	8	6.8	18.1	0.1	26
Stable Dr E	9	0.8	24.0	0.2	31
Allan Ave	10	0.5	4.9	0.1	37
Jefferson Blvd	11	32.7	50.7	0.2	12
Total		70.4	190.9	1.3	25

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	0.3	0.6	0.2	1019
Stable Dr E	9	0.3	4.7	0.1	38
Seymour Ave	8	6.4	25.0	0.2	30
Stable Dr W	7	1.3	17.2	0.1	27
Golden Gate Dr	6	9.9	14.9	0.1	13
Otis Ave	5	4.7	15.1	0.1	30
Guadelupe St	4	0.7	6.3	0.1	42
Jamaica St	3	0.3	4.6	0.1	41
Martinique St	2	0.2	11.0	0.1	44
Southport Pkwy	1	8.3	24.1	0.2	31
Total		32.3	123.4	1.2	35

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	UL	T	R
Maximum Queue (ft)	56	76	29	114	50	90	31
Average Queue (ft)	23	32	2	59	23	36	9
95th Queue (ft)	41	55	14	94	49	64	32
Link Distance (ft)	623	1022		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				1			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	11	50
Average Queue (ft)	0	20
95th Queue (ft)	5	48
Link Distance (ft)	1022	512
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Jamaica St & Marshall Rd

Movement	SB
Directions Served	LR
Maximum Queue (ft)	61
Average Queue (ft)	22
95th Queue (ft)	53
Link Distance (ft)	608
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	35	59
Average Queue (ft)	2	26
95th Queue (ft)	16	54
Link Distance (ft)	223	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	48	114
Average Queue (ft)	13	50
95th Queue (ft)	39	85
Link Distance (ft)	619	366
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	134	133	152
Average Queue (ft)	60	64	69
95th Queue (ft)	106	103	117
Link Distance (ft)	619	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	9	32
Average Queue (ft)	0	7
95th Queue (ft)	7	28
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	76	74	33	33
Average Queue (ft)	19	18	4	6
95th Queue (ft)	57	56	21	26
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	18	50
Average Queue (ft)	1	15
95th Queue (ft)	9	44
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	39	23	30	89
Average Queue (ft)	2	1	3	37
95th Queue (ft)	18	15	16	69
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	642	164	144	287	13	289	155
Average Queue (ft)	318	35	48	131	1	120	91
95th Queue (ft)	562	127	107	238	9	233	167
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	35	0		0		28	1
Queuing Penalty (veh)	16	0		0		94	2

Intersection: 12: Otis Ave & Project Driveway 3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 13: Otis Ave & Project Driveway 4

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 112

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	L	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.4
Total Delay (hr)	0.0	0.1	0.0	0.3	0.0	0.3	0.0	0.8
Total Del/Veh (s)	4.8	4.7	3.7	6.1	4.5	8.0	2.0	6.1
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4
Stop Del/Veh (s)	2.5	2.3	2.7	2.6	2.8	2.9	2.0	2.6
Total Stops	32	113	7	156	32	151	6	497
Stop/Veh	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	3.8	23.1	0.1	45.0	2.0	45.2	1.5	120.7
Travel Time (hr)	0.2	0.8	0.0	1.6	0.1	1.6	0.1	4.4
Avg Speed (mph)	24	30	9	28	17	28	29	28
Fuel Used (gal)	0.1	0.5	0.0	1.0	0.0	1.0	0.0	2.7
Fuel Eff. (mpg)	53.8	50.4	35.8	44.4	57.4	43.2	44.9	45.2
HC Emissions (g)	0	4	0	12	0	17	0	34
CO Emissions (g)	18	152	0	316	11	428	4	930
NOx Emissions (g)	2	20	0	38	1	52	1	112
Vehicles Entered	32	114	0	162	0	181	7	495
Vehicles Exited	32	114	7	156	32	151	6	498
Hourly Exit Rate	32	114	7	156	32	151	6	498
Density (ft/veh)		1407		905		834		2003
Occupancy (veh)	0	1	0	2	0	2	0	4

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.0	0.4	4.3	1.0
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.3	0.0	2.9	0.4
Total Stops	0	0	23	23
Stop/Veh	0.00	0.00	1.00	0.09
Travel Dist (mi)	21.2	17.2	2.2	40.7
Travel Time (hr)	0.6	0.4	0.1	1.2
Avg Speed (mph)	34	41	19	35
Fuel Used (gal)	1.0	0.4	0.0	1.5
Fuel Eff. (mpg)	21.0	40.5	47.4	27.4
HC Emissions (g)	19	6	0	25
CO Emissions (g)	1019	208	6	1233
NOx Emissions (g)	63	26	1	89
Vehicles Entered	104	130	23	257
Vehicles Exited	103	129	23	256
Hourly Exit Rate	103	129	23	256
Density (ft/veh)	1725			1973
Occupancy (veh)	1	0	0	1

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.2	4.3	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	3.1	0.2
Total Stops	0	0	14	14
Stop/Veh	0.00	0.00	1.00	0.05
Travel Dist (mi)	16.1	7.3	1.6	25.0
Travel Time (hr)	0.4	0.2	0.1	0.7
Avg Speed (mph)	41	38	20	38
Fuel Used (gal)	0.5	0.2	0.0	0.7
Fuel Eff. (mpg)	35.2	35.8	46.4	36.0
HC Emissions (g)	7	3	0	11
CO Emissions (g)	267	132	3	402
NOx Emissions (g)	29	13	0	43
Vehicles Entered	120	138	14	273
Vehicles Exited	120	137	14	272
Hourly Exit Rate	120	137	14	272
Density (ft/veh)				2411
Occupancy (veh)	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.4	4.5	0.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	3.2	0.2
Total Stops	0	0	17	17
Stop/Veh	0.00	0.00	1.00	0.06
Travel Dist (mi)	6.6	10.8	1.8	19.2
Travel Time (hr)	0.2	0.3	0.1	0.5
Avg Speed (mph)	40	37	20	35
Fuel Used (gal)	0.2	0.3	0.0	0.6
Fuel Eff. (mpg)	36.4	32.1	46.7	34.5
HC Emissions (g)	3	6	0	9
CO Emissions (g)	114	271	6	391
NOx Emissions (g)	13	20	1	34
Vehicles Entered	129	154	17	300
Vehicles Exited	129	154	17	300
Hourly Exit Rate	129	154	17	300
Density (ft/veh)				2193
Occupancy (veh)	0	0	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.3	0.1	0.4
Total Del/Veh (s)	0.5	4.7	3.1	3.1
Stop Delay (hr)	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.0	0.5	2.7	0.7
Total Stops	0	14	80	93
Stop/Veh	0.00	0.06	0.98	0.20
Travel Dist (mi)	9.8	30.0	6.0	45.8
Travel Time (hr)	0.3	1.1	0.3	1.7
Avg Speed (mph)	37	27	19	27
Fuel Used (gal)	0.3	1.7	0.1	2.1
Fuel Eff. (mpg)	33.3	17.6	57.7	21.8
HC Emissions (g)	6	33	1	41
CO Emissions (g)	242	1914	22	2178
NOx Emissions (g)	21	101	3	126
Vehicles Entered	141	235	82	458
Vehicles Exited	140	234	81	457
Hourly Exit Rate	140	234	81	457
Density (ft/veh)		608		856
Occupancy (veh)	0	1	0	2

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.5	0.9	0.3	1.7
Total Del/Veh (s)	9.1	7.1	5.8	7.3
Stop Delay (hr)	0.2	0.4	0.2	0.7
Stop Del/Veh (s)	3.0	3.1	3.3	3.1
Total Stops	193	440	186	820
Stop/Veh	0.99	1.00	0.99	1.00
Travel Dist (mi)	24.3	24.0	26.4	74.6
Travel Time (hr)	1.1	1.7	1.3	4.2
Avg Speed (mph)	21	14	21	18
Fuel Used (gal)	0.6	0.5	0.7	1.8
Fuel Eff. (mpg)	38.5	49.9	39.8	42.0
HC Emissions (g)	10	2	8	19
CO Emissions (g)	433	65	238	736
NOx Emissions (g)	29	6	22	57
Vehicles Entered	193	440	186	820
Vehicles Exited	194	440	186	821
Hourly Exit Rate	194	440	186	821
Density (ft/veh)	578	161	588	407
Occupancy (veh)	1	2	1	4

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.2	0.0	0.4
Total Del/Veh (s)	2.3	1.5	4.9	1.8
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.5	0.0	4.4	0.2
Total Stops	2	0	3	5
Stop/Veh	0.01	0.00	1.00	0.01
Travel Dist (mi)	19.6	60.3	0.2	80.1
Travel Time (hr)	0.9	2.2	0.0	3.1
Avg Speed (mph)	22	28	15	26
Fuel Used (gal)	1.7	2.6	0.0	4.3
Fuel Eff. (mpg)	11.3	23.4	49.6	18.5
HC Emissions (g)	34	52	0	86
CO Emissions (g)	2005	2722	0	4727
NOx Emissions (g)	106	147	0	252
Vehicles Entered	358	445	3	806
Vehicles Exited	358	445	3	806
Hourly Exit Rate	358	445	3	806
Density (ft/veh)	327	330		443
Occupancy (veh)	1	2	0	3

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.6	0.8	0.0	0.0	1.4
Total Del/Veh (s)	5.5	6.7	3.1	3.3	6.1
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.2	0.6	0.8	0.2
Total Stops	7	37	1	1	46
Stop/Veh	0.02	0.08	0.17	0.17	0.06
Travel Dist (mi)	44.6	92.7	1.1	0.4	138.8
Travel Time (hr)	1.7	3.2	0.0	0.0	5.0
Avg Speed (mph)	26	29	25	19	28
Fuel Used (gal)	0.9	1.9	0.0	0.0	2.9
Fuel Eff. (mpg)	47.1	49.5	46.9	44.2	48.7
HC Emissions (g)	18	24	0	0	42
CO Emissions (g)	551	569	3	1	1123
NOx Emissions (g)	54	86	0	0	140
Vehicles Entered	357	450	6	6	822
Vehicles Exited	357	450	6	6	820
Hourly Exit Rate	357	450	6	6	820
Density (ft/veh)	392	337			601
Occupancy (veh)	2	3	0	0	5

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.1	0.0	0.1
Total Del/Veh (s)	0.4	0.4	6.5	0.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	5.2	0.1
Total Stops	1	0	10	10
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	77.8	22.7	0.6	101.1
Travel Time (hr)	2.4	0.7	0.0	3.1
Avg Speed (mph)	33	35	14	33
Fuel Used (gal)	3.0	0.7	0.0	3.7
Fuel Eff. (mpg)	25.7	32.5	46.4	27.0
HC Emissions (g)	58	11	0	69
CO Emissions (g)	2715	433	1	3149
NOx Emissions (g)	184	40	0	223
Vehicles Entered	360	462	10	832
Vehicles Exited	359	461	10	831
Hourly Exit Rate	359	461	10	831
Density (ft/veh)	480	386		562
Occupancy (veh)	2	1	0	3

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.2	0.0	0.1	0.4
Total Del/Veh (s)	0.2	1.7	6.3	9.3	1.4
Stop Delay (hr)	0.0	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.0	0.3	5.1	7.6	0.5
Total Stops	1	1	5	37	44
Stop/Veh	0.00	0.00	1.00	1.00	0.05
Travel Dist (mi)	17.8	85.5	0.5	4.6	108.4
Travel Time (hr)	0.5	3.2	0.0	0.3	3.9
Avg Speed (mph)	37	27	18	17	27
Fuel Used (gal)	0.4	4.0	0.0	0.1	4.6
Fuel Eff. (mpg)	40.5	21.2	42.5	39.0	23.6
HC Emissions (g)	7	76	0	2	85
CO Emissions (g)	178	3731	1	36	3946
NOx Emissions (g)	26	242	0	4	272
Vehicles Entered	365	516	5	37	923
Vehicles Exited	365	514	5	37	922
Hourly Exit Rate	365	514	5	37	922
Density (ft/veh)		283			591
Occupancy (veh)	0	3	0	0	4

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.7
Denied Del/Veh (s)								1.5
Total Delay (hr)	2.8	0.1	0.8	0.8	0.0	4.6	0.5	9.6
Total Del/Veh (s)	29.8	5.4	44.9	11.5		38.5	3.6	21.4
Stop Delay (hr)	2.3	0.1	0.8	0.5	0.0	2.2	0.4	6.3
Stop Del/Veh (s)	24.3	5.2	43.1	7.1		18.6	3.2	14.1
Total Stops	248	36	61	90	0	334	188	956
Stop/Veh	0.73	0.56	0.92	0.34		0.78	0.42	0.59
Travel Dist (mi)	64.3	1.4	4.3	59.1	0.0	210.8	8.8	348.6
Travel Time (hr)	4.8	0.2	1.0	2.2	0.0	9.6	1.0	19.4
Avg Speed (mph)	13	8	4	27	1	22	9	19
Fuel Used (gal)	1.8	0.1	0.3	1.7	0.0	4.9	0.3	9.2
Fuel Eff. (mpg)	35.3	22.5	16.3	35.3	5.1	42.8	27.2	37.8
HC Emissions (g)	18	1	1	29	0	67	2	118
CO Emissions (g)	533	19	40	1114	0	2311	61	4089
NOx Emissions (g)	54	2	2	102	0	212	7	380
Vehicles Entered	398	0	0	325	0	865	0	1588
Vehicles Exited	332	64	65	260	0	416	450	1587
Hourly Exit Rate	332	64	65	260	0	416	450	1587
Density (ft/veh)	180		1021	466		140	1300	425
Occupancy (veh)	5	0	1	2	0	10	1	19

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	NB	SB	All
Movements Served	T	T	
Denied Delay (hr)			0.0
Denied Del/Veh (s)			0.0
Total Delay (hr)	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.2	0.2
Stop Delay (hr)	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.1	0.0
Total Stops	0	0	0
Stop/Veh	0.00	0.00	0.00
Travel Dist (mi)	15.0	8.4	23.4
Travel Time (hr)	0.4	0.3	0.8
Avg Speed (mph)	34	25	31
Fuel Used (gal)	0.3	0.5	0.8
Fuel Eff. (mpg)	44.7	17.0	28.2
HC Emissions (g)	6	8	14
CO Emissions (g)	90	472	562
NOx Emissions (g)	19	25	45
Vehicles Entered	81	107	188
Vehicles Exited	80	107	187
Hourly Exit Rate	80	107	187
Density (ft/veh)			1820
Occupancy (veh)	0	0	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	NB	SB	All
Movements Served	T	T	
Denied Delay (hr)			0.0
Denied Del/Veh (s)			0.1
Total Delay (hr)	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.1	0.1
Stop Delay (hr)	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	0.0
Total Stops	0	0	0
Stop/Veh	0.00	0.00	0.00
Travel Dist (mi)	13.4	19.7	33.0
Travel Time (hr)	0.4	0.6	1.0
Avg Speed (mph)	35	34	34
Fuel Used (gal)	0.3	0.4	0.8
Fuel Eff. (mpg)	42.9	44.4	43.8
HC Emissions (g)	6	4	10
CO Emissions (g)	106	68	174
NOx Emissions (g)	19	16	34
Vehicles Entered	81	106	187
Vehicles Exited	81	106	187
Hourly Exit Rate	81	106	187
Density (ft/veh)		1710	1930
Occupancy (veh)	0	1	1

Total Network Performance

Denied Delay (hr)	0.7
Denied Del/Veh (s)	1.4
Total Delay (hr)	16.1
Total Del/Veh (s)	28.7
Stop Delay (hr)	7.8
Stop Del/Veh (s)	14.0
Total Stops	2525
Stop/Veh	1.25
Travel Dist (mi)	1590.9
Travel Time (hr)	61.8
Avg Speed (mph)	26
Fuel Used (gal)	51.9
Fuel Eff. (mpg)	30.7
HC Emissions (g)	855
CO Emissions (g)	35846
NOx Emissions (g)	2830
Vehicles Entered	1969
Vehicles Exited	1962
Hourly Exit Rate	1962
Input Volume	9998
% of Volume	20
Density (ft/veh)	598
Occupancy (veh)	61

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	7.5	18.1	0.1	25
Martinique St	2	3.9	20.4	0.2	37
Jamaica St	3	0.1	10.8	0.1	45
Guadelupe St	4	0.1	4.3	0.1	44
Otis Ave	5	0.5	6.1	0.1	42
Golden Gate Dr	6	9.4	19.6	0.1	23
Stable Dr W	7	3.5	8.5	0.1	23
Seymour Ave	8	5.5	16.9	0.1	28
Stable Dr E	9	0.4	23.6	0.2	32
Allan Ave	10	0.2	4.6	0.1	39
Jefferson Blvd	11	28.8	46.7	0.2	13
Total		60.0	179.8	1.3	27

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.5	4.9	0.1	37
Seymour Ave	8	6.8	25.5	0.2	30
Stable Dr W	7	1.5	17.4	0.1	27
Golden Gate Dr	6	9.3	14.2	0.1	14
Otis Ave	5	4.7	15.2	0.1	30
Guadelupe St	4	0.4	6.1	0.1	43
Jamaica St	3	0.2	4.5	0.1	42
Martinique St	2	0.4	11.2	0.1	43
Southport Pkwy	1	8.3	24.5	0.2	31
Total		32.0	123.4	1.2	35

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (ft)	30	69	33	87	63	104	31
Average Queue (ft)	14	31	6	42	23	44	5
95th Queue (ft)	32	50	27	69	51	74	23
Link Distance (ft)	623	1022		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	2	35
Average Queue (ft)	0	17
95th Queue (ft)	2	43
Link Distance (ft)	1022	512
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	2	36
Average Queue (ft)	0	11
95th Queue (ft)	2	37
Link Distance (ft)	650	608
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	3	38
Average Queue (ft)	0	15
95th Queue (ft)	3	41
Link Distance (ft)	223	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	43	75
Average Queue (ft)	10	33
95th Queue (ft)	35	58
Link Distance (ft)	619	366
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	98	110	91
Average Queue (ft)	42	59	45
95th Queue (ft)	71	91	73
Link Distance (ft)	619	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	37	29
Average Queue (ft)	2	3
95th Queue (ft)	18	18
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	47	71	23	26
Average Queue (ft)	7	25	1	1
95th Queue (ft)	32	65	10	11
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	18	35
Average Queue (ft)	1	9
95th Queue (ft)	11	33
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	25	25	30	66
Average Queue (ft)	1	1	5	26
95th Queue (ft)	12	10	23	57
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	361	165	111	155	13	561	155
Average Queue (ft)	175	50	44	57	1	233	116
95th Queue (ft)	291	147	93	126	7	472	192
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	22	0				33	2
Queuing Penalty (veh)	12	0				151	10

Intersection: 12: Otis Ave & Project Driveway 3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 13: Otis Ave & Project Driveway 4

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 173

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	UL	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.4
Total Delay (hr)	0.1	0.2	0.0	0.7	0.1	0.2	0.0	1.2
Total Del/Veh (s)	6.7	4.5	5.5	8.1	4.5	7.5	1.9	6.8
Stop Delay (hr)	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Stop Del/Veh (s)	2.9	2.5	3.8	3.2	3.0	2.8	2.1	3.0
Total Stops	67	125	1	290	44	86	11	624
Stop/Veh	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.99
Travel Dist (mi)	8.0	25.4	0.0	81.1	2.7	31.1	2.7	151.1
Travel Time (hr)	0.3	0.9	0.0	3.1	0.2	1.1	0.1	5.7
Avg Speed (mph)	23	30	9	26	17	29	29	27
Fuel Used (gal)	0.2	0.5	0.0	1.8	0.0	0.7	0.1	3.4
Fuel Eff. (mpg)	48.2	47.7	33.2	44.1	56.7	43.7	45.8	44.8
HC Emissions (g)	2	6	0	23	0	8	0	39
CO Emissions (g)	76	220	0	594	12	223	8	1133
NOx Emissions (g)	5	24	0	71	1	27	1	130
Vehicles Entered	67	125	0	291	0	130	11	624
Vehicles Exited	67	126	1	290	44	86	11	625
Hourly Exit Rate	67	126	1	290	44	86	11	625
Density (ft/veh)		1258		481		1261		1560
Occupancy (veh)	0	1	0	3	0	1	0	6

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.8	0.4	3.6	5.0	1.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.4	0.0	2.8	3.5	0.7
Total Stops	0	1	22	26	51
Stop/Veh	0.00	0.01	0.96	1.00	0.16
Travel Dist (mi)	30.4	16.8	2.3	2.5	52.1
Travel Time (hr)	0.9	0.4	0.1	0.1	1.6
Avg Speed (mph)	34	41	20	19	33
Fuel Used (gal)	1.4	0.5	0.1	0.1	2.0
Fuel Eff. (mpg)	21.0	37.1	46.1	45.0	25.9
HC Emissions (g)	29	6	0	0	35
CO Emissions (g)	1512	264	7	10	1793
NOx Emissions (g)	94	26	1	1	122
Vehicles Entered	147	126	22	26	323
Vehicles Exited	148	126	22	26	322
Hourly Exit Rate	148	126	22	26	322
Density (ft/veh)	1212				1827
Occupancy (veh)	1	0	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.6	0.5	3.6	5.9	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.0	2.9	4.2	0.7
Total Stops	0	2	48	24	74
Stop/Veh	0.00	0.01	0.98	1.00	0.19
Travel Dist (mi)	23.6	7.8	4.9	2.8	39.0
Travel Time (hr)	0.6	0.2	0.2	0.1	1.2
Avg Speed (mph)	39	33	20	19	32
Fuel Used (gal)	0.7	0.3	0.1	0.1	1.2
Fuel Eff. (mpg)	32.4	30.5	42.6	44.3	33.6
HC Emissions (g)	13	4	1	1	19
CO Emissions (g)	531	219	35	14	799
NOx Emissions (g)	48	15	4	2	69
Vehicles Entered	176	147	49	24	398
Vehicles Exited	177	147	48	24	398
Hourly Exit Rate	177	147	48	24	398
Density (ft/veh)	1157				1717
Occupancy (veh)	1	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	0.5	0.8	5.6	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.1	3.9	0.5
Total Stops	2	0	43	45
Stop/Veh	0.01	0.00	1.00	0.10
Travel Dist (mi)	12.3	12.9	4.5	29.7
Travel Time (hr)	0.4	0.4	0.2	1.1
Avg Speed (mph)	31	30	19	28
Fuel Used (gal)	0.5	0.5	0.1	1.1
Fuel Eff. (mpg)	24.0	25.5	43.2	26.5
HC Emissions (g)	10	10	1	22
CO Emissions (g)	457	501	31	989
NOx Emissions (g)	35	31	3	69
Vehicles Entered	236	185	43	465
Vehicles Exited	236	184	43	464
Hourly Exit Rate	236	184	43	464
Density (ft/veh)				1125
Occupancy (veh)	0	0	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.3	0.4	0.8
Total Del/Veh (s)	1.2	4.8	6.2	4.0
Stop Delay (hr)	0.0	0.0	0.3	0.4
Stop Del/Veh (s)	0.1	0.8	4.8	1.9
Total Stops	0	23	242	264
Stop/Veh	0.00	0.10	0.99	0.36
Travel Dist (mi)	18.3	28.3	18.5	65.1
Travel Time (hr)	0.6	1.1	1.2	2.8
Avg Speed (mph)	33	27	15	23
Fuel Used (gal)	0.7	1.6	0.4	2.7
Fuel Eff. (mpg)	27.5	17.8	42.6	24.2
HC Emissions (g)	13	31	5	48
CO Emissions (g)	582	1773	141	2496
NOx Emissions (g)	42	95	13	150
Vehicles Entered	263	222	243	727
Vehicles Exited	262	222	242	727
Hourly Exit Rate	262	222	242	727
Density (ft/veh)	654	625	335	508
Occupancy (veh)	1	1	1	3

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	1.6	1.0	0.8	3.4
Total Del/Veh (s)	13.8	8.4	9.0	10.5
Stop Delay (hr)	0.7	0.6	0.5	1.8
Stop Del/Veh (s)	6.2	4.9	6.0	5.6
Total Stops	428	424	310	1162
Stop/Veh	0.99	0.99	0.99	0.99
Travel Dist (mi)	53.9	23.1	43.9	120.8
Travel Time (hr)	3.2	1.9	2.4	7.4
Avg Speed (mph)	17	12	18	16
Fuel Used (gal)	1.6	0.5	1.2	3.3
Fuel Eff. (mpg)	33.5	45.3	37.4	36.6
HC Emissions (g)	27	2	16	45
CO Emissions (g)	1045	71	475	1591
NOx Emissions (g)	79	7	45	131
Vehicles Entered	429	425	309	1163
Vehicles Exited	428	425	310	1164
Hourly Exit Rate	428	425	310	1164
Density (ft/veh)	211	150	313	228
Occupancy (veh)	3	2	2	7

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.6	0.2	0.0	0.7
Total Del/Veh (s)	2.9	1.5	8.2	2.4
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.7	0.0	8.0	0.5
Total Stops	0	1	5	5
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	37.9	57.0	0.3	95.3
Travel Time (hr)	1.8	2.0	0.0	3.8
Avg Speed (mph)	22	28	12	25
Fuel Used (gal)	3.4	2.4	0.0	5.9
Fuel Eff. (mpg)	11.0	23.5	41.5	16.2
HC Emissions (g)	71	49	0	120
CO Emissions (g)	3810	2574	1	6384
NOx Emissions (g)	222	140	0	362
Vehicles Entered	690	422	5	1116
Vehicles Exited	691	421	5	1115
Hourly Exit Rate	691	421	5	1115
Density (ft/veh)	164	349		353
Occupancy (veh)	2	2	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.5	0.8	0.0	0.0	2.3
Total Del/Veh (s)	7.5	6.8	3.8	3.7	7.2
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.2	1.5	1.3	0.3
Total Stops	58	34	3	6	101
Stop/Veh	0.08	0.08	0.33	0.33	0.09
Travel Dist (mi)	86.4	86.6	1.5	1.1	175.6
Travel Time (hr)	3.6	3.0	0.1	0.1	6.8
Avg Speed (mph)	24	29	24	18	26
Fuel Used (gal)	1.6	1.7	0.0	0.0	3.4
Fuel Eff. (mpg)	53.6	50.4	45.4	47.2	51.8
HC Emissions (g)	33	22	0	0	56
CO Emissions (g)	798	505	3	4	1310
NOx Emissions (g)	94	80	1	0	175
Vehicles Entered	691	420	9	18	1137
Vehicles Exited	691	421	9	18	1138
Hourly Exit Rate	691	421	9	18	1138
Density (ft/veh)	181	360			440
Occupancy (veh)	4	3	0	0	7

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.7	0.0	0.1	0.8
Total Del/Veh (s)	3.4	0.3	16.3	2.4
Stop Delay (hr)	0.3	0.0	0.1	0.4
Stop Del/Veh (s)	1.5	0.0	14.6	1.2
Total Stops	37	0	17	54
Stop/Veh	0.05	0.00	1.00	0.05
Travel Dist (mi)	151.7	20.9	1.1	173.7
Travel Time (hr)	5.2	0.6	0.1	5.9
Avg Speed (mph)	29	35	9	29
Fuel Used (gal)	5.9	0.6	0.0	6.5
Fuel Eff. (mpg)	25.7	35.4	30.5	26.6
HC Emissions (g)	117	10	0	127
CO Emissions (g)	5214	323	5	5543
NOx Emissions (g)	363	35	0	399
Vehicles Entered	702	426	17	1144
Vehicles Exited	702	426	17	1146
Hourly Exit Rate	702	426	17	1146
Density (ft/veh)	219	426		292
Occupancy (veh)	5	1	0	6

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.6	0.2	0.0	1.7	2.5
Total Del/Veh (s)	3.0	1.4	22.6	87.5	7.3
Stop Delay (hr)	0.3	0.1	0.0	1.7	2.0
Stop Del/Veh (s)	1.5	0.4	22.6	86.1	6.0
Total Stops	47	2	2	70	122
Stop/Veh	0.07	0.00	1.00	1.00	0.10
Travel Dist (mi)	34.8	72.8	0.2	8.7	116.6
Travel Time (hr)	1.5	2.6	0.0	2.0	6.2
Avg Speed (mph)	23	28	9	4	19
Fuel Used (gal)	0.8	3.5	0.0	0.6	4.9
Fuel Eff. (mpg)	42.7	21.0	30.6	14.4	23.9
HC Emissions (g)	12	66	0	4	81
CO Emissions (g)	283	3192	0	122	3597
NOx Emissions (g)	39	210	0	9	258
Vehicles Entered	714	437	2	70	1223
Vehicles Exited	713	438	2	69	1224
Hourly Exit Rate	713	438	2	69	1224
Density (ft/veh)	171	340		327	378
Occupancy (veh)	1	3	0	2	6

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.5
Denied Del/Veh (s)								1.1
Total Delay (hr)	10.8	0.0	1.0	2.3	0.0	2.2	0.4	16.7
Total Del/Veh (s)	54.0	2.4	47.9	22.4	32.2	37.8	4.0	33.6
Stop Delay (hr)	7.7	0.0	0.9	1.5	0.0	1.3	0.4	11.9
Stop Del/Veh (s)	38.8	2.1	45.6	14.9	31.5	22.0	3.7	23.9
Total Stops	707	17	68	196	1	158	216	1363
Stop/Veh	0.98	0.31	0.92	0.52	1.00	0.76	0.59	0.76
Travel Dist (mi)	124.9	1.2	4.8	81.7	0.0	136.2	6.9	355.9
Travel Time (hr)	14.6	0.1	1.2	4.2	0.0	5.5	0.9	26.9
Avg Speed (mph)	9	11	4	20	1	25	8	13
Fuel Used (gal)	4.8	0.1	0.3	2.5	0.0	3.2	0.3	11.3
Fuel Eff. (mpg)	26.0	24.0	14.9	32.3	4.6	42.0	26.4	31.4
HC Emissions (g)	38	1	1	38	0	49	2	128
CO Emissions (g)	974	22	64	1589	0	1817	46	4522
NOx Emissions (g)	105	2	4	123	0	162	6	401
Vehicles Entered	764	0	0	444	0	564	0	1774
Vehicles Exited	702	54	72	371	0	201	365	1765
Hourly Exit Rate	702	54	72	371	0	201	365	1765
Density (ft/veh)	59		863	241		245	1544	301
Occupancy (veh)	15	0	1	4	0	5	1	26

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	5.4	0.5	0.3	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.5	0.0	0.1	0.5
Total Stops	46	0	0	46
Stop/Veh	1.00	0.00	0.00	0.13
Travel Dist (mi)	4.6	37.3	8.5	50.4
Travel Time (hr)	0.2	1.1	0.4	1.7
Avg Speed (mph)	19	34	24	30
Fuel Used (gal)	0.1	0.9	0.5	1.5
Fuel Eff. (mpg)	43.0	42.6	17.0	34.0
HC Emissions (g)	1	13	9	23
CO Emissions (g)	29	257	481	767
NOx Emissions (g)	3	44	27	74
Vehicles Entered	46	201	112	359
Vehicles Exited	46	202	112	360
Hourly Exit Rate	46	202	112	360
Density (ft/veh)		881		1113
Occupancy (veh)	0	1	0	2

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	0.3	0.2	0.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.0	0.0	0.0	0.2
Total Stops	19	0	0	20
Stop/Veh	1.00	0.00	0.00	0.06
Travel Dist (mi)	2.0	30.9	18.9	51.7
Travel Time (hr)	0.1	0.9	0.6	1.6
Avg Speed (mph)	20	34	34	33
Fuel Used (gal)	0.0	0.7	0.4	1.2
Fuel Eff. (mpg)	47.3	41.5	42.6	42.1
HC Emissions (g)	0	13	5	18
CO Emissions (g)	5	268	113	386
NOx Emissions (g)	1	41	19	61
Vehicles Entered	19	189	102	310
Vehicles Exited	19	188	102	311
Hourly Exit Rate	19	188	102	311
Density (ft/veh)		958	1739	1526
Occupancy (veh)	0	1	1	2

Total Network Performance

Denied Delay (hr)	0.7
Denied Del/Veh (s)	1.0
Total Delay (hr)	30.6
Total Del/Veh (s)	45.2
Stop Delay (hr)	17.6
Stop Del/Veh (s)	26.0
Total Stops	3931
Stop/Veh	1.61
Travel Dist (mi)	2019.0
Travel Time (hr)	89.5
Avg Speed (mph)	23
Fuel Used (gal)	69.5
Fuel Eff. (mpg)	29.1
HC Emissions (g)	1129
CO Emissions (g)	46507
NOx Emissions (g)	3727
Vehicles Entered	2365
Vehicles Exited	2357
Hourly Exit Rate	2357
Input Volume	13167
% of Volume	18
Density (ft/veh)	435
Occupancy (veh)	89

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.4	19.4	0.1	24
Martinique St	2	4.1	20.9	0.2	36
Jamaica St	3	0.5	11.3	0.1	43
Guadelupe St	4	0.4	4.6	0.1	41
Otis Ave	5	1.2	6.9	0.1	38
Golden Gate Dr	6	14.4	24.6	0.1	18
Stable Dr W	7	3.9	8.9	0.1	22
Seymour Ave	8	7.6	18.9	0.1	25
Stable Dr E	9	3.3	26.5	0.2	28
Allan Ave	10	3.0	7.4	0.1	24
Jefferson Blvd	11	51.5	69.4	0.2	9
Total		98.4	218.8	1.3	22

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.3	4.8	0.1	38
Seymour Ave	8	6.8	25.5	0.2	30
Stable Dr W	7	1.5	17.4	0.1	27
Golden Gate Dr	6	11.2	16.1	0.1	12
Otis Ave	5	4.9	15.4	0.1	29
Guadelupe St	4	0.8	6.4	0.1	40
Jamaica St	3	0.5	4.8	0.1	39
Martinique St	2	0.4	11.1	0.1	44
Southport Pkwy	1	9.1	25.4	0.2	30
Total		35.4	126.9	1.2	34

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	UL	T	R
Maximum Queue (ft)	48	70	19	102	50	70	31
Average Queue (ft)	23	32	2	56	25	35	9
95th Queue (ft)	40	52	13	87	49	57	31
Link Distance (ft)	623	1024		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				1			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	11	16	40	45
Average Queue (ft)	1	1	18	19
95th Queue (ft)	7	7	44	46
Link Distance (ft)	1024	654	547	512
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	11	27	59	54
Average Queue (ft)	0	2	28	19
95th Queue (ft)	6	14	53	48
Link Distance (ft)	654	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	22	61
Average Queue (ft)	1	27
95th Queue (ft)	12	55
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	2	48	114
Average Queue (ft)	0	17	58
95th Queue (ft)	2	43	95
Link Distance (ft)	314	619	349
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	170	168	148
Average Queue (ft)	77	72	72
95th Queue (ft)	134	128	119
Link Distance (ft)	619	234	747
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	6	9	35
Average Queue (ft)	0	0	5
95th Queue (ft)	6	7	23
Link Distance (ft)	234	607	351
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	79	32	33
Average Queue (ft)	25	24	3	6
95th Queue (ft)	65	65	19	26
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	146	48
Average Queue (ft)	21	15
95th Queue (ft)	160	44
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	122	47	24	198
Average Queue (ft)	26	2	2	73
95th Queue (ft)	130	19	13	226
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	10			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	780	165	136	272	16	304	155
Average Queue (ft)	475	48	52	131	1	119	91
95th Queue (ft)	814	157	109	234	8	237	165
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)	2						
Queuing Penalty (veh)	19						
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	44	0		0		30	1
Queuing Penalty (veh)	24	0		0		110	2

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	63	3
Average Queue (ft)	27	0
95th Queue (ft)	53	3
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB
Directions Served	LR
Maximum Queue (ft)	43
Average Queue (ft)	16
95th Queue (ft)	43
Link Distance (ft)	546
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 166

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	L	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.6
Total Delay (hr)	0.0	0.2	0.0	0.3	0.1	0.3	0.0	0.9
Total Del/Veh (s)	4.7	4.6	3.5	6.4	4.7	8.2	2.0	6.1
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4
Stop Del/Veh (s)	2.5	2.4	2.5	2.8	2.8	2.8	2.1	2.7
Total Stops	31	132	6	164	56	151	5	544
Stop/Veh	1.00	0.98	0.86	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	3.7	27.0	0.1	47.4	3.4	50.0	1.5	133.2
Travel Time (hr)	0.2	0.9	0.0	1.7	0.2	1.8	0.1	4.9
Avg Speed (mph)	25	30	10	27	17	28	29	28
Fuel Used (gal)	0.1	0.6	0.0	1.1	0.1	1.2	0.0	3.0
Fuel Eff. (mpg)	53.6	46.9	35.5	44.0	55.3	42.4	43.1	44.1
HC Emissions (g)	0	10	0	16	0	15	0	42
CO Emissions (g)	15	310	0	395	19	418	3	1161
NOx Emissions (g)	2	35	0	49	1	48	1	136
Vehicles Entered	31	134	0	171	0	204	8	548
Vehicles Exited	31	134	6	164	56	151	5	546
Hourly Exit Rate	31	134	6	164	56	151	5	546
Density (ft/veh)		1191		854		765		1810
Occupancy (veh)	0	1	0	2	0	2	0	5

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.2	0.7	3.6	4.8	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.0	2.8	3.3	0.5
Total Stops	0	2	18	25	46
Stop/Veh	0.00	0.01	1.00	1.00	0.13
Travel Dist (mi)	27.2	21.9	1.9	2.4	53.4
Travel Time (hr)	0.8	0.6	0.1	0.1	1.6
Avg Speed (mph)	33	39	20	19	33
Fuel Used (gal)	1.3	0.6	0.0	0.1	2.0
Fuel Eff. (mpg)	21.0	37.4	46.8	46.8	27.1
HC Emissions (g)	27	11	0	0	39
CO Emissions (g)	1373	414	5	7	1799
NOx Emissions (g)	87	41	1	1	129
Vehicles Entered	133	164	18	25	340
Vehicles Exited	133	164	18	25	340
Hourly Exit Rate	133	164	18	25	340
Density (ft/veh)	1329	1239			1777
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.5	0.8	3.4	5.5	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.1	2.9	3.9	0.5
Total Stops	0	7	31	16	55
Stop/Veh	0.00	0.03	1.00	0.94	0.13
Travel Dist (mi)	20.6	11.3	3.1	1.9	36.9
Travel Time (hr)	0.5	0.4	0.2	0.1	1.1
Avg Speed (mph)	39	31	20	20	32
Fuel Used (gal)	0.7	0.3	0.1	0.0	1.1
Fuel Eff. (mpg)	31.5	36.3	47.5	45.1	34.4
HC Emissions (g)	12	6	1	0	19
CO Emissions (g)	510	226	14	6	755
NOx Emissions (g)	45	20	2	1	68
Vehicles Entered	155	212	31	17	415
Vehicles Exited	155	213	30	16	414
Hourly Exit Rate	155	213	30	16	414
Density (ft/veh)	1321				1849
Occupancy (veh)	1	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.3	0.8	5.1	0.7
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.0	3.9	0.2
Total Stops	0	0	16	16
Stop/Veh	0.00	0.00	1.00	0.04
Travel Dist (mi)	9.5	16.0	1.7	27.2
Travel Time (hr)	0.3	0.4	0.1	0.8
Avg Speed (mph)	35	36	19	34
Fuel Used (gal)	0.3	0.5	0.0	0.9
Fuel Eff. (mpg)	27.8	29.3	47.5	29.5
HC Emissions (g)	6	10	0	17
CO Emissions (g)	288	541	4	833
NOx Emissions (g)	22	34	0	56
Vehicles Entered	182	230	16	427
Vehicles Exited	181	230	16	427
Hourly Exit Rate	181	230	16	427
Density (ft/veh)				1489
Occupancy (veh)	0	0	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.6	0.1	0.7
Total Del/Veh (s)	0.7	5.4	4.0	3.8
Stop Delay (hr)	0.0	0.1	0.1	0.2
Stop Del/Veh (s)	0.0	0.6	3.4	0.9
Total Stops	0	30	115	145
Stop/Veh	0.00	0.08	0.99	0.21
Travel Dist (mi)	13.2	47.0	8.7	69.0
Travel Time (hr)	0.4	1.8	0.5	2.7
Avg Speed (mph)	36	26	17	26
Fuel Used (gal)	0.4	2.6	0.2	3.2
Fuel Eff. (mpg)	31.9	18.2	41.7	21.6
HC Emissions (g)	7	53	4	64
CO Emissions (g)	347	2874	103	3324
NOx Emissions (g)	26	161	11	197
Vehicles Entered	189	367	116	673
Vehicles Exited	189	367	116	673
Hourly Exit Rate	189	367	116	673
Density (ft/veh)		371	799	539
Occupancy (veh)	0	2	1	3

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.8	1.4	0.3	2.5
Total Del/Veh (s)	10.0	9.0	6.2	8.8
Stop Delay (hr)	0.2	0.6	0.2	1.1
Stop Del/Veh (s)	3.2	4.1	3.7	3.8
Total Stops	269	559	178	1006
Stop/Veh	0.99	0.99	0.99	0.99
Travel Dist (mi)	33.8	30.5	25.3	89.6
Travel Time (hr)	1.7	2.4	1.2	5.3
Avg Speed (mph)	20	13	20	17
Fuel Used (gal)	0.9	0.7	0.6	2.2
Fuel Eff. (mpg)	37.3	44.9	39.1	40.1
HC Emissions (g)	15	3	7	25
CO Emissions (g)	634	95	228	957
NOx Emissions (g)	43	9	21	74
Vehicles Entered	269	561	178	1007
Vehicles Exited	269	559	178	1006
Hourly Exit Rate	269	559	178	1006
Density (ft/veh)	397	115	605	317
Occupancy (veh)	2	2	1	5

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.3	0.3	0.0	0.6
Total Del/Veh (s)	2.6	1.9	5.3	2.2
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.5	0.0	4.8	0.2
Total Stops	1	0	2	4
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	23.2	76.6	0.1	99.9
Travel Time (hr)	1.0	2.8	0.0	3.9
Avg Speed (mph)	22	27	15	26
Fuel Used (gal)	2.1	3.1	0.0	5.2
Fuel Eff. (mpg)	11.2	24.4	45.0	19.2
HC Emissions (g)	42	66	0	108
CO Emissions (g)	2395	3339	0	5734
NOx Emissions (g)	128	189	0	317
Vehicles Entered	423	566	2	991
Vehicles Exited	423	566	2	991
Hourly Exit Rate	423	566	2	991
Density (ft/veh)	278	254		351
Occupancy (veh)	1	3	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.7	1.2	0.0	0.0	1.9
Total Del/Veh (s)	5.8	7.6	2.9	3.6	6.8
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.3	0.6	1.1	0.2
Total Stops	6	58	1	1	67
Stop/Veh	0.01	0.10	0.14	0.20	0.07
Travel Dist (mi)	52.7	118.5	1.1	0.3	172.6
Travel Time (hr)	2.0	4.2	0.0	0.0	6.3
Avg Speed (mph)	26	28	25	18	27
Fuel Used (gal)	1.1	2.3	0.0	0.0	3.5
Fuel Eff. (mpg)	48.5	50.5	42.9	49.1	49.8
HC Emissions (g)	21	32	0	0	52
CO Emissions (g)	601	745	3	1	1350
NOx Emissions (g)	60	109	0	0	170
Vehicles Entered	421	575	7	5	1009
Vehicles Exited	421	574	7	5	1007
Hourly Exit Rate	421	574	7	5	1007
Density (ft/veh)	327	255			472
Occupancy (veh)	2	4	0	0	6

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.1	0.0	0.2
Total Del/Veh (s)	0.5	0.5	8.5	0.6
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	7.0	0.1
Total Stops	1	0	10	11
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	91.5	29.0	0.6	121.1
Travel Time (hr)	2.8	0.8	0.0	3.7
Avg Speed (mph)	33	34	13	33
Fuel Used (gal)	3.6	0.9	0.0	4.5
Fuel Eff. (mpg)	25.6	32.3	43.3	27.0
HC Emissions (g)	68	15	0	82
CO Emissions (g)	3175	559	1	3735
NOx Emissions (g)	215	54	0	269
Vehicles Entered	423	591	10	1024
Vehicles Exited	422	590	10	1022
Hourly Exit Rate	422	590	10	1022
Density (ft/veh)	407	299		467
Occupancy (veh)	3	1	0	4

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.3	0.0	0.1	0.5
Total Del/Veh (s)	0.3	1.9	6.6	11.7	1.6
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.2
Stop Del/Veh (s)	0.0	0.3	5.2	10.1	0.5
Total Stops	2	2	4	36	44
Stop/Veh	0.00	0.00	1.00	1.00	0.04
Travel Dist (mi)	20.9	106.4	0.4	4.6	132.3
Travel Time (hr)	0.6	4.0	0.0	0.3	4.8
Avg Speed (mph)	37	27	18	16	27
Fuel Used (gal)	0.5	5.0	0.0	0.1	5.6
Fuel Eff. (mpg)	40.9	21.3	44.4	37.5	23.5
HC Emissions (g)	7	100	0	2	109
CO Emissions (g)	187	4646	1	39	4873
NOx Emissions (g)	29	317	0	5	351
Vehicles Entered	428	641	4	36	1110
Vehicles Exited	429	641	4	36	1112
Hourly Exit Rate	429	641	4	36	1112
Density (ft/veh)	450	226			482
Occupancy (veh)	1	4	0	0	5

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.9
Denied Del/Veh (s)								1.9
Total Delay (hr)	3.8	0.1	1.2	1.0	0.0	9.5	0.8	16.4
Total Del/Veh (s)	33.7	4.5	50.2	13.6	56.4	82.2	5.3	33.0
Stop Delay (hr)	3.0	0.1	1.1	0.6	0.0	5.1	0.8	10.8
Stop Del/Veh (s)	27.3	4.3	48.1	8.9	55.2	44.2	4.9	21.7
Total Stops	299	30	76	95	1	641	218	1358
Stop/Veh	0.74	0.48	0.92	0.37	1.00	1.53	0.39	0.76
Travel Dist (mi)	74.6	1.4	5.3	60.6	0.0	234.0	11.3	387.2
Travel Time (hr)	6.0	0.2	1.4	2.4	0.0	15.2	1.6	27.6
Avg Speed (mph)	12	8	4	26	1	15	7	15
Fuel Used (gal)	2.2	0.1	0.4	1.8	0.0	6.4	0.5	11.4
Fuel Eff. (mpg)	34.3	22.9	14.8	34.1	3.3	36.7	23.4	33.8
HC Emissions (g)	22	0	2	30	0	74	3	131
CO Emissions (g)	590	18	61	1191	0	2433	90	4400
NOx Emissions (g)	63	2	4	104	0	219	11	403
Vehicles Entered	459	0	0	337	0	968	0	1764
Vehicles Exited	397	63	82	258	1	405	559	1765
Hourly Exit Rate	397	63	82	258	1	405	559	1765
Density (ft/veh)	142		741	430		88	856	299
Occupancy (veh)	6	0	1	2	0	15	2	27

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	4.9	0.4	0.4	0.8
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.2	0.0	0.1	0.3
Total Stops	27	0	0	27
Stop/Veh	1.00	0.00	0.00	0.09
Travel Dist (mi)	2.7	17.1	13.0	32.9
Travel Time (hr)	0.1	0.5	0.6	1.2
Avg Speed (mph)	19	34	23	27
Fuel Used (gal)	0.1	0.4	0.7	1.2
Fuel Eff. (mpg)	45.2	42.1	18.7	28.3
HC Emissions (g)	1	6	12	19
CO Emissions (g)	22	122	662	806
NOx Emissions (g)	3	20	37	60
Vehicles Entered	27	92	173	291
Vehicles Exited	27	93	173	293
Hourly Exit Rate	27	93	173	293
Density (ft/veh)		1917	686	1555
Occupancy (veh)	0	1	1	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.0	0.3	0.3	0.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	2.7	0.0	0.0	0.1
Total Stops	10	0	0	9
Stop/Veh	1.00	0.00	0.00	0.04
Travel Dist (mi)	1.0	14.6	23.2	38.8
Travel Time (hr)	0.0	0.4	0.7	1.2
Avg Speed (mph)	20	34	33	33
Fuel Used (gal)	0.0	0.3	0.5	0.9
Fuel Eff. (mpg)	48.4	42.2	43.3	43.0
HC Emissions (g)	0	5	6	11
CO Emissions (g)	2	108	134	245
NOx Emissions (g)	0	18	21	39
Vehicles Entered	10	89	125	224
Vehicles Exited	10	89	125	223
Hourly Exit Rate	10	89	125	223
Density (ft/veh)			1391	2023
Occupancy (veh)	0	0	1	1

Total Network Performance

Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.7
Total Delay (hr)	25.3
Total Del/Veh (s)	40.1
Stop Delay (hr)	13.0
Stop Del/Veh (s)	20.6
Total Stops	3332
Stop/Veh	1.47
Travel Dist (mi)	1862.9
Travel Time (hr)	79.6
Avg Speed (mph)	24
Fuel Used (gal)	62.7
Fuel Eff. (mpg)	29.7
HC Emissions (g)	1036
CO Emissions (g)	43276
NOx Emissions (g)	3378
Vehicles Entered	2200
Vehicles Exited	2194
Hourly Exit Rate	2194
Input Volume	12050
% of Volume	18
Density (ft/veh)	492
Occupancy (veh)	79

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	7.8	18.6	0.1	25
Martinique St	2	3.6	18.5	0.2	41
Jamaica St	3	0.4	11.1	0.1	44
Guadelupe St	4	0.2	4.4	0.1	42
Otis Ave	5	0.7	6.4	0.1	41
Golden Gate Dr	6	10.3	20.5	0.1	22
Stable Dr W	7	3.5	8.4	0.1	23
Seymour Ave	8	5.8	17.2	0.1	27
Stable Dr E	9	0.5	23.7	0.2	32
Allan Ave	10	0.2	4.7	0.1	39
Jefferson Blvd	11	32.6	50.5	0.2	12
Total		65.6	183.9	1.3	26

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.5	5.0	0.1	36
Seymour Ave	8	7.7	26.3	0.2	29
Stable Dr W	7	1.9	17.7	0.1	27
Golden Gate Dr	6	10.7	15.6	0.1	13
Otis Ave	5	5.5	15.9	0.1	28
Guadelupe St	4	0.8	6.4	0.1	41
Jamaica St	3	0.6	4.9	0.1	38
Martinique St	2	0.7	11.4	0.1	42
Southport Pkwy	1	7.7	22.8	0.2	33
Total		36.1	126.1	1.2	35

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (ft)	29	64	33	82	56	81	31
Average Queue (ft)	14	34	6	44	29	43	5
95th Queue (ft)	32	54	27	69	51	67	23
Link Distance (ft)	623	1024		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	3	29	38	47
Average Queue (ft)	0	2	15	18
95th Queue (ft)	3	13	41	45
Link Distance (ft)	1024	654	547	512
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	6	36	51	42
Average Queue (ft)	0	7	21	13
95th Queue (ft)	4	29	48	40
Link Distance (ft)	654	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	3	37
Average Queue (ft)	0	13
95th Queue (ft)	3	40
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	67	81
Average Queue (ft)	21	38
95th Queue (ft)	52	63
Link Distance (ft)	619	349
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	87	132	86
Average Queue (ft)	47	73	48
95th Queue (ft)	74	112	74
Link Distance (ft)	619	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	33	29
Average Queue (ft)	2	2
95th Queue (ft)	17	15
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	42	95	26	18
Average Queue (ft)	5	32	1	1
95th Queue (ft)	26	78	11	12
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	28	35
Average Queue (ft)	1	9
95th Queue (ft)	13	33
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	31	32	31	70
Average Queue (ft)	2	2	4	26
95th Queue (ft)	16	13	20	57
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	392	165	141	182	24	964	155
Average Queue (ft)	222	62	58	62	2	432	139
95th Queue (ft)	351	172	114	136	19	942	189
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)						1	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	31					40	9
Queuing Penalty (veh)	19					228	37

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	54	12
Average Queue (ft)	20	0
95th Queue (ft)	50	6
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	33	12
Average Queue (ft)	9	0
95th Queue (ft)	32	6
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 285

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	UL	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.5
Total Delay (hr)	0.1	0.3	0.0	0.7	0.1	0.2	0.0	1.3
Total Del/Veh (s)	6.8	7.5	2.9	8.1	4.5	7.6	1.7	7.5
Stop Delay (hr)	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Stop Del/Veh (s)	2.9	2.5	2.0	3.3	3.0	2.8	1.9	3.0
Total Stops	65	125	2	297	44	80	10	622
Stop/Veh	1.00	0.98	1.00	0.99	1.00	1.00	0.91	0.99
Travel Dist (mi)	7.8	25.7	0.0	83.3	2.7	29.3	2.7	151.5
Travel Time (hr)	0.3	1.0	0.0	3.2	0.2	1.0	0.1	5.8
Avg Speed (mph)	23	27	10	26	17	29	29	26
Fuel Used (gal)	0.2	1.1	0.0	1.9	0.0	0.7	0.1	4.0
Fuel Eff. (mpg)	46.7	23.2	36.0	44.0	57.8	44.0	44.8	38.3
HC Emissions (g)	2	18	0	21	0	11	0	52
CO Emissions (g)	82	1133	0	576	12	255	7	2066
NOx Emissions (g)	6	56	0	67	1	34	1	165
Vehicles Entered	65	126	0	299	0	124	11	623
Vehicles Exited	65	127	2	297	44	79	10	623
Hourly Exit Rate	65	127	2	297	44	79	10	623
Density (ft/veh)		1107		467		1348		1525
Occupancy (veh)	0	1	0	3	0	1	0	6

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.4	0.4	0.0	0.0	0.9
Total Del/Veh (s)	9.7	11.3	3.4	4.2	9.4
Stop Delay (hr)	0.1	0.1	0.0	0.0	0.3
Stop Del/Veh (s)	2.7	2.6	2.6	2.7	2.7
Total Stops	156	127	24	28	335
Stop/Veh	0.99	0.98	1.00	1.00	0.99
Travel Dist (mi)	32.3	17.1	2.5	2.7	54.6
Travel Time (hr)	1.3	0.8	0.1	0.1	2.4
Avg Speed (mph)	24	21	21	20	23
Fuel Used (gal)	1.4	0.8	0.1	0.1	2.2
Fuel Eff. (mpg)	23.9	22.6	45.6	48.2	24.6
HC Emissions (g)	29	13	0	0	42
CO Emissions (g)	1466	757	8	11	2241
NOx Emissions (g)	82	38	1	1	121
Vehicles Entered	157	128	24	28	338
Vehicles Exited	157	128	24	28	337
Hourly Exit Rate	157	128	24	28	337
Density (ft/veh)	829	863			1192
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.6	0.3	0.0	0.0	1.0
Total Del/Veh (s)	11.8	7.0	3.4	4.6	8.6
Stop Delay (hr)	0.1	0.1	0.0	0.0	0.3
Stop Del/Veh (s)	2.8	2.5	2.7	2.8	2.7
Total Stops	186	150	48	28	412
Stop/Veh	0.99	0.99	1.00	0.97	0.99
Travel Dist (mi)	24.9	7.9	4.9	3.3	40.9
Travel Time (hr)	1.2	0.5	0.2	0.2	2.1
Avg Speed (mph)	20	15	20	21	19
Fuel Used (gal)	1.1	0.2	0.1	0.1	1.4
Fuel Eff. (mpg)	23.1	51.4	42.8	46.3	28.9
HC Emissions (g)	22	1	1	1	26
CO Emissions (g)	1088	44	30	24	1186
NOx Emissions (g)	63	4	3	3	73
Vehicles Entered	186	151	48	28	413
Vehicles Exited	187	151	48	28	414
Hourly Exit Rate	187	151	48	28	414
Density (ft/veh)	571	523			986
Occupancy (veh)	1	1	0	0	2

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.2	0.1	0.5
Total Del/Veh (s)	3.1	3.3	6.0	3.5
Stop Delay (hr)	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.3	0.3	4.3	0.7
Total Stops	2	0	44	46
Stop/Veh	0.01	0.00	0.98	0.09
Travel Dist (mi)	13.1	13.3	4.7	31.0
Travel Time (hr)	0.6	0.6	0.3	1.4
Avg Speed (mph)	22	23	18	22
Fuel Used (gal)	1.0	0.8	0.1	1.9
Fuel Eff. (mpg)	12.9	16.5	41.8	16.0
HC Emissions (g)	23	17	1	40
CO Emissions (g)	1086	853	26	1966
NOx Emissions (g)	70	51	3	124
Vehicles Entered	250	190	44	485
Vehicles Exited	250	190	44	485
Hourly Exit Rate	250	190	44	485
Density (ft/veh)	452	627		828
Occupancy (veh)	1	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.7	0.7	0.3	1.7
Total Del/Veh (s)	9.2	10.8	5.0	8.3
Stop Delay (hr)	0.3	0.2	0.2	0.7
Stop Del/Veh (s)	3.4	3.1	3.6	3.4
Total Stops	277	227	238	742
Stop/Veh	0.99	1.00	1.00	0.99
Travel Dist (mi)	19.3	28.8	18.1	66.2
Travel Time (hr)	1.2	1.5	1.1	3.8
Avg Speed (mph)	16	20	17	17
Fuel Used (gal)	0.4	1.3	0.4	2.1
Fuel Eff. (mpg)	47.1	22.4	44.7	31.6
HC Emissions (g)	6	25	4	35
CO Emissions (g)	155	1238	139	1532
NOx Emissions (g)	16	72	13	101
Vehicles Entered	278	227	238	742
Vehicles Exited	279	227	238	744
Hourly Exit Rate	279	227	238	744
Density (ft/veh)	300	454	368	379
Occupancy (veh)	1	1	1	4

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	2.0	0.9	0.9	3.9
Total Del/Veh (s)	16.5	8.0	9.9	11.6
Stop Delay (hr)	0.9	0.5	0.6	2.1
Stop Del/Veh (s)	7.4	4.4	6.9	6.2
Total Stops	437	425	321	1183
Stop/Veh	0.99	0.99	0.99	0.99
Travel Dist (mi)	55.1	23.2	45.5	123.7
Travel Time (hr)	3.5	1.8	2.6	7.9
Avg Speed (mph)	16	13	18	16
Fuel Used (gal)	2.4	0.5	1.2	4.1
Fuel Eff. (mpg)	22.9	46.4	37.1	30.0
HC Emissions (g)	42	2	14	59
CO Emissions (g)	1840	71	463	2375
NOx Emissions (g)	131	7	40	179
Vehicles Entered	438	426	321	1185
Vehicles Exited	438	426	322	1186
Hourly Exit Rate	438	426	322	1186
Density (ft/veh)	187	154	292	213
Occupancy (veh)	4	2	3	8

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.8	0.2	0.0	0.9
Total Del/Veh (s)	3.8	1.3	17.6	3.0
Stop Delay (hr)	0.3	0.0	0.0	0.3
Stop Del/Veh (s)	1.6	0.0	17.3	1.1
Total Stops	26	0	7	32
Stop/Veh	0.04	0.00	1.00	0.03
Travel Dist (mi)	38.9	56.9	0.5	96.3
Travel Time (hr)	2.0	2.0	0.1	4.1
Avg Speed (mph)	20	28	8	24
Fuel Used (gal)	3.5	2.4	0.0	5.9
Fuel Eff. (mpg)	11.2	23.4	29.0	16.3
HC Emissions (g)	68	53	0	120
CO Emissions (g)	3698	2674	1	6373
NOx Emissions (g)	215	147	0	362
Vehicles Entered	709	420	7	1134
Vehicles Exited	709	420	7	1135
Hourly Exit Rate	709	420	7	1135
Density (ft/veh)	145	353		332
Occupancy (veh)	2	2	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.1
Total Delay (hr)	2.4	0.7	0.0	0.0	3.1
Total Del/Veh (s)	12.2	6.0	3.9	3.8	9.7
Stop Delay (hr)	1.1	0.0	0.0	0.0	1.1
Stop Del/Veh (s)	5.3	0.1	1.5	1.5	3.3
Total Stops	108	10	2	6	126
Stop/Veh	0.15	0.02	0.25	0.33	0.11
Travel Dist (mi)	88.7	86.6	1.4	1.1	177.8
Travel Time (hr)	4.7	2.9	0.1	0.1	7.7
Avg Speed (mph)	19	30	24	18	23
Fuel Used (gal)	1.8	2.0	0.0	0.0	3.9
Fuel Eff. (mpg)	48.1	43.7	43.3	44.6	45.8
HC Emissions (g)	31	38	0	0	69
CO Emissions (g)	757	1167	3	4	1931
NOx Emissions (g)	87	118	1	0	206
Vehicles Entered	709	421	8	18	1155
Vehicles Exited	709	420	8	18	1155
Hourly Exit Rate	709	420	8	18	1155
Density (ft/veh)	141	372			387
Occupancy (veh)	5	3	0	0	8

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	3.9	0.4	0.4	4.6
Total Del/Veh (s)	19.3	3.3	65.7	14.2
Stop Delay (hr)	3.2	0.0	0.4	3.6
Stop Del/Veh (s)	16.1	0.3	63.9	11.1
Total Stops	155	0	19	173
Stop/Veh	0.21	0.00	0.95	0.15
Travel Dist (mi)	154.5	21.1	1.2	176.9
Travel Time (hr)	8.5	0.9	0.4	9.9
Avg Speed (mph)	18	22	3	18
Fuel Used (gal)	5.7	1.9	0.1	7.8
Fuel Eff. (mpg)	27.0	10.9	11.3	22.8
HC Emissions (g)	100	40	0	141
CO Emissions (g)	4686	2244	12	6952
NOx Emissions (g)	286	122	1	409
Vehicles Entered	717	427	19	1163
Vehicles Exited	712	427	19	1160
Hourly Exit Rate	712	427	19	1160
Density (ft/veh)	134	267		175
Occupancy (veh)	8	1	0	10

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	3.4	1.4	0.0	0.1	4.9
Total Del/Veh (s)	16.8	11.3	5.4	6.2	14.3
Stop Delay (hr)	2.3	0.5	0.0	0.1	2.9
Stop Del/Veh (s)	11.4	4.1	5.4	4.3	8.4
Total Stops	727	443	1	64	1237
Stop/Veh	1.00	0.99	1.00	0.98	1.00
Travel Dist (mi)	35.4	73.4	0.1	8.1	117.0
Travel Time (hr)	4.3	3.9	0.0	0.4	8.6
Avg Speed (mph)	8	19	19	20	14
Fuel Used (gal)	1.3	3.0	0.0	0.2	4.4
Fuel Eff. (mpg)	27.9	24.8	49.4	41.5	26.4
HC Emissions (g)	7	53	0	3	63
CO Emissions (g)	198	2571	0	65	2835
NOx Emissions (g)	21	158	0	7	186
Vehicles Entered	727	444	1	64	1237
Vehicles Exited	726	444	1	65	1235
Hourly Exit Rate	726	444	1	65	1235
Density (ft/veh)	59	229			270
Occupancy (veh)	4	4	0	0	9

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	All
Movements Served	LT	R	L	TR	T	R	
Denied Delay (hr)							0.5
Denied Del/Veh (s)							1.1
Total Delay (hr)	11.8	0.0	1.0	2.4	2.2	0.4	18.0
Total Del/Veh (s)	58.4	2.7	49.2	23.3	39.0	4.3	35.7
Stop Delay (hr)	8.2	0.0	1.0	1.6	1.3	0.4	12.6
Stop Del/Veh (s)	40.6	2.3	47.0	15.5	22.6	3.9	24.9
Total Stops	749	17	66	200	165	224	1421
Stop/Veh	1.03	0.30	0.90	0.53	0.80	0.60	0.78
Travel Dist (mi)	127.3	1.3	4.7	82.0	138.7	7.1	361.1
Travel Time (hr)	15.7	0.1	1.2	4.3	5.6	0.9	28.3
Avg Speed (mph)	8	11	4	19	25	8	13
Fuel Used (gal)	6.8	0.1	0.3	2.5	3.3	0.3	13.4
Fuel Eff. (mpg)	18.7	23.3	14.5	32.6	42.5	25.6	27.0
HC Emissions (g)	76	1	1	39	50	2	169
CO Emissions (g)	2783	22	64	1571	1812	54	6316
NOx Emissions (g)	244	2	3	123	166	7	545
Vehicles Entered	775	0	0	445	574	0	1794
Vehicles Exited	718	55	72	374	203	372	1794
Hourly Exit Rate	718	55	72	374	203	372	1794
Density (ft/veh)	55		857	235	240	1471	286
Occupancy (veh)	16	0	1	4	6	1	28

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	5.3	0.5	0.7	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	3.5	0.0	0.3	0.6
Total Stops	44	0	0	44
Stop/Veh	1.00	0.00	0.00	0.12
Travel Dist (mi)	4.4	36.7	8.7	49.8
Travel Time (hr)	0.2	1.1	0.4	1.7
Avg Speed (mph)	19	34	23	29
Fuel Used (gal)	0.1	0.9	0.5	1.5
Fuel Eff. (mpg)	44.4	42.9	15.9	33.2
HC Emissions (g)	1	11	10	22
CO Emissions (g)	26	205	526	758
NOx Emissions (g)	3	37	32	72
Vehicles Entered	44	198	116	357
Vehicles Exited	44	198	116	358
Hourly Exit Rate	44	198	116	358
Density (ft/veh)		894		1115
Occupancy (veh)	0	1	0	2

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.6	0.3	0.2	0.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.2	0.0	0.0	0.2
Total Stops	16	0	0	16
Stop/Veh	1.00	0.00	0.00	0.05
Travel Dist (mi)	1.7	30.9	19.1	51.7
Travel Time (hr)	0.1	0.9	0.6	1.6
Avg Speed (mph)	20	34	34	33
Fuel Used (gal)	0.0	0.7	0.4	1.2
Fuel Eff. (mpg)	46.3	41.5	42.7	42.0
HC Emissions (g)	0	10	5	16
CO Emissions (g)	4	229	102	336
NOx Emissions (g)	0	35	18	54
Vehicles Entered	16	189	104	308
Vehicles Exited	16	188	104	308
Hourly Exit Rate	16	188	104	308
Density (ft/veh)		953	1720	1530
Occupancy (veh)	0	1	1	2

Total Network Performance

Denied Delay (hr)	0.7
Denied Del/Veh (s)	1.1
Total Delay (hr)	42.7
Total Del/Veh (s)	62.3
Stop Delay (hr)	24.6
Stop Del/Veh (s)	35.9
Total Stops	6389
Stop/Veh	2.59
Travel Dist (mi)	2044.1
Travel Time (hr)	102.3
Avg Speed (mph)	20
Fuel Used (gal)	75.2
Fuel Eff. (mpg)	27.2
HC Emissions (g)	1230
CO Emissions (g)	52192
NOx Emissions (g)	3947
Vehicles Entered	2383
Vehicles Exited	2375
Hourly Exit Rate	2375
Input Volume	13167
% of Volume	18
Density (ft/veh)	380
Occupancy (veh)	102

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.2	19.1	0.1	24
Martinique St	2	12.3	29.0	0.2	26
Jamaica St	3	12.6	23.4	0.1	21
Guadelupe St	4	4.0	8.2	0.1	23
Otis Ave	5	9.8	15.5	0.1	17
Golden Gate Dr	6	18.6	28.7	0.1	16
Stable Dr W	7	4.9	9.9	0.1	20
Seymour Ave	8	12.2	23.7	0.1	20
Stable Dr E	9	19.3	42.5	0.2	18
Allan Ave	10	16.9	21.3	0.1	9
Jefferson Blvd	11	55.5	73.4	0.2	8
Total		174.4	294.6	1.3	16

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	3.4	7.8	0.1	23
Seymour Ave	8	6.0	24.6	0.2	31
Stable Dr W	7	1.3	17.2	0.1	27
Golden Gate Dr	6	10.5	15.5	0.1	13
Otis Ave	5	12.7	23.2	0.1	20
Guadelupe St	4	4.5	10.1	0.1	26
Jamaica St	3	7.9	12.2	0.1	15
Martinique St	2	12.2	22.9	0.1	21
Southport Pkwy	1	12.1	28.4	0.2	26
Total		70.7	161.9	1.2	27

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	UL	T	R
Maximum Queue (ft)	52	57	25	107	52	76	32
Average Queue (ft)	22	29	2	58	26	35	9
95th Queue (ft)	39	44	13	89	49	61	31
Link Distance (ft)	623	1024		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				1			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	71	58	35	49
Average Queue (ft)	35	33	18	20
95th Queue (ft)	53	47	44	47
Link Distance (ft)	1024	654	547	512
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	78	59	57	64
Average Queue (ft)	38	35	27	23
95th Queue (ft)	57	48	52	55
Link Distance (ft)	654	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	30	63
Average Queue (ft)	2	27
95th Queue (ft)	15	55
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	94	70	101
Average Queue (ft)	48	39	53
95th Queue (ft)	76	59	84
Link Distance (ft)	314	619	349
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	199	145	168
Average Queue (ft)	82	64	76
95th Queue (ft)	152	112	133
Link Distance (ft)	619	234	747
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	44	38
Average Queue (ft)	9	7
95th Queue (ft)	79	28
Link Distance (ft)	234	351
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	139	42	33	35
Average Queue (ft)	55	8	2	6
95th Queue (ft)	260	33	16	28
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	369	76
Average Queue (ft)	107	23
95th Queue (ft)	549	61
Link Distance (ft)	1034	334
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	33	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	207	150	23	69
Average Queue (ft)	125	66	1	32
95th Queue (ft)	216	112	12	58
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	17			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	L	TR	T	R
Maximum Queue (ft)	769	165	140	295	348	155
Average Queue (ft)	498	49	49	133	121	92
95th Queue (ft)	843	157	109	242	244	164
Link Distance (ft)	811			1008	1339	
Upstream Blk Time (%)	2					
Queuing Penalty (veh)	12					
Storage Bay Dist (ft)		115	300			100
Storage Blk Time (%)	44			0	31	2
Queuing Penalty (veh)	24			0	114	3

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB
Directions Served	LR
Maximum Queue (ft)	62
Average Queue (ft)	27
95th Queue (ft)	53
Link Distance (ft)	531
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	43	3
Average Queue (ft)	13	0
95th Queue (ft)	40	3
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 207

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	L	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.6
Total Delay (hr)	0.0	0.3	0.0	0.3	0.1	0.4	0.0	1.0
Total Del/Veh (s)	4.4	7.8	4.1	6.3	4.7	8.2	2.0	6.9
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4
Stop Del/Veh (s)	2.5	2.5	3.0	2.7	2.8	2.9	2.1	2.7
Total Stops	30	125	7	165	54	157	7	545
Stop/Veh	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	3.6	25.7	0.1	48.0	3.3	51.1	1.9	133.7
Travel Time (hr)	0.1	1.0	0.0	1.7	0.2	1.8	0.1	5.1
Avg Speed (mph)	25	27	9	27	17	28	29	27
Fuel Used (gal)	0.1	1.1	0.0	1.1	0.1	1.2	0.0	3.6
Fuel Eff. (mpg)	55.5	23.6	33.9	43.7	54.7	42.8	46.3	37.5
HC Emissions (g)	0	22	0	12	0	15	0	49
CO Emissions (g)	11	1193	0	331	18	414	4	1973
NOx Emissions (g)	1	64	0	38	1	48	1	154
Vehicles Entered	30	127	0	172	0	208	9	547
Vehicles Exited	30	126	7	165	54	157	7	548
Hourly Exit Rate	30	126	7	165	54	157	7	548
Density (ft/veh)		1107		845		744		1758
Occupancy (veh)	0	1	0	2	0	2	0	5

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.3	0.5	0.0	0.0	0.8
Total Del/Veh (s)	8.5	10.8	3.2	4.2	9.0
Stop Delay (hr)	0.1	0.1	0.0	0.0	0.2
Stop Del/Veh (s)	2.6	2.6	2.5	2.6	2.6
Total Stops	128	154	17	25	323
Stop/Veh	0.98	0.99	1.00	1.00	0.99
Travel Dist (mi)	26.3	20.8	1.7	2.4	51.3
Travel Time (hr)	1.1	1.0	0.1	0.1	2.3
Avg Speed (mph)	25	21	21	20	23
Fuel Used (gal)	1.1	0.9	0.0	0.1	2.1
Fuel Eff. (mpg)	24.1	22.8	47.4	47.6	24.5
HC Emissions (g)	19	18	0	0	38
CO Emissions (g)	1138	964	4	7	2113
NOx Emissions (g)	57	53	0	1	112
Vehicles Entered	129	155	16	25	324
Vehicles Exited	128	156	17	25	324
Hourly Exit Rate	128	156	17	25	324
Density (ft/veh)	1019	712			1262
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.5	0.4	0.0	0.0	0.9
Total Del/Veh (s)	11.3	7.0	3.2	4.3	8.2
Stop Delay (hr)	0.1	0.1	0.0	0.0	0.3
Stop Del/Veh (s)	2.7	2.5	2.6	2.8	2.6
Total Stops	148	203	32	15	398
Stop/Veh	0.99	1.00	1.00	1.00	1.00
Travel Dist (mi)	19.9	10.7	3.2	1.7	35.5
Travel Time (hr)	1.0	0.7	0.2	0.1	1.9
Avg Speed (mph)	21	15	20	21	19
Fuel Used (gal)	0.9	0.2	0.1	0.0	1.2
Fuel Eff. (mpg)	22.9	54.7	46.4	47.8	30.4
HC Emissions (g)	15	1	1	0	17
CO Emissions (g)	853	41	19	4	917
NOx Emissions (g)	44	4	2	0	51
Vehicles Entered	149	203	32	15	400
Vehicles Exited	149	203	32	15	399
Hourly Exit Rate	149	203	32	15	399
Density (ft/veh)	727	385			1109
Occupancy (veh)	1	1	0	0	2

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.3	0.0	0.4
Total Del/Veh (s)	3.1	4.1	5.1	3.7
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.3	0.2	3.9	0.4
Total Stops	0	0	15	15
Stop/Veh	0.00	0.00	1.00	0.04
Travel Dist (mi)	9.3	15.7	1.5	26.5
Travel Time (hr)	0.4	0.6	0.1	1.1
Avg Speed (mph)	23	24	19	23
Fuel Used (gal)	0.7	1.0	0.0	1.8
Fuel Eff. (mpg)	12.4	16.2	45.2	15.1
HC Emissions (g)	15	20	0	35
CO Emissions (g)	838	1053	4	1895
NOx Emissions (g)	46	62	0	108
Vehicles Entered	177	224	15	416
Vehicles Exited	177	224	15	415
Hourly Exit Rate	177	224	15	415
Density (ft/veh)		567		1047
Occupancy (veh)	0	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.4	1.2	0.1	1.7
Total Del/Veh (s)	8.3	11.5	3.3	9.2
Stop Delay (hr)	0.1	0.3	0.1	0.5
Stop Del/Veh (s)	2.8	2.9	2.7	2.8
Total Stops	184	359	114	656
Stop/Veh	0.99	0.99	0.98	0.99
Travel Dist (mi)	12.8	45.8	8.7	67.3
Travel Time (hr)	0.8	2.4	0.5	3.6
Avg Speed (mph)	17	19	18	19
Fuel Used (gal)	0.2	2.0	0.2	2.4
Fuel Eff. (mpg)	56.7	23.4	42.3	28.2
HC Emissions (g)	2	34	3	40
CO Emissions (g)	71	1729	97	1897
NOx Emissions (g)	6	105	10	121
Vehicles Entered	184	358	115	659
Vehicles Exited	184	359	116	659
Hourly Exit Rate	184	359	116	659
Density (ft/veh)	490	281		399
Occupancy (veh)	1	2	0	4

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.9	1.3	0.3	2.6
Total Del/Veh (s)	12.0	8.7	6.3	9.1
Stop Delay (hr)	0.2	0.6	0.2	1.0
Stop Del/Veh (s)	3.3	3.8	3.8	3.7
Total Stops	267	558	178	1004
Stop/Veh	0.99	0.99	0.99	1.00
Travel Dist (mi)	33.7	30.4	25.3	89.4
Travel Time (hr)	1.8	2.4	1.2	5.4
Avg Speed (mph)	19	13	20	16
Fuel Used (gal)	1.4	0.7	0.6	2.7
Fuel Eff. (mpg)	23.4	45.8	39.3	32.5
HC Emissions (g)	26	3	8	36
CO Emissions (g)	1293	89	228	1611
NOx Emissions (g)	78	9	21	109
Vehicles Entered	267	559	178	1006
Vehicles Exited	268	559	178	1004
Hourly Exit Rate	268	559	178	1004
Density (ft/veh)	367	117	604	312
Occupancy (veh)	2	2	1	5

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.3	0.3	0.0	0.6
Total Del/Veh (s)	2.5	1.7	12.8	2.1
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.5	0.0	12.3	0.2
Total Stops	1	0	2	1
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	23.1	76.5	0.1	99.7
Travel Time (hr)	1.0	2.8	0.0	3.8
Avg Speed (mph)	23	27	9	26
Fuel Used (gal)	2.1	3.1	0.0	5.2
Fuel Eff. (mpg)	11.2	24.3	30.3	19.2
HC Emissions (g)	40	65	0	105
CO Emissions (g)	2369	3358	0	5728
NOx Emissions (g)	124	184	0	308
Vehicles Entered	421	564	2	986
Vehicles Exited	421	565	2	987
Hourly Exit Rate	421	565	2	987
Density (ft/veh)	281	257		354
Occupancy (veh)	1	3	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.7	1.1	0.0	0.0	1.8
Total Del/Veh (s)	5.8	6.6	3.2	3.2	6.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.1	0.8	0.8	0.1
Total Stops	9	15	2	1	26
Stop/Veh	0.02	0.03	0.29	0.14	0.03
Travel Dist (mi)	52.5	117.2	1.3	0.4	171.4
Travel Time (hr)	2.0	4.0	0.1	0.0	6.1
Avg Speed (mph)	26	29	25	19	28
Fuel Used (gal)	1.1	2.6	0.0	0.0	3.8
Fuel Eff. (mpg)	48.9	44.4	45.2	44.2	45.7
HC Emissions (g)	20	48	0	0	69
CO Emissions (g)	584	1537	3	2	2126
NOx Emissions (g)	59	150	0	0	209
Vehicles Entered	419	569	7	7	1002
Vehicles Exited	419	568	7	7	1002
Hourly Exit Rate	419	568	7	7	1002
Density (ft/veh)	328	268			487
Occupancy (veh)	2	4	0	0	6

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.6	0.0	0.8
Total Del/Veh (s)	1.6	3.5	14.1	2.8
Stop Delay (hr)	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	0.0	0.3	12.4	0.3
Total Stops	1	0	8	9
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	91.6	28.9	0.5	121.1
Travel Time (hr)	2.9	1.3	0.1	4.3
Avg Speed (mph)	31	22	10	28
Fuel Used (gal)	3.2	2.7	0.0	5.9
Fuel Eff. (mpg)	28.6	10.9	36.1	20.6
HC Emissions (g)	63	51	0	113
CO Emissions (g)	3071	2952	1	6025
NOx Emissions (g)	184	161	0	345
Vehicles Entered	423	585	8	1017
Vehicles Exited	423	584	8	1016
Hourly Exit Rate	423	584	8	1016
Density (ft/veh)	388	191		401
Occupancy (veh)	3	1	0	4

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.0	2.5	0.0	0.0	3.6
Total Del/Veh (s)	8.5	14.0	5.0	5.0	11.6
Stop Delay (hr)	0.3	1.0	0.0	0.0	1.4
Stop Del/Veh (s)	2.8	5.6	3.4	3.4	4.4
Total Stops	429	633	5	30	1099
Stop/Veh	1.00	0.99	1.00	0.97	0.99
Travel Dist (mi)	20.8	105.0	0.5	3.8	130.2
Travel Time (hr)	1.5	6.1	0.0	0.2	7.9
Avg Speed (mph)	13	17	20	21	17
Fuel Used (gal)	0.4	4.1	0.0	0.1	4.7
Fuel Eff. (mpg)	47.2	25.5	51.1	46.3	28.0
HC Emissions (g)	2	69	0	1	72
CO Emissions (g)	53	3200	1	25	3279
NOx Emissions (g)	6	211	0	4	220
Vehicles Entered	429	636	5	30	1100
Vehicles Exited	429	633	5	30	1099
Hourly Exit Rate	429	633	5	30	1099
Density (ft/veh)	165	147			297
Occupancy (veh)	2	6	0	0	8

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.9
Denied Del/Veh (s)								1.8
Total Delay (hr)	3.7	0.1	1.1	1.1	0.0	8.9	0.9	15.8
Total Del/Veh (s)	33.8	5.2	53.1	14.5		77.7	5.5	32.1
Stop Delay (hr)	2.8	0.1	1.1	0.7	0.0	4.7	0.8	10.1
Stop Del/Veh (s)	24.9	5.0	51.0	9.5		40.9	5.0	20.5
Total Stops	277	32	70	103	0	606	209	1298
Stop/Veh	0.69	0.52	0.92	0.39		1.46	0.37	0.73
Travel Dist (mi)	74.1	1.3	4.9	60.5	0.0	232.5	11.4	384.8
Travel Time (hr)	6.0	0.2	1.3	2.4	0.0	14.5	1.6	26.9
Avg Speed (mph)	12	8	4	25	1	16	7	15
Fuel Used (gal)	3.6	0.1	0.3	1.8	0.0	6.2	0.5	12.7
Fuel Eff. (mpg)	20.5	22.5	14.2	34.0	3.2	37.6	23.0	30.3
HC Emissions (g)	57	1	1	30	0	75	3	168
CO Emissions (g)	2760	18	52	1191	0	2427	88	6553
NOx Emissions (g)	169	2	3	105	0	221	10	510
Vehicles Entered	454	0	0	335	0	964	0	1753
Vehicles Exited	392	62	75	262	0	398	560	1749
Hourly Exit Rate	392	62	75	262	0	398	560	1749
Density (ft/veh)	143		770	416		92	844	306
Occupancy (veh)	6	0	1	2	0	14	2	26

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	4.8	0.3	0.9	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.1	0.1	0.3	0.5
Total Stops	28	0	0	28
Stop/Veh	1.00	0.00	0.00	0.10
Travel Dist (mi)	2.8	16.9	12.7	32.3
Travel Time (hr)	0.1	0.5	0.6	1.2
Avg Speed (mph)	20	34	22	26
Fuel Used (gal)	0.1	0.4	0.7	1.2
Fuel Eff. (mpg)	47.6	41.6	17.0	26.7
HC Emissions (g)	1	7	12	20
CO Emissions (g)	21	142	651	814
NOx Emissions (g)	3	23	38	64
Vehicles Entered	28	91	168	287
Vehicles Exited	28	91	168	287
Hourly Exit Rate	28	91	168	287
Density (ft/veh)		1946	677	1553
Occupancy (veh)	0	1	1	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.7	0.2	0.2	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.2	0.0	0.0	0.2
Total Stops	11	1	0	11
Stop/Veh	1.00	0.01	0.00	0.05
Travel Dist (mi)	1.1	14.2	22.3	37.6
Travel Time (hr)	0.1	0.4	0.7	1.1
Avg Speed (mph)	20	34	33	33
Fuel Used (gal)	0.0	0.3	0.5	0.9
Fuel Eff. (mpg)	47.3	42.7	42.5	42.7
HC Emissions (g)	0	6	4	11
CO Emissions (g)	3	119	108	231
NOx Emissions (g)	0	20	16	37
Vehicles Entered	11	86	120	218
Vehicles Exited	11	86	120	218
Hourly Exit Rate	11	86	120	218
Density (ft/veh)			1454	2085
Occupancy (veh)	0	0	1	1

Total Network Performance

Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.6
Total Delay (hr)	31.3
Total Del/Veh (s)	49.7
Stop Delay (hr)	14.3
Stop Del/Veh (s)	22.8
Total Stops	5413
Stop/Veh	2.39
Travel Dist (mi)	1849.2
Travel Time (hr)	85.1
Avg Speed (mph)	22
Fuel Used (gal)	65.9
Fuel Eff. (mpg)	28.0
HC Emissions (g)	1094
CO Emissions (g)	48514
NOx Emissions (g)	3467
Vehicles Entered	2192
Vehicles Exited	2186
Hourly Exit Rate	2186
Input Volume	12050
% of Volume	18
Density (ft/veh)	459
Occupancy (veh)	84

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.2	19.5	0.1	24
Martinique St	2	10.6	25.4	0.2	29
Jamaica St	3	12.3	23.0	0.1	21
Guadelupe St	4	3.8	8.0	0.1	23
Otis Ave	5	8.9	14.5	0.1	18
Golden Gate Dr	6	13.7	23.9	0.1	19
Stable Dr W	7	3.4	8.4	0.1	24
Seymour Ave	8	5.8	17.2	0.1	27
Stable Dr E	9	1.6	24.8	0.2	30
Allan Ave	10	8.5	12.9	0.1	14
Jefferson Blvd	11	32.4	50.3	0.2	12
Total		109.2	228.0	1.3	21

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	3.6	8.0	0.1	23
Seymour Ave	8	6.7	25.3	0.2	30
Stable Dr W	7	1.7	17.6	0.1	27
Golden Gate Dr	6	10.4	15.3	0.1	13
Otis Ave	5	13.3	23.7	0.1	19
Guadelupe St	4	4.4	10.0	0.1	26
Jamaica St	3	8.1	12.4	0.1	15
Martinique St	2	12.2	22.9	0.1	21
Southport Pkwy	1	11.5	27.2	0.2	28
Total		71.9	162.4	1.2	27

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (ft)	29	70	33	76	56	86	31
Average Queue (ft)	13	31	7	41	29	44	7
95th Queue (ft)	30	50	29	64	51	70	27
Link Distance (ft)	623	1024		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	60	76	40	35
Average Queue (ft)	33	35	14	18
95th Queue (ft)	48	50	41	44
Link Distance (ft)	1024	654	547	512
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	69	79	53	38
Average Queue (ft)	36	37	22	13
95th Queue (ft)	53	56	50	39
Link Distance (ft)	654	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	9	38
Average Queue (ft)	0	12
95th Queue (ft)	5	38
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	76	77	68
Average Queue (ft)	38	43	36
95th Queue (ft)	58	66	55
Link Distance (ft)	314	619	349
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	85	131	96
Average Queue (ft)	45	68	48
95th Queue (ft)	71	107	76
Link Distance (ft)	619	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	14	25
Average Queue (ft)	1	2
95th Queue (ft)	9	15
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	52	52	26	25
Average Queue (ft)	7	12	2	2
95th Queue (ft)	32	41	14	14
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	22	38
Average Queue (ft)	1	9
95th Queue (ft)	11	32
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	93	205	31	61
Average Queue (ft)	51	96	5	22
95th Queue (ft)	80	164	23	51
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	371	165	149	190	28	998	155
Average Queue (ft)	208	50	53	68	1	402	142
95th Queue (ft)	326	149	113	146	13	856	189
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)						1	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	27	0				41	10
Queuing Penalty (veh)	17	0				231	42

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	53	10
Average Queue (ft)	22	0
95th Queue (ft)	51	6
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	33	12
Average Queue (ft)	11	0
95th Queue (ft)	35	7
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 290

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	UL	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.4
Total Delay (hr)	0.1	0.1	0.0	0.7	0.1	0.2	0.0	1.2
Total Del/Veh (s)	6.8	4.2	3.1	8.1	4.5	7.5	2.1	6.8
Stop Delay (hr)	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Stop Del/Veh (s)	2.8	2.3	2.1	3.2	3.0	2.8	2.2	2.9
Total Stops	71	127	2	287	41	83	10	620
Stop/Veh	0.99	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	8.6	26.7	0.0	80.3	2.5	29.6	2.6	150.2
Travel Time (hr)	0.4	1.0	0.0	3.0	0.2	1.0	0.1	5.8
Avg Speed (mph)	23	26	10	27	17	29	29	26
Fuel Used (gal)	0.2	1.1	0.0	1.8	0.0	0.7	0.1	3.9
Fuel Eff. (mpg)	46.1	24.9	33.3	44.6	57.7	43.2	47.2	38.9
HC Emissions (g)	2	19	0	23	0	10	0	55
CO Emissions (g)	96	1140	0	593	9	238	5	2082
NOx Emissions (g)	7	56	0	72	1	31	1	167
Vehicles Entered	72	128	0	288	0	124	10	621
Vehicles Exited	72	128	2	287	41	83	10	621
Hourly Exit Rate	72	128	2	287	41	83	10	621
Density (ft/veh)		1090		486		1329		1543
Occupancy (veh)	0	1	0	3	0	1	0	6

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.3	0.1	0.0	0.0	0.5
Total Del/Veh (s)	6.2	4.3	2.6	2.5	4.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.4	0.0	0.2	0.3	0.2
Total Stops	3	1	2	2	8
Stop/Veh	0.02	0.01	0.08	0.08	0.02
Travel Dist (mi)	31.1	16.2	2.6	2.4	52.3
Travel Time (hr)	1.1	0.5	0.1	0.1	1.9
Avg Speed (mph)	28	30	23	23	28
Fuel Used (gal)	1.4	0.4	0.1	0.1	1.8
Fuel Eff. (mpg)	22.8	46.1	42.5	42.4	28.6
HC Emissions (g)	27	5	0	0	33
CO Emissions (g)	1453	211	12	12	1687
NOx Emissions (g)	82	18	1	1	102
Vehicles Entered	154	125	26	26	333
Vehicles Exited	154	126	26	26	332
Hourly Exit Rate	154	126	26	26	332
Density (ft/veh)	958	1273			1480
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.6	0.6	3.6	5.4	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.1	3.0	3.7	0.6
Total Stops	0	3	46	26	75
Stop/Veh	0.00	0.02	1.00	1.00	0.19
Travel Dist (mi)	25.5	7.8	4.6	3.0	40.8
Travel Time (hr)	0.8	0.2	0.2	0.1	1.5
Avg Speed (mph)	31	32	20	20	28
Fuel Used (gal)	1.4	0.3	0.1	0.1	1.9
Fuel Eff. (mpg)	18.5	25.9	43.8	44.0	22.0
HC Emissions (g)	27	6	1	1	36
CO Emissions (g)	1603	328	26	21	1978
NOx Emissions (g)	83	20	3	3	109
Vehicles Entered	183	148	45	26	401
Vehicles Exited	183	148	46	26	402
Hourly Exit Rate	183	148	46	26	402
Density (ft/veh)	890				1480
Occupancy (veh)	1	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	0.7	0.5	5.4	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.0	3.9	0.4
Total Stops	2	0	40	42
Stop/Veh	0.01	0.00	0.98	0.09
Travel Dist (mi)	12.5	14.4	4.2	31.1
Travel Time (hr)	0.4	0.6	0.2	1.3
Avg Speed (mph)	30	23	19	25
Fuel Used (gal)	0.4	0.9	0.1	1.4
Fuel Eff. (mpg)	29.0	16.4	44.6	22.2
HC Emissions (g)	9	18	1	28
CO Emissions (g)	376	996	20	1392
NOx Emissions (g)	29	52	2	84
Vehicles Entered	241	181	40	464
Vehicles Exited	241	181	41	464
Hourly Exit Rate	241	181	41	464
Density (ft/veh)		691		998
Occupancy (veh)	0	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.4	0.5	0.2	1.1
Total Del/Veh (s)	5.2	7.4	3.6	5.4
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.5	0.6	0.5
Total Stops	22	6	35	63
Stop/Veh	0.08	0.03	0.15	0.09
Travel Dist (mi)	17.9	27.2	16.6	61.7
Travel Time (hr)	0.8	1.2	0.8	2.9
Avg Speed (mph)	21	23	20	21
Fuel Used (gal)	0.4	1.3	0.4	2.2
Fuel Eff. (mpg)	42.8	20.4	40.3	28.5
HC Emissions (g)	6	27	6	38
CO Emissions (g)	182	1338	168	1688
NOx Emissions (g)	19	81	19	119
Vehicles Entered	268	222	230	720
Vehicles Exited	268	223	230	721
Hourly Exit Rate	268	223	230	721
Density (ft/veh)	416	536	454	476
Occupancy (veh)	1	1	1	3

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	1.6	0.9	0.8	3.4
Total Del/Veh (s)	13.8	7.9	9.5	10.5
Stop Delay (hr)	0.8	0.5	0.6	1.9
Stop Del/Veh (s)	6.6	4.3	6.6	5.8
Total Stops	425	418	312	1155
Stop/Veh	0.99	0.99	0.99	0.99
Travel Dist (mi)	54.9	22.8	44.3	121.9
Travel Time (hr)	3.4	1.8	2.5	7.6
Avg Speed (mph)	16	13	18	16
Fuel Used (gal)	2.1	0.5	1.2	3.8
Fuel Eff. (mpg)	25.8	46.7	37.6	32.1
HC Emissions (g)	34	2	14	50
CO Emissions (g)	1569	71	445	2086
NOx Emissions (g)	104	7	40	150
Vehicles Entered	424	419	312	1156
Vehicles Exited	425	419	312	1155
Hourly Exit Rate	425	419	312	1155
Density (ft/veh)	202	158	304	225
Occupancy (veh)	3	2	2	8

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.5	0.2	0.0	0.7
Total Del/Veh (s)	2.8	1.4	4.0	2.3
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.7	0.0	3.9	0.5
Total Stops	0	0	6	5
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	37.7	56.1	0.4	94.1
Travel Time (hr)	1.7	2.0	0.0	3.8
Avg Speed (mph)	22	28	16	25
Fuel Used (gal)	3.4	2.4	0.0	5.8
Fuel Eff. (mpg)	11.1	23.5	46.3	16.2
HC Emissions (g)	66	53	0	119
CO Emissions (g)	3714	2651	1	6366
NOx Emissions (g)	209	148	0	357
Vehicles Entered	686	414	5	1105
Vehicles Exited	686	414	6	1105
Hourly Exit Rate	686	414	6	1105
Density (ft/veh)	165	358		360
Occupancy (veh)	2	2	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.5	0.7	0.0	0.0	2.2
Total Del/Veh (s)	7.9	6.1	4.0	3.9	7.1
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.2
Stop Del/Veh (s)	0.7	0.1	1.8	1.5	0.5
Total Stops	67	12	4	7	90
Stop/Veh	0.10	0.03	0.40	0.41	0.08
Travel Dist (mi)	85.9	85.0	1.7	1.0	173.6
Travel Time (hr)	3.7	2.9	0.1	0.1	6.7
Avg Speed (mph)	23	30	24	18	26
Fuel Used (gal)	1.6	2.0	0.0	0.0	3.7
Fuel Eff. (mpg)	53.4	41.7	43.9	46.5	46.8
HC Emissions (g)	30	41	0	0	71
CO Emissions (g)	727	1374	4	4	2108
NOx Emissions (g)	85	123	1	0	209
Vehicles Entered	687	413	10	17	1124
Vehicles Exited	688	413	10	17	1126
Hourly Exit Rate	688	413	10	17	1126
Density (ft/veh)	178	376			444
Occupancy (veh)	4	3	0	0	7

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.8	0.0	0.2	1.1
Total Del/Veh (s)	4.3	0.4	40.0	3.5
Stop Delay (hr)	0.3	0.0	0.2	0.5
Stop Del/Veh (s)	1.4	0.0	38.3	1.5
Total Stops	32	1	19	52
Stop/Veh	0.05	0.00	1.00	0.05
Travel Dist (mi)	150.2	23.0	1.2	174.4
Travel Time (hr)	5.3	1.0	0.3	6.6
Avg Speed (mph)	28	22	5	26
Fuel Used (gal)	5.2	1.7	0.1	6.9
Fuel Eff. (mpg)	28.8	13.8	16.9	25.1
HC Emissions (g)	101	33	0	133
CO Emissions (g)	4877	1882	8	6767
NOx Emissions (g)	295	98	1	393
Vehicles Entered	695	418	19	1132
Vehicles Exited	695	418	19	1133
Hourly Exit Rate	695	418	19	1133
Density (ft/veh)	213	280		266
Occupancy (veh)	5	1	0	7

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.5	0.8	0.0	0.1	2.4
Total Del/Veh (s)	7.8	6.8	3.8	4.2	7.2
Stop Delay (hr)	0.5	0.1	0.0	0.0	0.6
Stop Del/Veh (s)	2.4	0.6	1.5	1.4	1.7
Total Stops	177	22	1	24	224
Stop/Veh	0.25	0.05	0.50	0.35	0.18
Travel Dist (mi)	31.9	70.1	0.2	8.3	110.5
Travel Time (hr)	2.4	3.2	0.0	0.4	6.0
Avg Speed (mph)	14	22	21	22	19
Fuel Used (gal)	1.0	3.0	0.0	0.2	4.2
Fuel Eff. (mpg)	32.0	23.4	47.0	40.8	26.3
HC Emissions (g)	9	59	0	3	71
CO Emissions (g)	245	2717	0	71	3033
NOx Emissions (g)	34	180	0	8	223
Vehicles Entered	709	433	2	68	1212
Vehicles Exited	709	432	2	68	1211
Hourly Exit Rate	709	432	2	68	1211
Density (ft/veh)	100	273			379
Occupancy (veh)	2	3	0	0	6

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.5
Denied Del/Veh (s)								1.1
Total Delay (hr)	9.9	0.0	0.9	2.5	0.0	2.2	0.4	16.0
Total Del/Veh (s)	49.4	2.5	48.7	24.2		37.9	4.2	32.1
Stop Delay (hr)	7.2	0.0	0.9	1.7	0.0	1.2	0.4	11.4
Stop Del/Veh (s)	35.9	2.1	46.5	16.2		21.7	3.9	23.0
Total Stops	685	17	64	205	0	157	221	1349
Stop/Veh	0.95	0.31	0.91	0.55		0.76	0.60	0.75
Travel Dist (mi)	129.2	1.2	4.5	80.8	0.0	136.5	6.9	359.2
Travel Time (hr)	14.5	0.1	1.1	4.3	0.0	5.5	0.9	26.9
Avg Speed (mph)	9	11	4	19	1	25	8	14
Fuel Used (gal)	6.2	0.0	0.3	2.5	0.0	3.3	0.3	12.8
Fuel Eff. (mpg)	20.7	25.0	14.6	32.3	4.1	41.7	26.0	28.1
HC Emissions (g)	67	1	2	38	0	52	2	162
CO Emissions (g)	2636	20	66	1564	0	1901	51	6248
NOx Emissions (g)	213	2	4	121	0	169	6	515
Vehicles Entered	761	0	0	438	0	565	0	1763
Vehicles Exited	702	54	69	369	0	202	364	1760
Hourly Exit Rate	702	54	69	369	0	202	364	1760
Density (ft/veh)	62		899	232		245	1515	302
Occupancy (veh)	14	0	1	4	0	5	1	26

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	5.3	0.5	0.3	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.5	0.0	0.0	0.5
Total Stops	46	0	0	45
Stop/Veh	1.00	0.00	0.00	0.13
Travel Dist (mi)	4.6	35.2	9.9	49.7
Travel Time (hr)	0.2	1.0	0.4	1.7
Avg Speed (mph)	19	34	24	29
Fuel Used (gal)	0.1	0.8	0.5	1.4
Fuel Eff. (mpg)	44.2	43.6	19.4	34.9
HC Emissions (g)	1	11	9	21
CO Emissions (g)	31	202	485	718
NOx Emissions (g)	4	37	27	68
Vehicles Entered	46	189	115	350
Vehicles Exited	46	190	115	350
Hourly Exit Rate	46	190	115	350
Density (ft/veh)		939		1142
Occupancy (veh)	0	1	0	2

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.6	0.2	0.1	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.3	0.0	0.0	0.2
Total Stops	14	0	0	14
Stop/Veh	1.00	0.00	0.00	0.05
Travel Dist (mi)	1.5	29.6	18.9	49.9
Travel Time (hr)	0.1	0.9	0.6	1.5
Avg Speed (mph)	20	34	34	33
Fuel Used (gal)	0.0	0.7	0.4	1.2
Fuel Eff. (mpg)	45.4	42.1	42.9	42.5
HC Emissions (g)	0	10	5	15
CO Emissions (g)	4	219	108	332
NOx Emissions (g)	0	35	18	53
Vehicles Entered	14	180	102	296
Vehicles Exited	14	180	102	296
Hourly Exit Rate	14	180	102	296
Density (ft/veh)		1004	1740	1595
Occupancy (veh)	0	1	1	1

Total Network Performance

Denied Delay (hr)	0.6
Denied Del/Veh (s)	1.0
Total Delay (hr)	30.6
Total Del/Veh (s)	45.5
Stop Delay (hr)	15.5
Stop Del/Veh (s)	23.1
Total Stops	3742
Stop/Veh	1.55
Travel Dist (mi)	2008.3
Travel Time (hr)	90.7
Avg Speed (mph)	22
Fuel Used (gal)	71.9
Fuel Eff. (mpg)	27.9
HC Emissions (g)	1207
CO Emissions (g)	51749
NOx Emissions (g)	3893
Vehicles Entered	2341
Vehicles Exited	2336
Hourly Exit Rate	2336
Input Volume	13167
% of Volume	18
Density (ft/veh)	429
Occupancy (veh)	90

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.4	19.4	0.1	24
Martinique St	2	8.6	25.3	0.2	30
Jamaica St	3	0.5	16.2	0.1	30
Guadelupe St	4	0.6	4.9	0.1	38
Otis Ave	5	5.5	11.0	0.1	24
Golden Gate Dr	6	13.8	28.7	0.1	16
Stable Dr W	7	3.9	8.9	0.1	22
Seymour Ave	8	7.9	19.3	0.1	24
Stable Dr E	9	4.3	27.4	0.2	27
Allan Ave	10	7.8	11.9	0.1	15
Jefferson Blvd	11	47.1	68.8	0.2	9
Total		108.5	241.8	1.3	20

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.4	8.9	0.1	20
Seymour Ave	8	6.1	24.9	0.2	30
Stable Dr W	7	1.3	17.2	0.1	27
Golden Gate Dr	6	10.6	15.6	0.1	13
Otis Ave	5	8.9	18.8	0.1	24
Guadelupe St	4	0.6	11.1	0.1	23
Jamaica St	3	0.4	4.8	0.1	39
Martinique St	2	4.6	15.1	0.1	32
Southport Pkwy	1	8.1	28.3	0.2	26
Total		41.0	144.7	1.2	30

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	UL	T	R
Maximum Queue (ft)	46	59	26	107	50	70	34
Average Queue (ft)	23	31	2	58	24	36	9
95th Queue (ft)	40	45	13	89	49	59	31
Link Distance (ft)	623	1003		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				1			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	38	24	32	38
Average Queue (ft)	2	1	3	3
95th Queue (ft)	17	11	17	19
Link Distance (ft)	1003	633	526	491
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	6	32	53	59
Average Queue (ft)	0	3	25	20
95th Queue (ft)	4	19	51	50
Link Distance (ft)	633	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	30	60
Average Queue (ft)	1	26
95th Queue (ft)	14	53
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	55	41	74
Average Queue (ft)	16	6	24
95th Queue (ft)	46	26	60
Link Distance (ft)	299	592	326
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	193	138	171
Average Queue (ft)	82	65	74
95th Queue (ft)	150	110	131
Link Distance (ft)	592	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	6	33
Average Queue (ft)	0	5
95th Queue (ft)	5	24
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	118	50	33	33
Average Queue (ft)	26	9	4	6
95th Queue (ft)	87	37	21	27
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	118	60
Average Queue (ft)	14	19
95th Queue (ft)	125	51
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	138	76	16	63
Average Queue (ft)	53	14	1	18
95th Queue (ft)	131	51	7	50
Link Distance (ft)	183	790	502	642
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	4			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	841	165	128	308	18	350	155
Average Queue (ft)	452	40	48	137	1	116	90
95th Queue (ft)	802	141	101	255	13	237	162
Link Distance (ft)	790			1008		1339	
Upstream Blk Time (%)	4						
Queuing Penalty (veh)	30						
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	42	0		0		30	2
Queuing Penalty (veh)	23	0		0		111	4

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	61	3
Average Queue (ft)	28	0
95th Queue (ft)	54	3
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB
Directions Served	LR
Maximum Queue (ft)	38
Average Queue (ft)	12
95th Queue (ft)	37
Link Distance (ft)	546
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 171

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	L	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.6
Total Delay (hr)	0.0	0.2	0.0	0.3	0.1	0.4	0.0	0.9
Total Del/Veh (s)	4.5	4.4	4.0	6.3	4.6	8.0	1.9	6.0
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4
Stop Del/Veh (s)	2.5	2.3	2.9	2.7	2.8	2.9	1.9	2.7
Total Stops	30	126	6	156	53	159	7	536
Stop/Veh	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.99
Travel Dist (mi)	3.5	26.6	0.1	45.2	3.3	51.7	1.8	132.2
Travel Time (hr)	0.1	1.0	0.0	1.6	0.2	1.9	0.1	5.0
Avg Speed (mph)	25	26	9	28	17	28	30	27
Fuel Used (gal)	0.1	1.1	0.0	1.0	0.1	1.2	0.0	3.5
Fuel Eff. (mpg)	54.4	24.9	35.4	44.1	55.1	42.5	45.1	37.8
HC Emissions (g)	0	19	0	13	0	15	0	49
CO Emissions (g)	12	1138	0	345	17	422	4	1938
NOx Emissions (g)	1	55	0	43	1	49	1	150
Vehicles Entered	30	128	0	163	0	211	9	540
Vehicles Exited	30	128	6	156	53	159	7	538
Hourly Exit Rate	30	128	6	156	53	159	7	538
Density (ft/veh)		1088		900		736		1782
Occupancy (veh)	0	1	0	2	0	2	0	5

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.2	0.2	0.0	0.0	0.4
Total Del/Veh (s)	5.2	4.2	2.5	2.7	4.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.4	0.0	0.1	0.3	0.2
Total Stops	3	1	1	2	7
Stop/Veh	0.02	0.01	0.06	0.08	0.02
Travel Dist (mi)	25.6	20.3	1.8	2.3	49.9
Travel Time (hr)	0.9	0.7	0.1	0.1	1.8
Avg Speed (mph)	28	30	23	23	28
Fuel Used (gal)	1.1	0.4	0.0	0.1	1.7
Fuel Eff. (mpg)	22.3	46.2	43.7	43.4	29.7
HC Emissions (g)	24	7	0	0	31
CO Emissions (g)	1244	268	7	11	1529
NOx Emissions (g)	72	22	1	1	96
Vehicles Entered	128	156	18	24	327
Vehicles Exited	128	157	18	24	326
Hourly Exit Rate	128	157	18	24	326
Density (ft/veh)	1158	1004			1556
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.5	0.8	3.2	5.0	1.0
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.1	2.7	3.5	0.4
Total Stops	0	6	30	15	52
Stop/Veh	0.00	0.03	0.97	0.94	0.13
Travel Dist (mi)	21.0	10.9	3.1	1.8	36.8
Travel Time (hr)	0.7	0.4	0.2	0.1	1.3
Avg Speed (mph)	31	31	20	20	29
Fuel Used (gal)	1.2	0.4	0.1	0.0	1.6
Fuel Eff. (mpg)	18.2	28.9	45.7	46.0	22.5
HC Emissions (g)	26	7	1	0	34
CO Emissions (g)	1406	363	19	4	1793
NOx Emissions (g)	77	23	3	1	103
Vehicles Entered	150	206	30	15	400
Vehicles Exited	150	206	30	15	402
Hourly Exit Rate	150	206	30	15	402
Density (ft/veh)	1080				1676
Occupancy (veh)	1	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.4	0.4	4.9	0.6
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.0	3.6	0.2
Total Stops	1	0	18	19
Stop/Veh	0.01	0.00	1.00	0.05
Travel Dist (mi)	9.2	17.2	1.9	28.3
Travel Time (hr)	0.3	0.7	0.1	1.1
Avg Speed (mph)	33	25	19	26
Fuel Used (gal)	0.3	1.1	0.0	1.4
Fuel Eff. (mpg)	31.5	15.6	46.0	19.8
HC Emissions (g)	7	20	0	26
CO Emissions (g)	256	1256	5	1517
NOx Emissions (g)	21	57	1	79
Vehicles Entered	178	222	18	418
Vehicles Exited	178	222	18	417
Hourly Exit Rate	178	222	18	417
Density (ft/veh)		612		1166
Occupancy (veh)	0	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.3	0.8	0.1	1.2
Total Del/Veh (s)	4.9	8.1	2.9	6.3
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.4	0.3	0.4
Total Stops	18	9	10	38
Stop/Veh	0.10	0.03	0.09	0.06
Travel Dist (mi)	12.5	43.7	8.3	64.6
Travel Time (hr)	0.6	1.9	0.4	2.9
Avg Speed (mph)	22	23	21	22
Fuel Used (gal)	0.3	2.1	0.2	2.5
Fuel Eff. (mpg)	49.1	21.3	39.3	25.6
HC Emissions (g)	3	35	3	41
CO Emissions (g)	103	1864	97	2065
NOx Emissions (g)	10	112	10	133
Vehicles Entered	187	356	117	661
Vehicles Exited	187	356	117	660
Hourly Exit Rate	187	356	117	660
Density (ft/veh)	625	328		471
Occupancy (veh)	1	2	0	3

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.7	1.4	0.3	2.4
Total Del/Veh (s)	9.8	9.0	6.2	8.7
Stop Delay (hr)	0.2	0.7	0.2	1.1
Stop Del/Veh (s)	3.2	4.2	3.7	3.8
Total Stops	269	556	181	1007
Stop/Veh	0.99	0.99	0.99	1.00
Travel Dist (mi)	34.8	30.3	25.6	90.7
Travel Time (hr)	1.8	2.4	1.3	5.5
Avg Speed (mph)	19	13	20	16
Fuel Used (gal)	1.3	0.7	0.7	2.7
Fuel Eff. (mpg)	25.9	45.0	39.4	34.0
HC Emissions (g)	24	3	9	36
CO Emissions (g)	1188	90	250	1527
NOx Emissions (g)	71	9	24	104
Vehicles Entered	269	557	181	1005
Vehicles Exited	269	557	181	1006
Hourly Exit Rate	269	557	181	1006
Density (ft/veh)	372	115	595	310
Occupancy (veh)	2	2	1	6

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.3	0.3	0.0	0.6
Total Del/Veh (s)	2.6	1.8	12.1	2.2
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.5	0.0	11.5	0.2
Total Stops	2	1	1	4
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	23.4	76.0	0.1	99.5
Travel Time (hr)	1.0	2.8	0.0	3.8
Avg Speed (mph)	22	27	12	26
Fuel Used (gal)	2.1	3.1	0.0	5.2
Fuel Eff. (mpg)	11.2	24.4	39.5	19.1
HC Emissions (g)	44	64	0	107
CO Emissions (g)	2432	3305	0	5738
NOx Emissions (g)	134	180	0	314
Vehicles Entered	427	562	1	990
Vehicles Exited	427	562	1	990
Hourly Exit Rate	427	562	1	990
Density (ft/veh)	274	257		353
Occupancy (veh)	1	3	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.7	1.1	0.0	0.0	1.8
Total Del/Veh (s)	5.9	6.9	3.5	3.4	6.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.2	1.1	1.0	0.1
Total Stops	10	31	2	2	44
Stop/Veh	0.02	0.05	0.33	0.33	0.04
Travel Dist (mi)	53.1	117.0	1.0	0.4	171.5
Travel Time (hr)	2.0	4.1	0.0	0.0	6.2
Avg Speed (mph)	26	29	24	19	28
Fuel Used (gal)	1.1	2.8	0.0	0.0	3.9
Fuel Eff. (mpg)	48.6	42.2	42.5	45.9	44.0
HC Emissions (g)	24	49	0	0	73
CO Emissions (g)	654	1765	3	1	2423
NOx Emissions (g)	68	150	0	0	219
Vehicles Entered	424	568	6	6	1004
Vehicles Exited	424	568	6	6	1005
Hourly Exit Rate	424	568	6	6	1005
Density (ft/veh)	323	264			481
Occupancy (veh)	2	4	0	0	6

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.1	0.0	0.3
Total Del/Veh (s)	1.5	0.5	12.0	1.0
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	10.6	0.1
Total Stops	0	1	9	10
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	92.4	32.2	0.6	125.2
Travel Time (hr)	3.0	1.5	0.1	4.5
Avg Speed (mph)	31	22	11	28
Fuel Used (gal)	3.3	2.3	0.0	5.6
Fuel Eff. (mpg)	28.2	14.0	37.9	22.4
HC Emissions (g)	71	42	0	113
CO Emissions (g)	3213	2492	1	5706
NOx Emissions (g)	206	131	0	337
Vehicles Entered	427	583	9	1020
Vehicles Exited	427	583	9	1018
Hourly Exit Rate	427	583	9	1018
Density (ft/veh)	386	197		394
Occupancy (veh)	3	1	0	4

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.6	1.4	0.0	0.0	2.0
Total Del/Veh (s)	4.9	7.9	3.3	4.0	6.6
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.2
Stop Del/Veh (s)	0.1	0.7	0.7	1.5	0.5
Total Stops	18	61	1	12	90
Stop/Veh	0.04	0.10	0.25	0.35	0.08
Travel Dist (mi)	19.5	102.6	0.4	4.1	126.7
Travel Time (hr)	1.1	4.9	0.0	0.2	6.2
Avg Speed (mph)	18	21	22	22	20
Fuel Used (gal)	0.5	4.2	0.0	0.1	4.9
Fuel Eff. (mpg)	37.7	24.2	45.1	43.5	26.0
HC Emissions (g)	5	77	0	1	84
CO Emissions (g)	162	3541	1	25	3730
NOx Emissions (g)	22	242	0	4	268
Vehicles Entered	434	634	4	34	1106
Vehicles Exited	433	635	4	34	1107
Hourly Exit Rate	433	635	4	34	1107
Density (ft/veh)	217	178			364
Occupancy (veh)	1	5	0	0	6

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.8
Denied Del/Veh (s)								1.7
Total Delay (hr)	3.7	0.1	1.1	0.9	0.0	9.6	0.8	16.2
Total Del/Veh (s)	32.1	5.5	51.7	12.8		79.7	5.3	32.6
Stop Delay (hr)	2.9	0.1	1.1	0.6	0.0	5.1	0.8	10.6
Stop Del/Veh (s)	25.9	5.3	49.7	8.3		42.3	5.0	21.2
Total Stops	293	32	74	88	0	650	209	1346
Stop/Veh	0.72	0.52	0.94	0.35		1.50	0.37	0.75
Travel Dist (mi)	78.2	1.3	5.1	59.2	0.0	235.9	11.3	391.0
Travel Time (hr)	6.5	0.2	1.3	2.2	0.0	15.3	1.6	27.9
Avg Speed (mph)	12	7	4	26	1	15	7	14
Fuel Used (gal)	3.6	0.1	0.4	1.7	0.0	6.4	0.5	12.8
Fuel Eff. (mpg)	21.9	21.9	14.5	33.9	4.2	36.7	23.4	30.5
HC Emissions (g)	57	1	1	32	0	76	3	172
CO Emissions (g)	2614	20	56	1209	0	2476	88	6479
NOx Emissions (g)	162	2	3	111	0	222	10	511
Vehicles Entered	463	0	0	330	0	975	0	1767
Vehicles Exited	403	60	78	252	0	416	556	1765
Hourly Exit Rate	403	60	78	252	0	416	556	1765
Density (ft/veh)	139		758	451		88	859	295
Occupancy (veh)	6	0	1	2	0	15	2	27

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	5.0	0.4	0.5	0.8
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.3	0.0	0.0	0.3
Total Stops	26	0	0	27
Stop/Veh	1.00	0.00	0.00	0.09
Travel Dist (mi)	2.6	17.4	14.8	34.9
Travel Time (hr)	0.1	0.5	0.7	1.3
Avg Speed (mph)	19	34	23	27
Fuel Used (gal)	0.1	0.4	0.7	1.2
Fuel Eff. (mpg)	47.6	42.1	20.6	29.4
HC Emissions (g)	1	6	10	17
CO Emissions (g)	12	125	612	750
NOx Emissions (g)	1	21	32	55
Vehicles Entered	26	94	169	290
Vehicles Exited	26	94	169	291
Hourly Exit Rate	26	94	169	291
Density (ft/veh)		1888	662	1487
Occupancy (veh)	0	1	1	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.5	0.3	0.3	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.1	0.0	0.0	0.1
Total Stops	10	0	0	11
Stop/Veh	1.00	0.00	0.00	0.05
Travel Dist (mi)	1.1	14.9	22.9	38.9
Travel Time (hr)	0.1	0.4	0.7	1.2
Avg Speed (mph)	20	34	33	33
Fuel Used (gal)	0.0	0.4	0.5	0.9
Fuel Eff. (mpg)	48.3	42.0	43.3	42.9
HC Emissions (g)	0	6	4	10
CO Emissions (g)	3	112	112	227
NOx Emissions (g)	0	18	17	36
Vehicles Entered	10	91	124	226
Vehicles Exited	10	91	124	226
Hourly Exit Rate	10	91	124	226
Density (ft/veh)			1405	2014
Occupancy (veh)	0	0	1	1

Total Network Performance

Denied Delay (hr)	0.9
Denied Del/Veh (s)	1.5
Total Delay (hr)	27.3
Total Del/Veh (s)	43.3
Stop Delay (hr)	12.6
Stop Del/Veh (s)	20.0
Total Stops	3191
Stop/Veh	1.41
Travel Dist (mi)	1861.1
Travel Time (hr)	83.1
Avg Speed (mph)	23
Fuel Used (gal)	65.9
Fuel Eff. (mpg)	28.2
HC Emissions (g)	1126
CO Emissions (g)	48928
NOx Emissions (g)	3552
Vehicles Entered	2201
Vehicles Exited	2193
Hourly Exit Rate	2193
Input Volume	12050
% of Volume	18
Density (ft/veh)	471
Occupancy (veh)	82

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	7.5	18.4	0.1	25
Martinique St	2	7.4	22.1	0.2	34
Jamaica St	3	0.5	16.1	0.1	30
Guadelupe St	4	0.4	4.6	0.1	40
Otis Ave	5	5.1	10.6	0.1	25
Golden Gate Dr	6	9.7	24.5	0.1	18
Stable Dr W	7	3.6	8.5	0.1	23
Seymour Ave	8	5.9	17.3	0.1	27
Stable Dr E	9	1.5	24.7	0.2	31
Allan Ave	10	4.9	9.0	0.1	20
Jefferson Blvd	11	31.0	53.0	0.2	12
Total		77.5	208.8	1.3	23

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.5	9.0	0.1	20
Seymour Ave	8	7.0	25.7	0.2	29
Stable Dr W	7	1.8	17.7	0.1	27
Golden Gate Dr	6	10.7	15.6	0.1	13
Otis Ave	5	9.4	19.4	0.1	23
Guadelupe St	4	0.4	10.9	0.1	24
Jamaica St	3	0.6	5.0	0.1	38
Martinique St	2	4.8	15.3	0.1	32
Southport Pkwy	1	8.0	28.8	0.2	26
Total		43.1	147.4	1.2	30

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (ft)	33	60	32	78	50	78	31
Average Queue (ft)	13	31	6	43	27	43	6
95th Queue (ft)	32	47	26	66	51	66	26
Link Distance (ft)	623	1003		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	41	22	19	33
Average Queue (ft)	3	1	1	3
95th Queue (ft)	21	8	10	17
Link Distance (ft)	1003	633	526	491
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	3	40	56	38
Average Queue (ft)	0	6	21	13
95th Queue (ft)	3	26	50	39
Link Distance (ft)	633	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	16	38
Average Queue (ft)	1	14
95th Queue (ft)	7	41
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	52	33	53
Average Queue (ft)	14	8	9
95th Queue (ft)	42	31	36
Link Distance (ft)	299	592	326
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	91	148	86
Average Queue (ft)	48	72	47
95th Queue (ft)	76	122	73
Link Distance (ft)	592	234	747
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	33	6	19
Average Queue (ft)	1	0	1
95th Queue (ft)	18	6	11
Link Distance (ft)	234	607	351
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	45	68	32	23
Average Queue (ft)	8	17	2	2
95th Queue (ft)	34	54	15	14
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	12	38
Average Queue (ft)	0	9
95th Queue (ft)	3	33
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	56	113	19	50
Average Queue (ft)	14	30	1	11
95th Queue (ft)	44	86	8	39
Link Distance (ft)	183	790	502	642
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	394	165	150	150	9	1011	155
Average Queue (ft)	221	49	56	57	1	442	140
95th Queue (ft)	347	146	117	128	7	886	191
Link Distance (ft)	790			1008		1339	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	30	0				42	9
Queuing Penalty (veh)	18	0				237	39

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	47	3
Average Queue (ft)	19	0
95th Queue (ft)	48	3
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	35	9
Average Queue (ft)	9	1
95th Queue (ft)	33	7
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 294

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	UL	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.5
Total Delay (hr)	0.1	0.2	0.0	0.7	0.1	0.2	0.0	1.2
Total Del/Veh (s)	6.6	4.4	4.6	8.2	4.4	7.5	1.9	6.8
Stop Delay (hr)	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Stop Del/Veh (s)	2.8	2.4	3.3	3.3	3.0	2.8	2.1	2.9
Total Stops	72	125	2	292	42	77	10	620
Stop/Veh	1.00	0.98	1.00	0.99	0.98	0.97	1.00	0.99
Travel Dist (mi)	8.6	26.5	0.0	82.1	2.6	28.5	2.7	151.0
Travel Time (hr)	0.4	1.0	0.0	3.1	0.2	1.0	0.1	5.8
Avg Speed (mph)	23	26	9	26	17	29	29	26
Fuel Used (gal)	0.2	1.1	0.0	1.8	0.0	0.7	0.1	3.9
Fuel Eff. (mpg)	48.7	25.2	30.1	44.4	57.8	43.5	45.7	39.2
HC Emissions (g)	2	15	0	22	0	12	0	51
CO Emissions (g)	73	1056	0	592	11	275	7	2015
NOx Emissions (g)	5	45	0	72	1	36	1	160
Vehicles Entered	72	126	0	294	0	120	10	622
Vehicles Exited	72	126	2	292	42	77	10	621
Hourly Exit Rate	72	126	2	292	42	77	10	621
Density (ft/veh)		1093		474		1381		1532
Occupancy (veh)	0	1	0	3	0	1	0	6

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.3	0.2	0.0	0.0	0.4
Total Del/Veh (s)	6.2	4.3	2.7	2.5	4.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.4	0.0	0.3	0.2	0.2
Total Stops	1	1	2	2	5
Stop/Veh	0.01	0.01	0.09	0.08	0.02
Travel Dist (mi)	30.4	16.5	2.2	2.3	51.3
Travel Time (hr)	1.1	0.5	0.1	0.1	1.8
Avg Speed (mph)	28	30	23	23	28
Fuel Used (gal)	1.3	0.4	0.0	0.1	1.8
Fuel Eff. (mpg)	22.7	45.9	44.6	43.9	28.6
HC Emissions (g)	24	4	0	0	29
CO Emissions (g)	1394	197	9	11	1612
NOx Emissions (g)	75	16	1	1	93
Vehicles Entered	150	127	22	25	325
Vehicles Exited	150	127	22	25	325
Hourly Exit Rate	150	127	22	25	325
Density (ft/veh)	983	1253			1512
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.6	0.6	3.5	5.7	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.0	2.9	3.9	0.7
Total Stops	0	2	49	28	79
Stop/Veh	0.00	0.01	1.00	1.00	0.20
Travel Dist (mi)	24.7	7.6	4.9	3.2	40.5
Travel Time (hr)	0.8	0.2	0.2	0.2	1.4
Avg Speed (mph)	31	33	20	20	28
Fuel Used (gal)	1.3	0.3	0.1	0.1	1.8
Fuel Eff. (mpg)	18.7	25.9	44.2	44.8	22.5
HC Emissions (g)	25	5	1	1	32
CO Emissions (g)	1523	301	28	28	1879
NOx Emissions (g)	75	18	3	3	99
Vehicles Entered	177	144	49	28	399
Vehicles Exited	177	144	48	28	398
Hourly Exit Rate	177	144	48	28	398
Density (ft/veh)	919				1489
Occupancy (veh)	1	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.2	0.1	0.3
Total Del/Veh (s)	0.8	3.1	5.9	2.2
Stop Delay (hr)	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.1	0.3	4.2	0.6
Total Stops	2	0	44	45
Stop/Veh	0.01	0.00	1.00	0.10
Travel Dist (mi)	12.4	12.7	4.6	29.8
Travel Time (hr)	0.4	0.6	0.2	1.2
Avg Speed (mph)	29	23	19	24
Fuel Used (gal)	0.4	0.9	0.1	1.4
Fuel Eff. (mpg)	31.0	14.1	42.8	21.1
HC Emissions (g)	9	18	1	28
CO Emissions (g)	354	1022	30	1407
NOx Emissions (g)	27	54	3	84
Vehicles Entered	240	182	44	467
Vehicles Exited	240	182	44	466
Hourly Exit Rate	240	182	44	466
Density (ft/veh)		664		973
Occupancy (veh)	0	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.7	0.5	0.3	1.5
Total Del/Veh (s)	9.0	7.8	4.9	7.3
Stop Delay (hr)	0.2	0.2	0.2	0.6
Stop Del/Veh (s)	3.2	2.8	3.5	3.2
Total Stops	265	227	236	729
Stop/Veh	0.99	1.00	1.00	1.00
Travel Dist (mi)	18.5	29.5	17.9	65.9
Travel Time (hr)	1.2	1.5	1.1	3.7
Avg Speed (mph)	16	20	17	18
Fuel Used (gal)	0.4	1.2	0.4	2.0
Fuel Eff. (mpg)	48.3	25.2	44.9	33.8
HC Emissions (g)	5	20	5	30
CO Emissions (g)	134	1066	147	1347
NOx Emissions (g)	14	59	15	87
Vehicles Entered	266	224	235	726
Vehicles Exited	266	225	236	727
Hourly Exit Rate	266	225	236	727
Density (ft/veh)	319	453	373	389
Occupancy (veh)	1	2	1	4

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	1.2	0.5	0.5	2.2
Total Del/Veh (s)	10.1	3.9	5.9	6.7
Stop Delay (hr)	0.2	0.0	0.2	0.4
Stop Del/Veh (s)	1.7	0.1	2.4	1.3
Total Stops	109	9	130	247
Stop/Veh	0.25	0.02	0.42	0.21
Travel Dist (mi)	52.1	22.1	42.8	117.1
Travel Time (hr)	2.7	1.2	2.0	5.9
Avg Speed (mph)	19	19	21	20
Fuel Used (gal)	2.4	0.5	1.1	4.0
Fuel Eff. (mpg)	22.1	40.9	38.7	29.2
HC Emissions (g)	47	5	16	68
CO Emissions (g)	2016	155	459	2630
NOx Emissions (g)	147	21	46	214
Vehicles Entered	431	428	311	1171
Vehicles Exited	432	427	311	1170
Hourly Exit Rate	432	427	311	1170
Density (ft/veh)	238	227	357	277
Occupancy (veh)	3	1	2	6

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.1	0.0	0.4
Total Del/Veh (s)	1.2	1.2	4.4	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.0	4.3	0.2
Total Stops	6	0	6	12
Stop/Veh	0.01	0.00	0.86	0.01
Travel Dist (mi)	45.7	57.1	0.4	103.2
Travel Time (hr)	2.1	2.0	0.0	4.2
Avg Speed (mph)	21	28	15	25
Fuel Used (gal)	3.3	2.5	0.0	5.8
Fuel Eff. (mpg)	13.8	23.3	45.5	17.9
HC Emissions (g)	68	50	0	118
CO Emissions (g)	3485	2649	1	6134
NOx Emissions (g)	213	142	0	355
Vehicles Entered	695	422	6	1123
Vehicles Exited	695	421	6	1122
Hourly Exit Rate	695	421	6	1122
Density (ft/veh)	163	355		338
Occupancy (veh)	2	2	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.7	0.7	0.0	0.0	2.5
Total Del/Veh (s)	8.8	6.2	3.8	3.7	7.7
Stop Delay (hr)	0.2	0.0	0.0	0.0	0.3
Stop Del/Veh (s)	1.2	0.1	1.2	1.3	0.8
Total Stops	119	16	2	5	141
Stop/Veh	0.17	0.04	0.25	0.33	0.12
Travel Dist (mi)	87.0	87.2	1.4	0.9	176.5
Travel Time (hr)	3.9	3.0	0.1	0.1	7.0
Avg Speed (mph)	22	29	24	18	25
Fuel Used (gal)	1.7	2.1	0.0	0.0	3.8
Fuel Eff. (mpg)	51.4	42.3	43.7	45.5	46.4
HC Emissions (g)	34	36	0	0	71
CO Emissions (g)	862	1287	4	3	2156
NOx Emissions (g)	95	113	1	0	208
Vehicles Entered	696	424	8	15	1142
Vehicles Exited	696	423	8	15	1141
Hourly Exit Rate	696	423	8	15	1141
Density (ft/veh)	169	364			426
Occupancy (veh)	4	3	0	0	7

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	1.2	0.0	0.3	1.6
Total Del/Veh (s)	6.3	0.4	54.7	5.0
Stop Delay (hr)	0.6	0.0	0.3	0.9
Stop Del/Veh (s)	3.0	0.0	52.9	2.8
Total Stops	66	1	20	87
Stop/Veh	0.09	0.00	0.95	0.08
Travel Dist (mi)	152.0	23.7	1.3	177.0
Travel Time (hr)	5.8	1.1	0.4	7.2
Avg Speed (mph)	26	22	3	24
Fuel Used (gal)	5.3	1.7	0.1	7.1
Fuel Eff. (mpg)	28.5	14.0	12.8	24.9
HC Emissions (g)	112	31	0	144
CO Emissions (g)	5076	1893	13	6982
NOx Emissions (g)	324	95	1	419
Vehicles Entered	703	429	20	1152
Vehicles Exited	704	429	20	1153
Hourly Exit Rate	704	429	20	1153
Density (ft/veh)	197	272		244
Occupancy (veh)	6	1	0	7

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.7	0.8	0.0	0.1	2.6
Total Del/Veh (s)	8.6	6.8	8.6	4.1	7.7
Stop Delay (hr)	0.7	0.1	0.0	0.0	0.8
Stop Del/Veh (s)	3.3	0.6	5.8	1.4	2.2
Total Stops	190	20	2	22	232
Stop/Veh	0.26	0.04	1.00	0.34	0.19
Travel Dist (mi)	32.4	71.9	0.2	7.8	112.3
Travel Time (hr)	2.6	3.3	0.0	0.4	6.2
Avg Speed (mph)	13	22	17	22	18
Fuel Used (gal)	1.1	3.1	0.0	0.2	4.3
Fuel Eff. (mpg)	30.7	23.6	44.5	41.4	26.1
HC Emissions (g)	10	55	0	2	67
CO Emissions (g)	272	2688	1	51	3011
NOx Emissions (g)	38	171	0	6	215
Vehicles Entered	720	444	2	64	1230
Vehicles Exited	720	444	2	64	1230
Hourly Exit Rate	720	444	2	64	1230
Density (ft/veh)	93	266			364
Occupancy (veh)	3	3	0	0	6

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.5
Denied Del/Veh (s)								1.1
Total Delay (hr)	10.5	0.0	1.0	2.4	0.0	2.3	0.4	16.6
Total Del/Veh (s)	51.7	2.4	47.7	23.0		39.7	4.3	33.0
Stop Delay (hr)	7.6	0.0	0.9	1.6	0.0	1.4	0.4	11.9
Stop Del/Veh (s)	37.7	2.1	45.5	15.3		23.0	4.0	23.7
Total Stops	717	15	66	198	0	171	229	1397
Stop/Veh	0.98	0.29	0.92	0.53		0.81	0.61	0.77
Travel Dist (mi)	130.7	1.2	4.6	81.2	0.0	139.8	7.2	364.7
Travel Time (hr)	15.1	0.1	1.1	4.2	0.0	5.7	0.9	27.8
Avg Speed (mph)	9	11	4	19	1	25	8	13
Fuel Used (gal)	6.4	0.0	0.3	2.5	0.0	3.3	0.3	12.9
Fuel Eff. (mpg)	20.5	24.8	14.8	32.5	3.8	42.2	25.5	28.2
HC Emissions (g)	72	1	1	36	0	52	2	163
CO Emissions (g)	2645	25	59	1534	0	1869	49	6192
NOx Emissions (g)	221	3	3	116	0	169	6	518
Vehicles Entered	770	0	0	440	0	579	0	1788
Vehicles Exited	713	52	71	370	0	206	373	1785
Hourly Exit Rate	713	52	71	370	0	206	373	1785
Density (ft/veh)	59		891	239		235	1455	293
Occupancy (veh)	15	0	1	4	0	6	1	27

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	5.5	0.5	0.7	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	3.6	0.0	0.3	0.6
Total Stops	43	0	0	43
Stop/Veh	1.00	0.00	0.00	0.12
Travel Dist (mi)	4.3	36.2	8.5	48.9
Travel Time (hr)	0.2	1.1	0.4	1.7
Avg Speed (mph)	19	34	23	29
Fuel Used (gal)	0.1	0.8	0.5	1.5
Fuel Eff. (mpg)	44.6	42.7	16.1	33.3
HC Emissions (g)	2	13	9	24
CO Emissions (g)	35	243	490	768
NOx Emissions (g)	4	43	30	77
Vehicles Entered	43	194	112	350
Vehicles Exited	43	196	113	351
Hourly Exit Rate	43	196	113	351
Density (ft/veh)		908		1133
Occupancy (veh)	0	1	0	2

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	0.2	0.1	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.1	0.0	0.0	0.2
Total Stops	17	0	0	16
Stop/Veh	1.00	0.00	0.00	0.05
Travel Dist (mi)	1.7	30.0	18.5	50.2
Travel Time (hr)	0.1	0.9	0.5	1.5
Avg Speed (mph)	20	34	34	33
Fuel Used (gal)	0.0	0.7	0.4	1.2
Fuel Eff. (mpg)	46.6	41.5	42.5	42.0
HC Emissions (g)	0	12	5	18
CO Emissions (g)	5	257	107	370
NOx Emissions (g)	1	40	18	59
Vehicles Entered	17	183	100	299
Vehicles Exited	17	183	100	299
Hourly Exit Rate	17	183	100	299
Density (ft/veh)		984	1771	1573
Occupancy (veh)	0	1	1	2

Total Network Performance

Denied Delay (hr)	0.7
Denied Del/Veh (s)	1.0
Total Delay (hr)	31.2
Total Del/Veh (s)	46.1
Stop Delay (hr)	15.8
Stop Del/Veh (s)	23.3
Total Stops	3653
Stop/Veh	1.50
Travel Dist (mi)	2032.0
Travel Time (hr)	92.2
Avg Speed (mph)	22
Fuel Used (gal)	72.4
Fuel Eff. (mpg)	28.1
HC Emissions (g)	1226
CO Emissions (g)	51984
NOx Emissions (g)	3949
Vehicles Entered	2355
Vehicles Exited	2360
Hourly Exit Rate	2360
Input Volume	13167
% of Volume	18
Density (ft/veh)	422
Occupancy (veh)	92

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.2	19.2	0.1	24
Martinique St	2	8.5	25.3	0.2	30
Jamaica St	3	0.5	16.2	0.1	30
Guadelupe St	4	0.8	5.0	0.1	37
Otis Ave	5	9.5	15.2	0.1	17
Golden Gate Dr	6	12.0	21.8	0.1	21
Stable Dr W	7	1.0	10.2	0.1	19
Seymour Ave	8	8.8	20.2	0.1	23
Stable Dr E	9	6.3	29.4	0.2	26
Allan Ave	10	8.6	12.7	0.1	14
Jefferson Blvd	11	49.2	70.9	0.2	9
Total		113.5	246.0	1.3	20

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.4	8.9	0.1	20
Seymour Ave	8	6.2	24.9	0.2	30
Stable Dr W	7	1.2	17.0	0.1	28
Golden Gate Dr	6	5.0	9.7	0.1	20
Otis Ave	5	9.2	24.1	0.1	19
Guadelupe St	4	4.2	9.9	0.1	26
Jamaica St	3	0.5	4.8	0.1	39
Martinique St	2	4.6	15.1	0.1	32
Southport Pkwy	1	8.2	28.7	0.2	26
Total		39.4	143.1	1.2	30

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	UL	T	R
Maximum Queue (ft)	48	60	32	101	47	68	32
Average Queue (ft)	23	29	2	58	24	36	9
95th Queue (ft)	38	44	16	87	48	60	31
Link Distance (ft)	623	1003		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				1			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	21	6	32	36
Average Queue (ft)	1	1	2	2
95th Queue (ft)	10	7	16	15
Link Distance (ft)	1003	633	526	491
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	8	22	52	63
Average Queue (ft)	0	2	28	21
95th Queue (ft)	5	14	51	53
Link Distance (ft)	633	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	30	2	67
Average Queue (ft)	2	0	28
95th Queue (ft)	14	2	56
Link Distance (ft)	225	314	552
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	88	83	102
Average Queue (ft)	46	41	52
95th Queue (ft)	74	65	85
Link Distance (ft)	314	592	349
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	118	55	125
Average Queue (ft)	45	8	54
95th Queue (ft)	93	34	100
Link Distance (ft)	592	219	725
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	3	33
Average Queue (ft)	0	7
95th Queue (ft)	0	28
Link Distance (ft)	219	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	170	64	29	32
Average Queue (ft)	43	11	2	5
95th Queue (ft)	120	42	16	24
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	167	78
Average Queue (ft)	31	23
95th Queue (ft)	188	62
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	143	65	28	53
Average Queue (ft)	58	14	1	17
95th Queue (ft)	147	51	11	47
Link Distance (ft)	183	790	502	642
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	8			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	832	165	132	296	12	329	155
Average Queue (ft)	478	51	49	134	1	126	97
95th Queue (ft)	830	165	102	245	9	246	171
Link Distance (ft)	790			1008		1339	
Upstream Blk Time (%)	4						
Queuing Penalty (veh)	35						
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	43			0	0	31	2
Queuing Penalty (veh)	23			0	0	113	4

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	65	6
Average Queue (ft)	28	0
95th Queue (ft)	55	5
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	36	3
Average Queue (ft)	13	0
95th Queue (ft)	39	3
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 183

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	L	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.6
Total Delay (hr)	0.0	0.2	0.0	0.3	0.1	0.4	0.0	0.9
Total Del/Veh (s)	4.9	4.7	3.6	6.2	4.7	8.1	2.2	6.1
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4
Stop Del/Veh (s)	2.6	2.4	2.6	2.7	2.8	2.9	2.2	2.7
Total Stops	29	134	7	156	54	156	6	542
Stop/Veh	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	3.5	28.3	0.1	45.4	3.3	50.9	1.7	133.2
Travel Time (hr)	0.1	1.1	0.0	1.6	0.2	1.8	0.1	5.1
Avg Speed (mph)	24	26	10	28	17	28	29	27
Fuel Used (gal)	0.1	1.1	0.0	1.0	0.1	1.2	0.0	3.6
Fuel Eff. (mpg)	54.1	25.2	35.5	43.4	54.4	42.3	45.8	37.5
HC Emissions (g)	0	21	0	13	0	16	0	51
CO Emissions (g)	16	1204	0	348	19	449	4	2042
NOx Emissions (g)	2	59	0	42	1	51	1	156
Vehicles Entered	29	136	0	163	0	208	8	544
Vehicles Exited	29	136	7	156	54	156	6	545
Hourly Exit Rate	29	136	7	156	54	156	6	545
Density (ft/veh)		1015		897		750		1765
Occupancy (veh)	0	1	0	2	0	2	0	5

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.2	0.2	0.0	0.0	0.4
Total Del/Veh (s)	5.2	4.3	2.5	2.8	4.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.4	0.0	0.2	0.3	0.2
Total Stops	3	2	1	2	8
Stop/Veh	0.02	0.01	0.05	0.08	0.02
Travel Dist (mi)	25.6	21.5	1.9	2.5	51.5
Travel Time (hr)	0.9	0.7	0.1	0.1	1.8
Avg Speed (mph)	28	30	23	23	28
Fuel Used (gal)	1.2	0.5	0.0	0.1	1.7
Fuel Eff. (mpg)	22.3	45.7	44.6	43.1	29.9
HC Emissions (g)	22	9	0	0	31
CO Emissions (g)	1209	315	8	11	1544
NOx Emissions (g)	66	27	1	1	95
Vehicles Entered	129	167	19	26	340
Vehicles Exited	128	166	19	26	339
Hourly Exit Rate	128	166	19	26	339
Density (ft/veh)	1155	940			1505
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.1	0.0	0.0	0.1
Total Del/Veh (s)	0.5	0.9	3.5	4.9	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.1	2.9	3.4	0.4
Total Stops	0	6	33	18	57
Stop/Veh	0.00	0.03	0.97	0.95	0.14
Travel Dist (mi)	21.0	11.4	3.4	2.1	38.0
Travel Time (hr)	0.7	0.4	0.2	0.1	1.3
Avg Speed (mph)	31	31	20	20	28
Fuel Used (gal)	1.1	0.4	0.1	0.0	1.6
Fuel Eff. (mpg)	18.3	30.2	45.1	45.7	23.0
HC Emissions (g)	24	8	1	0	34
CO Emissions (g)	1364	374	26	6	1771
NOx Emissions (g)	71	27	4	1	102
Vehicles Entered	150	215	33	19	416
Vehicles Exited	150	216	33	18	417
Hourly Exit Rate	150	216	33	18	417
Density (ft/veh)	1078				1615
Occupancy (veh)	1	0	0	0	1

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.2	0.0	0.3
Total Del/Veh (s)	0.5	3.8	5.4	2.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.2	4.0	0.3
Total Stops	1	0	16	17
Stop/Veh	0.01	0.00	1.00	0.04
Travel Dist (mi)	9.4	16.2	1.7	27.4
Travel Time (hr)	0.3	0.6	0.1	1.0
Avg Speed (mph)	32	25	19	27
Fuel Used (gal)	0.3	1.2	0.0	1.5
Fuel Eff. (mpg)	33.4	13.3	46.0	17.7
HC Emissions (g)	7	25	0	32
CO Emissions (g)	260	1466	5	1731
NOx Emissions (g)	21	76	1	97
Vehicles Entered	182	231	16	430
Vehicles Exited	182	232	16	430
Hourly Exit Rate	182	232	16	430
Density (ft/veh)		568		1159
Occupancy (veh)	0	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.4	0.9	0.1	1.4
Total Del/Veh (s)	8.0	8.4	3.4	7.4
Stop Delay (hr)	0.1	0.3	0.1	0.5
Stop Del/Veh (s)	2.8	2.7	2.7	2.7
Total Stops	189	368	118	676
Stop/Veh	0.99	0.99	0.98	0.99
Travel Dist (mi)	13.2	48.5	9.0	70.7
Travel Time (hr)	0.8	2.5	0.5	3.8
Avg Speed (mph)	17	19	18	19
Fuel Used (gal)	0.2	1.8	0.2	2.3
Fuel Eff. (mpg)	58.7	26.3	42.5	31.0
HC Emissions (g)	2	29	4	35
CO Emissions (g)	58	1513	106	1677
NOx Emissions (g)	5	89	10	104
Vehicles Entered	189	367	120	676
Vehicles Exited	189	368	120	676
Hourly Exit Rate	189	368	120	676
Density (ft/veh)	483	269	803	382
Occupancy (veh)	1	3	1	4

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.6	0.7	0.2	1.5
Total Del/Veh (s)	8.3	4.4	4.3	5.4
Stop Delay (hr)	0.1	0.0	0.1	0.1
Stop Del/Veh (s)	0.7	0.0	1.3	0.4
Total Stops	28	9	57	94
Stop/Veh	0.10	0.02	0.31	0.09
Travel Dist (mi)	33.0	29.3	25.1	87.4
Travel Time (hr)	1.5	1.6	1.1	4.2
Avg Speed (mph)	22	19	23	21
Fuel Used (gal)	1.6	0.8	0.7	3.0
Fuel Eff. (mpg)	21.0	38.9	38.3	29.3
HC Emissions (g)	30	8	8	45
CO Emissions (g)	1481	224	235	1940
NOx Emissions (g)	93	30	24	147
Vehicles Entered	273	566	182	1021
Vehicles Exited	274	566	182	1021
Hourly Exit Rate	274	566	182	1021
Density (ft/veh)	416	168	654	386
Occupancy (veh)	2	2	1	4

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.2	0.0	0.3
Total Del/Veh (s)	0.7	1.5	4.9	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.0	4.7	0.1
Total Stops	2	0	2	3
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	28.3	77.4	0.1	105.8
Travel Time (hr)	1.3	2.8	0.0	4.1
Avg Speed (mph)	22	28	14	26
Fuel Used (gal)	2.1	3.3	0.0	5.3
Fuel Eff. (mpg)	13.8	23.7	48.1	19.9
HC Emissions (g)	39	68	0	107
CO Emissions (g)	2252	3491	0	5743
NOx Emissions (g)	117	194	0	312
Vehicles Entered	432	572	2	1006
Vehicles Exited	433	572	2	1006
Hourly Exit Rate	433	572	2	1006
Density (ft/veh)	275	257		348
Occupancy (veh)	1	3	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.7	1.1	0.0	0.0	1.8
Total Del/Veh (s)	5.9	6.9	3.5	3.4	6.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.1	1.1	0.9	0.1
Total Stops	12	26	2	1	41
Stop/Veh	0.03	0.04	0.33	0.17	0.04
Travel Dist (mi)	53.8	119.3	1.0	0.4	174.5
Travel Time (hr)	2.1	4.2	0.0	0.0	6.3
Avg Speed (mph)	26	29	25	18	28
Fuel Used (gal)	1.2	2.8	0.0	0.0	4.0
Fuel Eff. (mpg)	46.6	42.3	46.5	42.9	43.6
HC Emissions (g)	21	53	0	0	74
CO Emissions (g)	667	1842	2	1	2513
NOx Emissions (g)	61	159	0	0	221
Vehicles Entered	430	580	6	6	1022
Vehicles Exited	430	578	6	6	1020
Hourly Exit Rate	430	578	6	6	1020
Density (ft/veh)	317	259			472
Occupancy (veh)	2	4	0	0	6

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.1	0.0	0.3
Total Del/Veh (s)	1.5	0.5	15.6	1.0
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.0	14.0	0.1
Total Stops	1	0	8	10
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	93.8	32.7	0.5	127.1
Travel Time (hr)	3.0	1.5	0.1	4.6
Avg Speed (mph)	31	22	9	28
Fuel Used (gal)	3.3	2.4	0.0	5.7
Fuel Eff. (mpg)	28.1	13.8	31.8	22.2
HC Emissions (g)	64	44	0	108
CO Emissions (g)	3136	2564	2	5702
NOx Emissions (g)	191	137	0	328
Vehicles Entered	433	593	8	1035
Vehicles Exited	434	593	8	1036
Hourly Exit Rate	434	593	8	1036
Density (ft/veh)	380	194		387
Occupancy (veh)	3	1	0	5

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.6	1.4	0.0	0.0	2.1
Total Del/Veh (s)	4.9	8.0	3.8	3.5	6.6
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.2
Stop Del/Veh (s)	0.1	0.7	1.1	1.0	0.5
Total Stops	16	64	2	9	90
Stop/Veh	0.04	0.10	0.33	0.26	0.08
Travel Dist (mi)	19.8	103.8	0.6	4.1	128.2
Travel Time (hr)	1.1	5.0	0.0	0.2	6.3
Avg Speed (mph)	18	21	21	23	20
Fuel Used (gal)	0.5	4.3	0.0	0.1	4.9
Fuel Eff. (mpg)	37.2	24.2	43.9	42.7	26.0
HC Emissions (g)	5	77	0	1	83
CO Emissions (g)	161	3534	2	25	3722
NOx Emissions (g)	22	244	0	3	269
Vehicles Entered	439	642	6	34	1121
Vehicles Exited	439	642	6	34	1121
Hourly Exit Rate	439	642	6	34	1121
Density (ft/veh)	215	176			359
Occupancy (veh)	1	5	0	0	6

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.9
Denied Del/Veh (s)								1.8
Total Delay (hr)	3.7	0.1	1.2	1.0	0.0	10.4	0.9	17.2
Total Del/Veh (s)	32.6	4.7	53.5	13.7		88.4	5.5	34.5
Stop Delay (hr)	3.0	0.1	1.1	0.6	0.0	5.6	0.8	11.3
Stop Del/Veh (s)	26.1	4.5	51.3	8.9		48.0	5.2	22.6
Total Stops	296	30	73	93	0	694	211	1397
Stop/Veh	0.72	0.50	0.94	0.37		1.64	0.37	0.78
Travel Dist (mi)	78.7	1.3	5.0	58.7	0.0	235.9	11.5	391.2
Travel Time (hr)	6.6	0.2	1.4	2.3	0.0	16.0	1.6	28.9
Avg Speed (mph)	12	8	4	26	1	15	7	14
Fuel Used (gal)	3.6	0.1	0.4	1.7	0.0	6.6	0.5	13.1
Fuel Eff. (mpg)	21.8	23.2	14.1	33.8	2.6	35.5	22.9	29.9
HC Emissions (g)	52	0	1	30	0	71	3	159
CO Emissions (g)	2518	14	55	1164	0	2428	91	6285
NOx Emissions (g)	150	1	3	103	0	212	11	481
Vehicles Entered	466	0	0	327	0	973	0	1766
Vehicles Exited	407	60	77	249	0	410	566	1769
Hourly Exit Rate	407	60	77	249	0	410	566	1769
Density (ft/veh)	136		746	443		84	827	285
Occupancy (veh)	7	0	1	2	0	16	2	28

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	4.9	0.3	0.9	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.1	0.0	0.3	0.5
Total Stops	29	1	0	29
Stop/Veh	1.00	0.01	0.00	0.10
Travel Dist (mi)	2.9	17.6	13.0	33.4
Travel Time (hr)	0.1	0.5	0.6	1.3
Avg Speed (mph)	19	34	22	26
Fuel Used (gal)	0.1	0.4	0.8	1.2
Fuel Eff. (mpg)	47.0	41.9	17.0	26.9
HC Emissions (g)	1	6	12	19
CO Emissions (g)	23	121	659	803
NOx Emissions (g)	3	20	38	62
Vehicles Entered	29	95	172	296
Vehicles Exited	29	95	172	296
Hourly Exit Rate	29	95	172	296
Density (ft/veh)		1873	661	1505
Occupancy (veh)	0	1	1	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	0.2	0.3	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	2.8	0.0	0.0	0.1
Total Stops	11	0	0	11
Stop/Veh	1.00	0.00	0.00	0.05
Travel Dist (mi)	1.1	15.0	22.9	39.0
Travel Time (hr)	0.1	0.4	0.7	1.2
Avg Speed (mph)	20	34	33	33
Fuel Used (gal)	0.0	0.4	0.5	0.9
Fuel Eff. (mpg)	49.1	42.4	42.4	42.6
HC Emissions (g)	0	5	5	11
CO Emissions (g)	2	106	131	240
NOx Emissions (g)	0	18	19	37
Vehicles Entered	11	91	124	226
Vehicles Exited	11	92	124	225
Hourly Exit Rate	11	92	124	225
Density (ft/veh)			1411	2014
Occupancy (veh)	0	0	1	1

Total Network Performance

Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.6
Total Delay (hr)	27.8
Total Del/Veh (s)	43.8
Stop Delay (hr)	12.8
Stop Del/Veh (s)	20.1
Total Stops	2975
Stop/Veh	1.30
Travel Dist (mi)	1879.8
Travel Time (hr)	84.2
Avg Speed (mph)	23
Fuel Used (gal)	67.0
Fuel Eff. (mpg)	28.1
HC Emissions (g)	1098
CO Emissions (g)	48922
NOx Emissions (g)	3499
Vehicles Entered	2200
Vehicles Exited	2206
Hourly Exit Rate	2206
Input Volume	12050
% of Volume	18
Density (ft/veh)	464
Occupancy (veh)	83

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.0	19.2	0.1	24
Martinique St	2	7.4	22.2	0.2	34
Jamaica St	3	0.5	16.1	0.1	30
Guadelupe St	4	0.5	4.8	0.1	39
Otis Ave	5	8.7	14.4	0.1	18
Golden Gate Dr	6	9.8	19.6	0.1	23
Stable Dr W	7	0.5	9.7	0.1	20
Seymour Ave	8	5.9	17.3	0.1	27
Stable Dr E	9	1.5	24.7	0.2	30
Allan Ave	10	4.9	9.0	0.1	20
Jefferson Blvd	11	31.2	53.2	0.2	12
Total		78.9	210.2	1.3	23

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	0.5	9.0	0.1	20
Seymour Ave	8	7.0	25.7	0.2	29
Stable Dr W	7	1.5	17.4	0.1	27
Golden Gate Dr	6	5.3	10.0	0.1	20
Otis Ave	5	9.7	24.7	0.1	18
Guadelupe St	4	4.1	9.7	0.1	27
Jamaica St	3	0.7	4.9	0.1	38
Martinique St	2	4.9	15.2	0.1	32
Southport Pkwy	1	8.1	28.8	0.2	26
Total		41.7	145.4	1.2	30

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (ft)	28	58	32	80	58	84	34
Average Queue (ft)	13	31	6	41	27	43	6
95th Queue (ft)	31	46	26	67	51	68	25
Link Distance (ft)	623	1003		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	35	22	20	30
Average Queue (ft)	3	2	1	2
95th Queue (ft)	19	13	11	15
Link Distance (ft)	1003	633	526	491
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	9	42	58	40
Average Queue (ft)	0	6	24	15
95th Queue (ft)	4	28	52	42
Link Distance (ft)	633	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	18	44
Average Queue (ft)	1	14
95th Queue (ft)	8	41
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	72	83	68
Average Queue (ft)	39	46	36
95th Queue (ft)	59	71	56
Link Distance (ft)	314	592	349
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	69	51	82
Average Queue (ft)	20	8	30
95th Queue (ft)	54	33	66
Link Distance (ft)	592	219	725
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	37	19
Average Queue (ft)	2	2
95th Queue (ft)	18	13
Link Distance (ft)	219	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	60	30	23
Average Queue (ft)	8	16	2	1
95th Queue (ft)	37	49	15	12
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	26	42
Average Queue (ft)	1	8
95th Queue (ft)	11	31
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	46	102	33	42
Average Queue (ft)	12	30	2	10
95th Queue (ft)	40	79	14	35
Link Distance (ft)	183	790	502	642
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	445	165	145	184	10	1081	155
Average Queue (ft)	225	54	58	60	1	470	143
95th Queue (ft)	380	157	121	137	7	979	188
Link Distance (ft)	790			1008		1339	
Upstream Blk Time (%)						1	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	29					42	10
Queuing Penalty (veh)	18					237	43

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	57	12
Average Queue (ft)	22	1
95th Queue (ft)	52	9
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	33	10
Average Queue (ft)	10	0
95th Queue (ft)	35	6
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 298

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	UL	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.5
Total Delay (hr)	0.1	0.2	0.0	0.7	0.1	0.2	0.0	1.2
Total Del/Veh (s)	6.6	4.3	3.1	8.2	4.6	7.6	1.8	6.8
Stop Delay (hr)	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Stop Del/Veh (s)	2.9	2.5	2.1	3.2	3.1	2.8	2.0	3.0
Total Stops	67	125	2	294	45	81	9	623
Stop/Veh	0.99	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	8.0	25.7	0.0	82.2	2.8	29.9	2.3	151.0
Travel Time (hr)	0.4	0.9	0.0	3.1	0.2	1.0	0.1	5.7
Avg Speed (mph)	23	28	10	26	17	29	29	27
Fuel Used (gal)	0.2	0.5	0.0	1.9	0.0	0.7	0.1	3.4
Fuel Eff. (mpg)	48.8	47.7	28.8	43.9	57.0	43.3	45.5	44.6
HC Emissions (g)	2	7	0	22	0	11	0	42
CO Emissions (g)	77	200	0	576	11	263	4	1132
NOx Emissions (g)	6	26	0	69	1	35	1	138
Vehicles Entered	67	127	0	294	0	126	9	623
Vehicles Exited	67	126	2	294	45	81	9	626
Hourly Exit Rate	67	126	2	294	45	81	9	626
Density (ft/veh)		1177		473		1320		1546
Occupancy (veh)	0	1	0	3	0	1	0	6

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.1	0.1	0.0	0.0	0.2
Total Del/Veh (s)	1.7	3.2	3.5	5.0	2.7
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.4	0.2	2.7	3.5	0.8
Total Stops	1	0	24	28	53
Stop/Veh	0.01	0.00	1.00	1.00	0.16
Travel Dist (mi)	31.1	17.2	2.5	2.7	53.5
Travel Time (hr)	1.0	0.6	0.1	0.1	1.8
Avg Speed (mph)	31	31	20	19	29
Fuel Used (gal)	1.3	0.9	0.1	0.1	2.4
Fuel Eff. (mpg)	23.3	19.2	45.5	45.4	22.8
HC Emissions (g)	30	18	0	0	48
CO Emissions (g)	1258	943	8	9	2217
NOx Emissions (g)	93	55	1	1	150
Vehicles Entered	151	128	24	28	330
Vehicles Exited	152	128	24	28	330
Hourly Exit Rate	152	128	24	28	330
Density (ft/veh)	1104	1242			1568
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.4	0.3	0.0	0.0	0.8
Total Del/Veh (s)	8.2	6.7	3.2	4.6	6.9
Stop Delay (hr)	0.1	0.1	0.0	0.0	0.3
Stop Del/Veh (s)	2.6	2.5	2.6	2.8	2.6
Total Stops	181	147	44	27	399
Stop/Veh	0.99	0.99	1.00	0.96	0.99
Travel Dist (mi)	24.3	7.8	4.4	3.2	39.6
Travel Time (hr)	1.1	0.5	0.2	0.2	2.0
Avg Speed (mph)	22	15	20	21	20
Fuel Used (gal)	0.5	0.1	0.1	0.1	0.9
Fuel Eff. (mpg)	44.7	52.5	44.7	46.1	46.2
HC Emissions (g)	7	2	1	1	11
CO Emissions (g)	288	50	27	19	384
NOx Emissions (g)	22	5	3	2	33
Vehicles Entered	182	148	44	28	402
Vehicles Exited	182	148	44	27	401
Hourly Exit Rate	182	148	44	27	401
Density (ft/veh)	650	531			1080
Occupancy (veh)	1	1	0	0	2

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.0	0.1	0.3
Total Del/Veh (s)	2.8	0.7	5.6	2.2
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.4	0.0	4.0	0.6
Total Stops	2	0	42	44
Stop/Veh	0.01	0.00	1.00	0.09
Travel Dist (mi)	12.6	14.7	4.3	31.6
Travel Time (hr)	0.6	0.6	0.2	1.5
Avg Speed (mph)	22	23	19	22
Fuel Used (gal)	1.0	0.7	0.1	1.8
Fuel Eff. (mpg)	12.7	19.9	43.8	17.3
HC Emissions (g)	22	16	1	39
CO Emissions (g)	1079	753	26	1859
NOx Emissions (g)	68	46	3	117
Vehicles Entered	241	185	41	469
Vehicles Exited	241	185	42	468
Hourly Exit Rate	241	185	42	468
Density (ft/veh)	469	662		859
Occupancy (veh)	1	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.4	0.4	0.2	1.1
Total Del/Veh (s)	5.1	6.9	3.6	5.2
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.5	0.6	0.5
Total Stops	24	7	37	69
Stop/Veh	0.09	0.03	0.15	0.09
Travel Dist (mi)	17.8	27.6	16.6	61.9
Travel Time (hr)	0.9	1.2	0.9	2.9
Avg Speed (mph)	20	23	19	21
Fuel Used (gal)	0.4	1.3	0.4	2.2
Fuel Eff. (mpg)	40.4	21.0	39.5	28.5
HC Emissions (g)	8	27	5	40
CO Emissions (g)	233	1285	156	1675
NOx Emissions (g)	25	81	18	124
Vehicles Entered	265	225	244	733
Vehicles Exited	266	225	244	734
Hourly Exit Rate	266	225	244	734
Density (ft/veh)	406	525	418	459
Occupancy (veh)	1	1	1	3

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	1.7	0.9	0.7	3.4
Total Del/Veh (s)	14.0	7.9	8.8	10.4
Stop Delay (hr)	0.9	0.5	0.5	1.9
Stop Del/Veh (s)	7.3	4.2	5.8	5.8
Total Stops	436	428	304	1171
Stop/Veh	0.99	0.99	0.99	0.99
Travel Dist (mi)	56.4	23.4	43.1	122.8
Travel Time (hr)	3.6	1.8	2.3	7.7
Avg Speed (mph)	16	13	19	16
Fuel Used (gal)	2.2	0.5	1.2	3.8
Fuel Eff. (mpg)	25.8	47.0	37.4	32.0
HC Emissions (g)	38	2	17	57
CO Emissions (g)	1641	68	480	2190
NOx Emissions (g)	116	7	46	169
Vehicles Entered	436	430	304	1168
Vehicles Exited	435	430	304	1170
Hourly Exit Rate	435	430	304	1170
Density (ft/veh)	192	154	321	222
Occupancy (veh)	4	2	2	8

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.6	0.2	0.0	0.7
Total Del/Veh (s)	2.9	1.3	6.1	2.3
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.7	0.0	5.8	0.5
Total Stops	1	0	6	6
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	38.1	57.3	0.4	95.8
Travel Time (hr)	1.8	2.0	0.0	3.8
Avg Speed (mph)	22	28	14	25
Fuel Used (gal)	3.4	2.4	0.0	5.9
Fuel Eff. (mpg)	11.1	23.6	44.9	16.3
HC Emissions (g)	75	53	0	128
CO Emissions (g)	3879	2685	1	6565
NOx Emissions (g)	232	149	0	382
Vehicles Entered	694	423	6	1123
Vehicles Exited	694	424	6	1124
Hourly Exit Rate	694	424	6	1124
Density (ft/veh)	163	350		353
Occupancy (veh)	2	2	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.5	0.7	0.0	0.0	2.2
Total Del/Veh (s)	7.7	6.0	3.5	3.7	7.0
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.5	0.1	1.1	1.3	0.3
Total Stops	56	10	2	6	73
Stop/Veh	0.08	0.02	0.25	0.38	0.06
Travel Dist (mi)	86.7	87.4	1.4	1.0	176.5
Travel Time (hr)	3.7	2.9	0.1	0.1	6.7
Avg Speed (mph)	23	30	25	18	26
Fuel Used (gal)	1.6	2.0	0.0	0.0	3.7
Fuel Eff. (mpg)	53.1	44.1	48.6	48.4	48.2
HC Emissions (g)	36	39	0	0	75
CO Emissions (g)	848	1162	3	4	2016
NOx Emissions (g)	100	121	0	0	222
Vehicles Entered	695	424	8	16	1144
Vehicles Exited	694	424	8	16	1142
Hourly Exit Rate	694	424	8	16	1142
Density (ft/veh)	179	368			442
Occupancy (veh)	4	3	0	0	7

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	3.2	0.4	0.3	3.8
Total Del/Veh (s)	16.2	3.3	57.3	12.0
Stop Delay (hr)	2.5	0.0	0.3	2.8
Stop Del/Veh (s)	12.6	0.3	55.5	8.7
Total Stops	146	0	18	165
Stop/Veh	0.21	0.00	1.00	0.14
Travel Dist (mi)	151.1	21.3	1.1	173.5
Travel Time (hr)	7.7	0.9	0.3	9.0
Avg Speed (mph)	20	23	3	19
Fuel Used (gal)	5.5	1.9	0.1	7.5
Fuel Eff. (mpg)	27.6	10.9	12.7	23.1
HC Emissions (g)	106	39	0	146
CO Emissions (g)	4729	2250	10	7004
NOx Emissions (g)	297	120	1	419
Vehicles Entered	700	430	18	1147
Vehicles Exited	698	430	18	1146
Hourly Exit Rate	698	430	18	1146
Density (ft/veh)	148	266		192
Occupancy (veh)	8	1	0	9

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	3.3	1.4	0.0	0.1	4.8
Total Del/Veh (s)	16.4	11.3	3.6	6.0	13.9
Stop Delay (hr)	2.2	0.5	0.0	0.1	2.8
Stop Del/Veh (s)	11.0	4.1	3.6	4.2	8.1
Total Stops	713	444	2	68	1228
Stop/Veh	1.00	0.99	1.00	1.00	0.99
Travel Dist (mi)	34.7	73.5	0.2	8.5	116.9
Travel Time (hr)	4.1	3.9	0.0	0.4	8.5
Avg Speed (mph)	8	19	19	20	14
Fuel Used (gal)	1.2	3.0	0.0	0.2	4.4
Fuel Eff. (mpg)	28.5	24.9	47.0	43.1	26.7
HC Emissions (g)	8	53	0	2	63
CO Emissions (g)	206	2559	0	56	2821
NOx Emissions (g)	22	158	0	6	186
Vehicles Entered	712	443	2	68	1227
Vehicles Exited	713	444	2	68	1228
Hourly Exit Rate	713	444	2	68	1228
Density (ft/veh)	62	229			275
Occupancy (veh)	4	4	0	0	8

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								0.5
Denied Del/Veh (s)								1.1
Total Delay (hr)	11.1	0.0	1.0	2.4	0.0	2.2	0.4	17.1
Total Del/Veh (s)	55.4	2.4	50.6	22.8		38.8	4.2	34.3
Stop Delay (hr)	7.7	0.0	1.0	1.6	0.0	1.3	0.4	12.0
Stop Del/Veh (s)	38.5	2.1	48.5	15.4		22.4	3.9	24.0
Total Stops	715	15	65	201	0	157	228	1381
Stop/Veh	0.99	0.28	0.92	0.54		0.78	0.61	0.77
Travel Dist (mi)	125.6	1.2	4.6	81.2	0.0	137.9	7.1	357.6
Travel Time (hr)	15.0	0.1	1.2	4.2	0.0	5.5	0.9	27.4
Avg Speed (mph)	8	11	4	19	1	25	8	13
Fuel Used (gal)	6.6	0.1	0.3	2.5	0.0	3.3	0.3	13.2
Fuel Eff. (mpg)	19.0	24.2	14.4	31.9	3.7	42.2	26.0	27.1
HC Emissions (g)	80	1	1	39	0	50	2	173
CO Emissions (g)	2913	25	59	1601	0	1850	50	6508
NOx Emissions (g)	251	3	3	126	0	167	6	556
Vehicles Entered	766	0	0	440	0	570	0	1775
Vehicles Exited	708	54	69	369	0	198	374	1772
Hourly Exit Rate	708	54	69	369	0	198	374	1772
Density (ft/veh)	57		859	240		243	1482	296
Occupancy (veh)	15	0	1	4	0	5	1	27

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	5.5	0.5	0.3	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.6	0.0	0.0	0.5
Total Stops	47	0	0	47
Stop/Veh	1.00	0.00	0.00	0.13
Travel Dist (mi)	4.7	37.1	9.3	51.1
Travel Time (hr)	0.2	1.1	0.4	1.8
Avg Speed (mph)	19	33	24	29
Fuel Used (gal)	0.1	0.9	0.5	1.5
Fuel Eff. (mpg)	43.1	43.0	19.1	35.0
HC Emissions (g)	1	13	7	21
CO Emissions (g)	29	242	444	716
NOx Emissions (g)	3	42	23	68
Vehicles Entered	47	200	113	359
Vehicles Exited	47	200	113	360
Hourly Exit Rate	47	200	113	360
Density (ft/veh)		883		1096
Occupancy (veh)	0	1	0	2

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.7	0.3	0.2	0.5
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	3.3	0.0	0.0	0.2
Total Stops	18	0	0	18
Stop/Veh	1.00	0.00	0.00	0.06
Travel Dist (mi)	1.9	30.8	18.2	50.9
Travel Time (hr)	0.1	0.9	0.5	1.5
Avg Speed (mph)	20	34	34	33
Fuel Used (gal)	0.0	0.7	0.4	1.2
Fuel Eff. (mpg)	46.6	41.3	42.9	42.0
HC Emissions (g)	0	12	4	17
CO Emissions (g)	5	262	93	361
NOx Emissions (g)	1	40	16	56
Vehicles Entered	18	188	99	305
Vehicles Exited	18	187	99	304
Hourly Exit Rate	18	187	99	304
Density (ft/veh)		958	1794	1548
Occupancy (veh)	0	1	1	2

Total Network Performance

Denied Delay (hr)	0.7
Denied Del/Veh (s)	1.1
Total Delay (hr)	37.4
Total Del/Veh (s)	55.3
Stop Delay (hr)	20.9
Stop Del/Veh (s)	30.9
Total Stops	5277
Stop/Veh	2.17
Travel Dist (mi)	2023.3
Travel Time (hr)	97.1
Avg Speed (mph)	21
Fuel Used (gal)	72.8
Fuel Eff. (mpg)	27.8
HC Emissions (g)	1239
CO Emissions (g)	50836
NOx Emissions (g)	3968
Vehicles Entered	2353
Vehicles Exited	2350
Hourly Exit Rate	2350
Input Volume	13167
% of Volume	18
Density (ft/veh)	401
Occupancy (veh)	96

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.2	19.3	0.1	24
Martinique St	2	3.8	22.8	0.2	33
Jamaica St	3	8.2	20.3	0.1	24
Guadelupe St	4	3.4	8.2	0.1	23
Otis Ave	5	5.3	11.4	0.1	23
Golden Gate Dr	6	13.7	29.2	0.1	16
Stable Dr W	7	3.9	8.9	0.1	22
Seymour Ave	8	7.7	19.1	0.1	25
Stable Dr E	9	16.1	39.4	0.2	19
Allan Ave	10	16.4	20.8	0.1	9
Jefferson Blvd	11	52.8	70.7	0.2	9
Total		139.8	270.0	1.3	18

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	3.4	7.8	0.1	23
Seymour Ave	8	6.0	24.6	0.2	31
Stable Dr W	7	1.3	17.2	0.1	27
Golden Gate Dr	6	10.4	15.3	0.1	13
Otis Ave	5	8.1	19.1	0.1	24
Guadelupe St	4	0.8	11.5	0.1	23
Jamaica St	3	7.4	12.2	0.1	15
Martinique St	2	3.3	15.3	0.1	32
Southport Pkwy	1	7.6	25.6	0.2	29
Total		48.3	148.8	1.2	29

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	UL	T	R
Maximum Queue (ft)	54	66	29	110	53	74	31
Average Queue (ft)	23	32	2	57	26	34	8
95th Queue (ft)	41	51	14	89	49	59	29
Link Distance (ft)	623	1024		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				1			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	17	14	38	50
Average Queue (ft)	1	0	19	20
95th Queue (ft)	7	6	45	48
Link Distance (ft)	1024	654	547	512
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	73	68	49	53
Average Queue (ft)	40	36	25	21
95th Queue (ft)	61	53	50	50
Link Distance (ft)	654	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	37	61
Average Queue (ft)	2	26
95th Queue (ft)	16	54
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	61	44	93
Average Queue (ft)	18	6	24
95th Queue (ft)	50	29	63
Link Distance (ft)	300	593	305
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	204	134	151
Average Queue (ft)	87	63	71
95th Queue (ft)	164	106	115
Link Distance (ft)	593	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	17	38
Average Queue (ft)	1	5
95th Queue (ft)	10	26
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	103	49	32	32
Average Queue (ft)	25	9	2	6
95th Queue (ft)	78	35	15	26
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	432	74
Average Queue (ft)	93	21
95th Queue (ft)	455	58
Link Distance (ft)	1034	334
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	2	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	210	143	26	67
Average Queue (ft)	120	66	2	33
95th Queue (ft)	215	111	13	58
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	16			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	809	165	121	263	6	343	155
Average Queue (ft)	469	46	47	131	0	114	89
95th Queue (ft)	821	154	97	230	4	234	160
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)	1						
Queuing Penalty (veh)	11						
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	43	0		0		30	2
Queuing Penalty (veh)	24	0		0		109	4

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB
Directions Served	LR
Maximum Queue (ft)	61
Average Queue (ft)	28
95th Queue (ft)	53
Link Distance (ft)	531
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	38	3
Average Queue (ft)	15	0
95th Queue (ft)	41	0
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 166

1: Southport Pkwy & Marshall Rd Performance by lane

Lane	EB	WB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LTR	L	TR	L	T	R	
Denied Delay (hr)								0.1
Denied Del/Veh (s)								0.5
Total Delay (hr)	0.0	0.2	0.0	0.3	0.1	0.4	0.0	0.9
Total Del/Veh (s)	5.1	4.5	3.7	6.3	4.6	8.0	2.2	6.1
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4
Stop Del/Veh (s)	2.7	2.5	2.6	2.8	2.7	2.8	2.3	2.7
Total Stops	31	126	5	161	51	159	6	539
Stop/Veh	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Travel Dist (mi)	3.7	25.8	0.1	46.1	3.2	51.2	1.7	131.8
Travel Time (hr)	0.2	0.9	0.0	1.7	0.2	1.8	0.1	4.9
Avg Speed (mph)	24	28	9	28	17	28	28	27
Fuel Used (gal)	0.1	0.5	0.0	1.1	0.1	1.2	0.0	3.0
Fuel Eff. (mpg)	52.4	47.6	34.2	43.7	55.5	42.8	43.9	44.2
HC Emissions (g)	0	8	0	13	1	18	0	40
CO Emissions (g)	18	212	0	349	20	462	4	1067
NOx Emissions (g)	2	27	0	43	1	55	1	129
Vehicles Entered	31	127	0	166	0	209	8	541
Vehicles Exited	31	127	5	161	51	159	6	542
Hourly Exit Rate	31	127	5	161	51	159	6	542
Density (ft/veh)		1179		879		743		1808
Occupancy (veh)	0	1	0	2	0	2	0	5

2: Martinique St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.0	0.2	0.0	0.0	0.2
Total Del/Veh (s)	1.0	3.5	3.6	4.8	2.7
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.3	2.9	3.1	0.7
Total Stops	0	2	17	26	45
Stop/Veh	0.00	0.01	0.94	1.00	0.13
Travel Dist (mi)	26.5	21.6	1.8	2.5	52.4
Travel Time (hr)	0.8	0.7	0.1	0.1	1.8
Avg Speed (mph)	31	29	20	19	29
Fuel Used (gal)	1.2	1.1	0.0	0.1	2.4
Fuel Eff. (mpg)	23.0	19.2	46.6	45.0	22.1
HC Emissions (g)	21	24	0	0	45
CO Emissions (g)	1015	1203	4	8	2230
NOx Emissions (g)	68	71	1	1	141
Vehicles Entered	130	161	18	26	333
Vehicles Exited	129	161	17	26	333
Hourly Exit Rate	129	161	17	26	333
Density (ft/veh)	1289	944			1576
Occupancy (veh)	1	1	0	0	2

3: Jamaica St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.3	0.4	0.0	0.0	0.8
Total Del/Veh (s)	7.7	6.7	3.2	4.3	6.7
Stop Delay (hr)	0.1	0.1	0.0	0.0	0.3
Stop Del/Veh (s)	2.5	2.5	2.6	2.8	2.5
Total Stops	151	207	34	15	408
Stop/Veh	0.99	1.00	0.97	1.00	1.00
Travel Dist (mi)	20.2	10.9	3.5	1.8	36.4
Travel Time (hr)	0.9	0.7	0.2	0.1	1.8
Avg Speed (mph)	23	15	20	21	20
Fuel Used (gal)	0.5	0.2	0.1	0.0	0.8
Fuel Eff. (mpg)	44.5	55.6	45.3	48.4	47.6
HC Emissions (g)	5	1	1	0	7
CO Emissions (g)	219	34	22	3	278
NOx Emissions (g)	16	3	3	0	23
Vehicles Entered	152	207	34	15	407
Vehicles Exited	152	207	34	15	408
Hourly Exit Rate	152	207	34	15	408
Density (ft/veh)	798	378			1144
Occupancy (veh)	1	1	0	0	2

4: Marshall Rd & Guadelupe St Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.1	0.0	0.0	0.2
Total Del/Veh (s)	2.7	0.6	5.3	1.7
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.3	0.0	4.0	0.3
Total Stops	0	0	16	16
Stop/Veh	0.00	0.00	0.94	0.04
Travel Dist (mi)	9.5	17.6	1.7	28.8
Travel Time (hr)	0.4	0.7	0.1	1.2
Avg Speed (mph)	23	24	19	23
Fuel Used (gal)	0.8	0.9	0.0	1.7
Fuel Eff. (mpg)	11.8	19.4	46.0	16.5
HC Emissions (g)	16	18	0	35
CO Emissions (g)	875	947	3	1825
NOx Emissions (g)	50	54	0	104
Vehicles Entered	181	227	17	425
Vehicles Exited	181	226	16	424
Hourly Exit Rate	181	226	16	424
Density (ft/veh)		584		1005
Occupancy (veh)	0	1	0	1

5: Otis Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.8	0.1	1.1
Total Del/Veh (s)	4.7	7.5	2.8	5.9
Stop Delay (hr)	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.3	0.4	0.3	0.4
Total Stops	18	9	10	37
Stop/Veh	0.09	0.02	0.09	0.06
Travel Dist (mi)	12.7	44.2	7.7	64.7
Travel Time (hr)	0.6	2.0	0.4	3.0
Avg Speed (mph)	21	22	20	22
Fuel Used (gal)	0.3	2.0	0.2	2.5
Fuel Eff. (mpg)	44.5	21.6	36.8	25.4
HC Emissions (g)	4	37	3	45
CO Emissions (g)	130	1847	100	2078
NOx Emissions (g)	12	118	11	142
Vehicles Entered	190	360	114	666
Vehicles Exited	190	360	114	666
Hourly Exit Rate	190	360	114	666
Density (ft/veh)	594	322		457
Occupancy (veh)	1	2	0	3

6: Marshall Rd & Golden Gate Dr Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.7	1.3	0.3	2.4
Total Del/Veh (s)	9.2	8.6	6.4	8.3
Stop Delay (hr)	0.2	0.6	0.2	1.0
Stop Del/Veh (s)	3.2	3.7	3.8	3.6
Total Stops	266	561	186	1013
Stop/Veh	0.99	1.00	0.99	0.99
Travel Dist (mi)	34.5	30.6	26.3	91.4
Travel Time (hr)	1.8	2.4	1.3	5.5
Avg Speed (mph)	19	13	20	17
Fuel Used (gal)	1.3	0.7	0.7	2.7
Fuel Eff. (mpg)	25.7	46.0	39.4	34.1
HC Emissions (g)	22	3	8	33
CO Emissions (g)	1129	89	243	1460
NOx Emissions (g)	65	9	23	96
Vehicles Entered	266	561	185	1013
Vehicles Exited	267	561	186	1013
Hourly Exit Rate	267	561	186	1013
Density (ft/veh)	376	118	577	312
Occupancy (veh)	2	2	1	5

7: Marshall Rd & Stable Dr W Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.3	0.3	0.0	0.6
Total Del/Veh (s)	2.6	1.7	8.8	2.1
Stop Delay (hr)	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.5	0.0	8.1	0.2
Total Stops	1	0	2	4
Stop/Veh	0.00	0.00	1.00	0.00
Travel Dist (mi)	23.5	76.6	0.2	100.2
Travel Time (hr)	1.0	2.8	0.0	3.8
Avg Speed (mph)	22	28	14	26
Fuel Used (gal)	2.1	3.1	0.0	5.3
Fuel Eff. (mpg)	11.1	24.4	43.0	19.0
HC Emissions (g)	41	66	0	107
CO Emissions (g)	2399	3376	0	5776
NOx Emissions (g)	126	187	0	314
Vehicles Entered	428	565	2	996
Vehicles Exited	428	566	2	997
Hourly Exit Rate	428	566	2	997
Density (ft/veh)	275	256		352
Occupancy (veh)	1	3	0	4

8: Seymour Ave & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	0.7	1.1	0.0	0.0	1.8
Total Del/Veh (s)	5.9	6.7	3.6	3.3	6.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.1	0.9	0.9	0.1
Total Stops	9	16	1	2	27
Stop/Veh	0.02	0.03	0.20	0.33	0.03
Travel Dist (mi)	53.5	117.8	0.9	0.4	172.5
Travel Time (hr)	2.1	4.1	0.0	0.0	6.2
Avg Speed (mph)	26	29	25	19	28
Fuel Used (gal)	1.1	2.6	0.0	0.0	3.8
Fuel Eff. (mpg)	48.1	44.5	44.2	46.4	45.6
HC Emissions (g)	20	49	0	0	69
CO Emissions (g)	592	1539	2	1	2134
NOx Emissions (g)	58	152	0	0	211
Vehicles Entered	426	572	5	6	1009
Vehicles Exited	427	572	5	6	1010
Hourly Exit Rate	427	572	5	6	1010
Density (ft/veh)	321	266			482
Occupancy (veh)	2	4	0	0	6

9: Marshall Rd & Stable Dr E Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.2	0.6	0.0	0.8
Total Del/Veh (s)	1.7	3.5	17.1	2.8
Stop Delay (hr)	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	0.0	0.3	15.6	0.3
Total Stops	1	0	10	10
Stop/Veh	0.00	0.00	1.00	0.01
Travel Dist (mi)	93.1	29.0	0.6	122.8
Travel Time (hr)	3.0	1.3	0.1	4.4
Avg Speed (mph)	31	22	8	28
Fuel Used (gal)	3.3	2.7	0.0	6.0
Fuel Eff. (mpg)	28.2	10.9	29.2	20.5
HC Emissions (g)	62	51	0	113
CO Emissions (g)	3103	2970	2	6075
NOx Emissions (g)	183	162	0	346
Vehicles Entered	430	587	10	1026
Vehicles Exited	431	587	10	1026
Hourly Exit Rate	431	587	10	1026
Density (ft/veh)	381	191		394
Occupancy (veh)	3	1	0	4

10: Allan Ave/Rivermont St & Marshall Rd Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Delay (hr)					0.0
Denied Del/Veh (s)					0.0
Total Delay (hr)	1.0	2.5	0.0	0.0	3.6
Total Del/Veh (s)	8.5	13.9	4.5	5.2	11.5
Stop Delay (hr)	0.3	1.0	0.0	0.0	1.4
Stop Del/Veh (s)	2.8	5.4	3.3	3.5	4.3
Total Stops	438	640	6	34	1119
Stop/Veh	1.00	0.99	1.00	1.00	0.99
Travel Dist (mi)	21.3	106.1	0.6	4.3	132.3
Travel Time (hr)	1.6	6.1	0.0	0.2	8.0
Avg Speed (mph)	13	17	19	21	17
Fuel Used (gal)	0.5	4.1	0.0	0.1	4.7
Fuel Eff. (mpg)	46.7	25.6	49.9	44.0	28.1
HC Emissions (g)	2	72	0	1	75
CO Emissions (g)	55	3264	1	26	3345
NOx Emissions (g)	6	219	0	3	228
Vehicles Entered	437	641	6	34	1119
Vehicles Exited	438	640	6	34	1119
Hourly Exit Rate	438	640	6	34	1119
Density (ft/veh)	161	146			293
Occupancy (veh)	2	6	0	0	8

11: Jefferson Blvd & Marshall Rd Performance by lane

Lane	EB	EB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	L	TR	L	T	R	
Denied Delay (hr)								1.4
Denied Del/Veh (s)								2.9
Total Delay (hr)	4.1	0.1	1.1	1.0	0.0	11.6	0.9	18.8
Total Del/Veh (s)	35.6	4.8	51.7	14.0	43.2	99.7	5.7	37.7
Stop Delay (hr)	3.0	0.1	1.0	0.6	0.0	6.6	0.8	12.2
Stop Del/Veh (s)	26.3	4.6	49.7	9.1	42.2	56.5	5.4	24.5
Total Stops	299	31	70	98	1	745	206	1450
Stop/Veh	0.72	0.50	0.92	0.38	1.00	1.78	0.36	0.81
Travel Dist (mi)	76.3	1.4	4.9	59.0	0.0	235.2	11.5	388.3
Travel Time (hr)	6.4	0.2	1.3	2.3	0.0	17.3	1.7	30.5
Avg Speed (mph)	12	8	4	25	1	14	7	13
Fuel Used (gal)	3.8	0.1	0.3	1.7	0.0	6.9	0.5	13.7
Fuel Eff. (mpg)	20.1	22.6	14.5	34.1	3.9	34.0	22.6	28.4
HC Emissions (g)	56	0	1	29	0	77	3	168
CO Emissions (g)	2736	17	53	1162	0	2480	90	6564
NOx Emissions (g)	167	2	3	102	0	227	10	511
Vehicles Entered	468	0	0	328	0	975	0	1772
Vehicles Exited	406	61	75	253	1	405	566	1767
Hourly Exit Rate	406	61	75	253	1	405	566	1767
Density (ft/veh)	134		789	435		78	810	274
Occupancy (veh)	6	0	1	2	0	17	2	29

12: Otis Ave & Project Driveway 3 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.0
Total Delay (hr)	0.0	0.0	0.0	0.1
Total Del/Veh (s)	4.6	0.3	0.5	0.9
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	2.9	0.0	0.0	0.3
Total Stops	30	0	0	30
Stop/Veh	1.00	0.00	0.00	0.10
Travel Dist (mi)	3.0	16.4	14.3	33.7
Travel Time (hr)	0.2	0.5	0.6	1.3
Avg Speed (mph)	20	34	22	26
Fuel Used (gal)	0.1	0.4	0.7	1.2
Fuel Eff. (mpg)	45.6	41.3	20.1	28.7
HC Emissions (g)	1	5	10	16
CO Emissions (g)	18	110	599	726
NOx Emissions (g)	2	18	31	52
Vehicles Entered	30	88	171	290
Vehicles Exited	30	89	172	290
Hourly Exit Rate	30	89	172	290
Density (ft/veh)			645	1505
Occupancy (veh)	0	0	1	1

13: Otis Ave & Project Driveway 4 Performance by lane

Lane	EB	NB	SB	All
Movements Served	LR	LT	TR	
Denied Delay (hr)				0.0
Denied Del/Veh (s)				0.1
Total Delay (hr)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.3	0.3	0.2	0.4
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	2.9	0.0	0.0	0.1
Total Stops	10	1	0	11
Stop/Veh	1.00	0.01	0.00	0.05
Travel Dist (mi)	1.0	14.1	23.3	38.5
Travel Time (hr)	0.1	0.4	0.7	1.2
Avg Speed (mph)	20	34	33	33
Fuel Used (gal)	0.0	0.3	0.5	0.9
Fuel Eff. (mpg)	46.4	42.4	42.5	42.5
HC Emissions (g)	0	5	5	10
CO Emissions (g)	2	97	124	223
NOx Emissions (g)	0	16	18	35
Vehicles Entered	10	86	126	222
Vehicles Exited	10	86	125	222
Hourly Exit Rate	10	86	125	222
Density (ft/veh)			1390	2044
Occupancy (veh)	0	0	1	1

Total Network Performance

Denied Delay (hr)	1.5
Denied Del/Veh (s)	2.5
Total Delay (hr)	32.4
Total Del/Veh (s)	51.1
Stop Delay (hr)	15.8
Stop Del/Veh (s)	24.9
Total Stops	4709
Stop/Veh	2.06
Travel Dist (mi)	1864.9
Travel Time (hr)	88.1
Avg Speed (mph)	22
Fuel Used (gal)	66.7
Fuel Eff. (mpg)	27.9
HC Emissions (g)	1088
CO Emissions (g)	47295
NOx Emissions (g)	3468
Vehicles Entered	2207
Vehicles Exited	2206
Hourly Exit Rate	2206
Input Volume	12050
% of Volume	18
Density (ft/veh)	446
Occupancy (veh)	87

Arterial Level of Service: EB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southport Pkwy	1	8.0	18.7	0.1	25
Martinique St	2	3.5	21.1	0.2	36
Jamaica St	3	7.9	20.0	0.1	24
Guadelupe St	4	3.3	8.0	0.1	23
Otis Ave	5	4.9	11.0	0.1	24
Golden Gate Dr	6	9.1	24.6	0.1	18
Stable Dr W	7	3.6	8.5	0.1	23
Seymour Ave	8	5.9	17.3	0.1	27
Stable Dr E	9	1.7	24.9	0.2	30
Allan Ave	10	8.5	12.9	0.1	14
Jefferson Blvd	11	34.2	52.1	0.2	12
Total		90.5	219.1	1.3	22

Arterial Level of Service: WB Marshall Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Rivermont St	10	-	-	0.2	-
Stable Dr E	9	3.5	8.0	0.1	23
Seymour Ave	8	6.7	25.4	0.2	30
Stable Dr W	7	1.7	17.6	0.1	27
Golden Gate Dr	6	10.3	15.3	0.1	13
Otis Ave	5	8.5	19.6	0.1	23
Guadelupe St	4	0.7	11.3	0.1	23
Jamaica St	3	7.5	12.4	0.1	15
Martinique St	2	3.6	15.5	0.1	31
Southport Pkwy	1	7.7	25.8	0.2	29
Total		50.2	150.8	1.2	29

Intersection: 1: Southport Pkwy & Marshall Rd

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (ft)	36	62	32	87	57	79	31
Average Queue (ft)	14	32	5	43	27	43	5
95th Queue (ft)	32	48	23	70	51	68	24
Link Distance (ft)	623	1024		1473		1368	1368
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		250		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 2: Martinique St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	6	31	38	43
Average Queue (ft)	0	2	14	18
95th Queue (ft)	4	16	40	45
Link Distance (ft)	1024	654	547	512
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Jamaica St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	71	69	61	33
Average Queue (ft)	37	38	24	13
95th Queue (ft)	54	55	52	39
Link Distance (ft)	654	225	534	608
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Marshall Rd & Guadelupe St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	16	40
Average Queue (ft)	0	15
95th Queue (ft)	7	42
Link Distance (ft)	225	552
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Otis Ave & Marshall Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	49	39	52
Average Queue (ft)	14	7	9
95th Queue (ft)	42	31	36
Link Distance (ft)	300	593	305
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Marshall Rd & Golden Gate Dr

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	90	125	87
Average Queue (ft)	48	67	49
95th Queue (ft)	75	103	76
Link Distance (ft)	593	234	747
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Marshall Rd & Stable Dr W

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	26	32
Average Queue (ft)	1	3
95th Queue (ft)	11	17
Link Distance (ft)	234	351
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Seymour Ave & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	52	29	32
Average Queue (ft)	7	12	2	2
95th Queue (ft)	32	41	13	14
Link Distance (ft)	607	1034	918	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Marshall Rd & Stable Dr E

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	24	42
Average Queue (ft)	1	9
95th Queue (ft)	12	35
Link Distance (ft)	1034	334
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allan Ave/Rivermont St & Marshall Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	92	208	31	58
Average Queue (ft)	51	97	6	23
95th Queue (ft)	79	164	24	51
Link Distance (ft)	202	811	521	663
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Jefferson Blvd & Marshall Rd

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	TR	L	T	R
Maximum Queue (ft)	418	165	134	180	27	1185	155
Average Queue (ft)	225	58	55	66	1	504	142
95th Queue (ft)	361	166	111	143	14	1118	190
Link Distance (ft)	811			1008		1339	
Upstream Blk Time (%)						3	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)		115	300		60		100
Storage Blk Time (%)	30					42	11
Queuing Penalty (veh)	18					239	46

Intersection: 12: Otis Ave & Project Driveway 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	49	15
Average Queue (ft)	22	1
95th Queue (ft)	49	8
Link Distance (ft)	531	924
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Otis Ave & Project Driveway 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	34	20
Average Queue (ft)	9	1
95th Queue (ft)	32	11
Link Distance (ft)	546	865
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 303

CA MUTCD, Section 2B.07 Multi-Way Stop Applications				
Warrant Evaluation for Marshall Road / Martinique Street				
Existing Plus Brar Farms Project				
Guidance		**Description**	**Warrant Met**	**Evaluation**
A		Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.	N/A	Not considered or evaluated for this location
B		Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.	No	Does not meet minimum number of reported crashes.
C	Minimum volumes:			
	1	The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and	No	Minimum volume warrant is 210 vehicles per hour for any 8 hours of an average day (which is 70 percent of 300 vehicles per hour due to the speed qualification from Item 3). Uses peak period volumes at the intersections (5 hours), and K-factor for the remaining 3 hours from Marshall Road roadway counts, plus trips associated with Brar Farms project. All 8 hours are above the 210 vehicles per hour threshold for the major street (Marshall Road) approaches.
	2	The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but	No	Mimimum volume warrant is 140 units (vehicle, pedestrian, and bicycle) per hour from the minor street approaches for the same 8 hours (which is 70 percent of the 200 units per hour due to the speed qualitifcation from Item 3). Volume criteria is not met, and minor-street vehicle delay is less than 30 seconds per vehicle during the peak hours
	3	If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.		Yes, Marshall Road has 85th-percential approach speed of 45 mph in this location; therefore, the minimum volume warrants are 70 percent of the values in Items 1 and 2.
D		Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.	No	Does not meet Criteria B
Option		**Description**		
	Other criteria that may be considered in an engineering study include:			
A		The need to control left-turn conflicts;	No	Added left turn volume with trips associated with the proposed Brar Farms project; however, vehicle delay is at acceptable level
B		The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;	Yes	Anticipated that this will be a primary safe route to school (Bridgeway Island Elementary School) from proposed Brar Farms project, with need to cross Marshall Road.
C		Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and	N/A	Not applicable to this location
D		An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.	No	Marshall Road (collector roadway) and Martinque Street (local residential street) will have different operating characteristics.

CA MUTCD, Section 2B.07 Multi-Way Stop Applications								
Warrant Evaluation for Marshall Road / Martinique Street								
Existing Plus Brar Farms Project								
Analysis Traffic Volumes for Warrant C1								
7:00 AM	**8:00 AM**	1:00 PM	2:00 PM	3:00 PM	4:00 PM	**5:00 PM**	6:00 PM	
0.911	**AM Peak**	0.731	0.843	0.735	0.936	**PM Peak**	0.827	K-Factor from AM or PM Peak
192	**197**	182	210	194	198	**249**	206	Existing Major Street Approach Volumes
23	**25**	37	43	37	48	**51**	42	Brar Farms Added Trips to Major Street Approach
215	222	219	253	231	246	300	248	Total Volumes for Warrant C1

CA MUTCD, Section 2B.07 Multi-Way Stop Applications				
Warrant Evaluation for Marshall Road / Jamaica Street				
Existing Plus Brar Farms Project				
Guidance		**Description**	**Warrant Met**	**Evaluation**
A		Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.	N/A	Not considered or evaluated for this location
B		Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.	No	Does not meet minimum number of reported crashes.
C	Minimum volumes:			
	1	The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and	Yes	Minimum volume warrant is 210 vehicles per hour for any 8 hours of an average day (which is 70 percent of 300 vehicles per hour due to the speed qualification from Item 3). Uses peak period volumes at the intersections (5 hours), and K-factor for the remaining 3 hours from Marshall Road roadway counts, plus trips associated with Brar Farms project. All 8 hours are above the 210 vehicles per hour threshold for the major street (Marshall Road) approaches.
	2	The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but	No	Mimimum volume warrant is 140 units (vehicle, pedestrian, and bicycle) per hour from the minor street approaches for the same 8 hours (which is 70 percent of the 200 units per hour due to the speed qualitifcation from Item 3). Volume criteria is not met, and minor-street vehicle delay is less than 30 seconds per vehicle during the peak hours
	3	If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.		Yes, Marshall Road has 85th-percential approach speed of 45 mph in this location; therefore, the minimum volume warrants are 70 percent of the values in Items 1 and 2.
D		Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.	No	Does not meet Criteria B
Option		**Description**		
	Other criteria that may be considered in an engineering study include:			
A		The need to control left-turn conflicts;	No	Added left turn volume with trips associated with the proposed Brar Farms project; however, vehicle delay is at acceptable level
B		The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;	Yes	Anticipated that this will be a primary safe route to school (Bridgeway Island Elementary School) from proposed Brar Farms project, with need to cross Marshall Road.
C		Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and	N/A	Not applicable to this location
D		An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.	No	Marshall Road (collector roadway) and Jamaica Street (local residential street) will have different operating characteristics.

CA MUTCD, Section 2B.07 Multi-Way Stop Applications								
Warrant Evaluation for Marshall Road / Jamaica Street								
Existing Plus Brar Farms Project								
Analysis Traffic Volumes for Warrant C1								
7:00 AM	**8:00 AM**	1:00 PM	2:00 PM	3:00 PM	4:00 PM	**5:00 PM**	6:00 PM	
0.911	**AM Peak**	0.731	0.843	0.735	0.936	**PM Peak**	0.827	K-Factor from AM or PM Peak
209	**221**	194	224	218	223	**266**	220	Existing Major Street Approach Volumes
44	**48**	72	83	72	92	**98**	81	Brar Farms Added Trips to Major Street Approach
253	269	266	307	290	315	364	301	Total Volumes for Warrant C1

CA MUTCD, Section 2B.07 Multi-Way Stop Applications				
Warrant Evaluation for Marshall Road / Otis Avenue				
Existing Plus Brar Farms Project				
Guidance		**Description**	**Warrant Met**	**Evaluation**
A		Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.	N/A	Not considered or evaluated for this location
B		Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.	No	Does not meet minimum number of reported crashes.
C	Minimum volumes:			
	1	The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and	Yes	Minimum volume warrant is 210 vehicles per hour for any 8 hours of an average day (which is 70 percent of 300 vehicles per hour due to the speed qualification from Item 3). Uses peak period volumes at the intersections (5 hours), and K-factor for the remaining 3 hours from Marshall Road roadway counts, plus trips associated with Brar Farms project. All 8 hours are above the 210 vehicles per hour threshold for the major street (Marshall Road) approaches.
	2	The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but	No	Mimimum volume warrant is 140 units (vehicle, pedestrian, and bicycle) per hour from the minor street approaches for the same 8 hours (which is 70 percent of the 200 units per hour due to the speed qualitifcation from Item 3). Volume criteria is met; but minor-street vehicle delay is less than 30 seconds per vehicle during the peak hours
	3	If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.		Yes, Marshall Road has 85th-percential approach speed of 45 mph in this location; therefore, the minimum volume warrants are 70 percent of the values in Items 1 and 2.
D		Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.	No	Does not meet Criteria B
Option		**Description**		
	Other criteria that may be considered in an engineering study include:			
A		The need to control left-turn conflicts;	No	Added left turn volume with trips associated with the proposed Brar Farms project; however, vehicle delay is at acceptable level
B		The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;	Yes	Anticipated that this will be a primary safe route to school (Bridgeway Island Elementary School) from proposed Brar Farms project, with need to cross Marshall Road.
C		Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and	N/A	Not applicable to this location
D		An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.	Yes	Marshall Road and Otis Avenue have similar design (cross-section, bike lanes) and are both categorized as Collector roadways in the City of West Sacramento General Plan Mobility Element.

CA MUTCD, Section 2B.07 Multi-Way Stop Applications								
Warrant Evaluation for Marshall Road / Otis Avenue								
Existing Plus Brar Farms Project								
Analysis Traffic Volumes for Warrant C1								
7:00 AM	**8:00 AM**	1:00 PM	2:00 PM	3:00 PM	4:00 PM	**5:00 PM**	6:00 PM	
0.911	**AM Peak**	0.731	0.843	0.735	0.936	**PM Peak**	0.827	K-Factor from AM or PM Peak
279	**327**	287	331	333	336	**393**	325	Existing Major Street Approach Volumes
89	**98**	125	144	126	160	**171**	141	Brar Farms Added Trips to Major Street Approach
368	425	412	475	459	496	564	466	Total Volumes for Warrant C1

CA MUTCD, Section 2B.07 Multi-Way Stop Applications				
Warrant Evaluation for Marshall Road / Rivermont Street / Allan Drive				
Existing Plus Brar Farms Project				
Guidance		**Description**	**Warrant Met**	**Evaluation**
A		Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.	N/A	Not considered or evaluated for this location
B		Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.	No	Does not meet minimum number of reported crashes.
C	Minimum volumes:			
	1	The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and	Yes	Minimum volume warrant is 210 vehicles per hour for any 8 hours of an average day (which is 70 percent of 300 vehicles per hour due to the speed qualification from Item 3). Uses peak period volumes at the intersections (5 hours), and K-factor for the remaining 3 hours from Marshall Road roadway counts, plus trips associated with Brar Farms project. All 8 hours are above the 210 vehicles per hour threshold for the major street (Marshall Road) approaches.
	2	The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but	Yes	Mimimum volume warrant is 140 units (vehicle, pedestrian, and bicycle) per hour from the minor street approaches for the same 8 hours (which is 70 percent of the 200 units per hour due to the speed qualitifcation from Item 3). Volume criteria is met; and minor-street vehicle delay is more than 30 seconds per vehicle during the AM peak hour.
	3	If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.		Yes, Marshall Road has 85th-percential approach speed of 40 mph in this location; therefore, the minimum volume warrants are 70 percent of the values in Items 1 and 2.
D		Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.	No	Does not meet Criteria B
Option		**Description**		
	Other criteria that may be considered in an engineering study include:			
A		The need to control left-turn conflicts;	Yes	Added left turn volume with trips associated with the proposed Brar Farms project, and vehicle delay would be at unacceptable level
B		The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;	Yes	May want to provide access with additional pedestrian volume to/from bus stop at the intersection, currently no marked crossing exists to cross Marshall Road in this location.
C		Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and	N/A	Not applicable to this location
D		An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.	No	Marshall Road (collector roadway) and Rivermont Street/Allan Drive (local residential street) will have different operating characteristics.

CA MUTCD, Section 2B.07 Multi-Way Stop Applications								
Warrant Evaluation for Marshall Road / Rivermont Street / Allan Drive								
Existing Plus Brar Farms Project								
Analysis Traffic Volumes for Warrant C1								
7:00 AM	**8:00 AM**	1:00 PM	2:00 PM	3:00 PM	4:00 PM	**5:00 PM**	6:00 PM	
0.823	**AM Peak**	0.764	0.807	0.965	0.995	**PM Peak**	0.726	K-Factor from AM or PM Peak
735	**855**	664	702	751	806	**869**	631	Existing Major Street Approach Volumes
119	**145**	151	160	191	197	**198**	144	Brar Farms Added Trips to Major Street Approach
854	1000	815	862	942	1003	1067	775	Total Volumes for Warrant C1

APPENDIX D

VOLUME DEVELOPMENT WORKSHEETS

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
1 Southport Parkway/Marshall Road						
NBL	8	0	8	8	0	8
NBT	579	0	579	166	0	166
NBR	80	1	81	53	1	54
SBL	28	12	40	45	38	83
SBT	163	0	163	492	0	492
SBR	5	0	5	16	0	16
EBL	15	0	15	3	0	3
EBT	34	0	34	18	0	18
EBR	15	0	15	10	0	10
WBL	47	2	49	90	1	91
WBT	23	0	23	38	0	38
WBR	40	33	73	22	23	45
North Leg						
Approach	196	12	208	553	38	591
Departure	634	33	667	191	23	214
Total	830	45	875	744	61	805
South Leg						
Approach	667	1	668	227	1	228
Departure	225	2	227	592	1	593
Total	892	3	895	819	2	821
East Leg						
Approach	110	35	145	150	24	174
Departure	142	13	155	116	39	155
Total	252	48	300	266	63	329
West Leg						
Approach	64	0	64	31	0	31
Departure	36	0	36	62	0	62
Total	100	0	100	93	0	93
Total Approaches						
Approach	1,037	48	1,085	961	63	1,024
Departure	1,037	48	1,085	961	63	1,024
Total	2,074	96	2,170	1,922	126	2,048

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
2 Martinique Street-Project Driveway 1/Marshall Road						
NBL	0	16	16	0	11	11
NBT	0	3	3	0	1	1
NBR	0	18	18	0	13	13
SBL	27	0	27	28	0	28
SBT	0	1	1	0	3	3
SBR	9	0	9	6	0	6
EBL	11	0	11	1	0	1
EBT	131	7	138	115	21	136
EBR	0	6	6	0	18	18
WBL	0	6	6	0	22	22
WBT	100	19	119	144	13	157
WBR	9	0	9	25	0	25
North Leg						
Approach	36	1	37	34	3	37
Departure	20	3	23	26	1	27
Total	56	4	60	60	4	64
South Leg						
Approach	0	37	37	0	25	25
Departure	0	13	13	0	43	43
Total	0	50	50	0	68	68
East Leg						
Approach	109	25	134	169	35	204
Departure	158	25	183	143	34	177
Total	267	50	317	312	69	381
West Leg						
Approach	142	13	155	116	39	155
Departure	109	35	144	150	24	174
Total	251	48	299	266	63	329
Total Approaches						
Approach	287	76	363	319	102	421
Departure	287	76	363	319	102	421
Total	574	152	726	638	204	842

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
3 Jamaica Street-Project Driveway 2/Marshall Road						
NBL	0	16	16	0	11	11
NBT	0	3	3	0	1	1
NBR	0	18	18	0	13	13
SBL	30	0	30	8	0	8
SBT	0	1	1	0	3	3
SBR	3	0	3	3	0	3
EBL	3	0	3	3	0	3
EBT	155	19	174	140	16	156
EBR	0	6	6	0	18	18
WBL	0	6	6	0	22	22
WBT	106	9	115	166	24	190
WBR	11	0	11	14	0	14
North Leg						
Approach	33	1	34	11	3	14
Departure	14	3	17	17	1	18
Total	47	4	51	28	4	32
South Leg						
Approach	0	37	37	0	25	25
Departure	0	13	13	0	43	43
Total	0	50	50	0	68	68
East Leg						
Approach	117	15	132	180	46	226
Departure	185	37	222	148	29	177
Total	302	52	354	328	75	403
West Leg						
Approach	158	25	183	143	34	177
Departure	109	25	134	169	35	204
Total	267	50	317	312	69	381
Total Approaches						
Approach	308	78	386	334	108	442
Departure	308	78	386	334	108	442
Total	616	156	772	668	216	884

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
4	**Otis Avenue/Marshall Road**						
NBL		58	3	61	6	2	8
NBT		0	0	0	0	0	0
NBR		256	37	293	122	26	148
SBL		0	0	0	0	0	0
SBT		0	0	0	0	0	0
SBR		0	0	0	0	0	0
EBL		0	0	0	0	0	0
EBT		176	36	212	133	26	159
EBR		34	1	35	27	3	30
WBL		119	13	132	243	43	286
WBT		102	12	114	202	44	246
WBR		0	0	0	0	0	0
North Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
South Leg							
	Approach	314	40	354	128	28	156
	Departure	153	14	167	270	46	316
	Total	467	54	521	398	74	472
East Leg							
	Approach	221	25	246	445	87	532
	Departure	432	73	505	255	52	307
	Total	653	98	751	700	139	839
West Leg							
	Approach	210	37	247	160	29	189
	Departure	160	15	175	208	46	254
	Total	370	52	422	368	75	443
Total Approaches							
	Approach	745	102	847	733	144	877
	Departure	745	102	847	733	144	877
	Total	1,490	204	1,694	1,466	288	1,754

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
5 Golden Gate Drive/Marshall Road						
NBL	0	0	0	0	0	0
NBT	0	0	0	0	0	0
NBR	0	0	0	0	0	0
SBL	295	0	295	192	0	192
SBT	0	0	0	0	0	0
SBR	37	1	38	28	5	33
EBL	67	3	70	11	4	15
EBT	365	70	435	244	48	292
EBR	0	0	0	0	0	0
WBL	0	0	0	0	0	0
WBT	184	24	208	417	82	499
WBR	246	0	246	201	0	201
North Leg						
Approach	332	1	333	220	5	225
Departure	313	3	316	212	4	216
Total	645	4	649	432	9	441
South Leg						
Approach	0	0	0	0	0	0
Departure	0	0	0	0	0	0
Total	0	0	0	0	0	0
East Leg						
Approach	430	24	454	618	82	700
Departure	660	70	730	436	48	484
Total	1,090	94	1,184	1,054	130	1,184
West Leg						
Approach	432	73	505	255	52	307
Departure	221	25	246	445	87	532
Total	653	98	751	700	139	839
Total Approaches						
Approach	1,194	98	1,292	1,093	139	1,232
Departure	1,194	98	1,292	1,093	139	1,232
Total	2,388	196	2,584	2,186	278	2,464

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
6	**Seymour Avenue/Marshall Road**						
NBL		7	0	7	6	0	6
NBT		0	0	0	0	0	0
NBR		1	0	1	1	0	1
SBL		15	0	15	4	0	4
SBT		0	0	0	0	0	0
SBR		2	0	2	2	0	2
EBL		3	0	3	1	0	1
EBT		591	70	661	379	48	427
EBR		5	0	5	2	0	2
WBL		1	0	1	2	0	2
WBT		440	24	464	480	82	562
WBR		8	0	8	12	0	12
North Leg							
	Approach	17	0	17	6	0	6
	Departure	11	0	11	13	0	13
	Total	28	0	28	19	0	19
South Leg							
	Approach	8	0	8	7	0	7
	Departure	6	0	6	4	0	4
	Total	14	0	14	11	0	11
East Leg							
	Approach	449	24	473	494	82	576
	Departure	607	70	677	384	48	432
	Total	1,056	94	1,150	878	130	1,008
West Leg							
	Approach	599	70	669	382	48	430
	Departure	449	24	473	488	82	570
	Total	1,048	94	1,142	870	130	1,000
Total Approaches							
	Approach	1,073	94	1,167	889	130	1,019
	Departure	1,073	94	1,167	889	130	1,019
	Total	2,146	188	2,334	1,778	260	2,038

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
7	**Rivermont Street-Allan Drive/Marshall Road**						
NBL		1	0	1	2	0	2
NBT		0	0	0	1	0	1
NBR		2	0	2	2	0	2
SBL		58	0	58	34	0	34
SBT		3	0	3	0	0	0
SBR		14	0	14	6	0	6
EBL		6	0	6	5	0	5
EBT		643	70	713	374	48	422
EBR		1	0	1	1	0	1
WBL		3	0	3	4	0	4
WBT		439	24	463	498	82	580
WBR		29	0	29	63	0	63
North Leg							
	Approach	75	0	75	40	0	40
	Departure	35	0	35	69	0	69
	Total	110	0	110	109	0	109
South Leg							
	Approach	3	0	3	5	0	5
	Departure	7	0	7	5	0	5
	Total	10	0	10	10	0	10
East Leg							
	Approach	471	24	495	565	82	647
	Departure	703	70	773	410	48	458
	Total	1,174	94	1,268	975	130	1,105
West Leg							
	Approach	650	70	720	380	48	428
	Departure	454	24	478	506	82	588
	Total	1,104	94	1,198	886	130	1,016
Total Approaches							
	Approach	1,199	94	1,293	990	130	1,120
	Departure	1,199	94	1,293	990	130	1,120
	Total	2,398	188	2,586	1,980	260	2,240

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Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
8	**Jefferson Boulevard/Marshall Road**						
NBL		82	0	82	56	2	58
NBT		765	0	765	557	0	557
NBR		0	0	0	0	0	0
SBL		0	0	0	1	0	1
SBT		499	0	499	734	0	734
SBR		362	24	386	509	80	589
EBL		590	69	659	395	47	442
EBT		0	0	0	0	0	0
EBR		42	1	43	69	1	70
WBL		0	0	0	0	0	0
WBT		0	0	0	0	0	0
WBR		0	0	0	0	0	0
North Leg							
	Approach	861	24	885	1,244	80	1,324
	Departure	1,355	69	1,424	952	47	999
	Total	2,216	93	2,309	2,196	127	2,323
South Leg							
	Approach	847	0	847	613	2	615
	Departure	541	1	542	803	1	804
	Total	1,388	1	1,389	1,416	3	1,419
East Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	1	0	1
	Total	0	0	0	1	0	1
West Leg							
	Approach	632	70	702	464	48	512
	Departure	444	24	468	565	82	647
	Total	1,076	94	1,170	1,029	130	1,159
Total Approaches							
	Approach	2,340	94	2,434	2,321	130	2,451
	Departure	2,340	94	2,434	2,321	130	2,451
	Total	4,680	188	4,868	4,642	260	4,902

LSA

Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
9	**Otis Avenue/Project Driveway 3**						
NBL			3	3		11	11
NBT		314	20	334	128	14	142
NBR			0	0		0	0
SBL			0	0		0	0
SBT		153	7	160	270	23	293
SBR			7	7		23	23
EBL			20	20		14	14
EBT			0	0		0	0
EBR			9	9		6	6
WBL			0	0		0	0
WBT			0	0		0	0
WBR			0	0		0	0
North Leg							
	Approach	153	14	167	270	46	316
	Departure	314	40	354	128	28	156
	Total	467	54	521	398	74	472
South Leg							
	Approach	314	23	337	128	25	153
	Departure	153	16	169	270	29	299
	Total	467	39	506	398	54	452
East Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
West Leg							
	Approach	0	29	29	0	20	20
	Departure	0	10	10	0	34	34
	Total	0	39	39	0	54	54
Total Approaches							
	Approach	467	66	533	398	91	489
	Departure	467	66	533	398	91	489
	Total	934	132	1,066	796	182	978

LSA

Table D.1: Build-Out Peak Hour Volume Summary
No Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
10	**Otis Avenue/Project Driveway 4**						
NBL			3	3		11	11
NBT		314	3	317	128	11	139
NBR			0	0		0	0
SBL			0	0		0	0
SBT		153	9	162	270	6	276
SBR			7	7		23	23
EBL			20	20		14	14
EBT			0	0		0	0
EBR			9	9		6	6
WBL			0	0		0	0
WBT			0	0		0	0
WBR			0	0		0	0
North Leg							
	Approach	153	16	169	270	29	299
	Departure	314	23	337	128	25	153
	Total	467	39	506	398	54	452
South Leg							
	Approach	314	6	320	128	22	150
	Departure	153	18	171	270	12	282
	Total	467	24	491	398	34	432
East Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
West Leg							
	Approach	0	29	29	0	20	20
	Departure	0	10	10	0	34	34
	Total	0	39	39	0	54	54
Total Approaches							
	Approach	467	51	518	398	71	469
	Departure	467	51	518	398	71	469
	Total	934	102	1,036	796	142	938

LSA

Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
1 Southport Parkway/Marshall Road						
NBL	9	0	9	14	0	14
NBT	891	0	891	491	0	491
NBR	62	1	63	51	1	52
SBL	28	22	50	31	74	105
SBT	440	0	440	830	0	830
SBR	8	0	8	21	0	21
EBL	17	0	17	5	0	5
EBT	19	0	19	11	0	11
EBR	21	0	21	14	0	14
WBL	61	2	63	70	1	71
WBT	18	0	18	23	0	23
WBR	40	63	103	19	44	63
North Leg						
Approach	476	22	498	882	74	956
Departure	948	63	1,011	515	44	559
Total	1,424	85	1,509	1,397	118	1,515
South Leg						
Approach	962	1	963	556	1	557
Departure	522	2	524	914	1	915
Total	1,484	3	1,487	1,470	2	1,472
East Leg						
Approach	119	65	184	112	45	157
Departure	109	23	132	93	75	168
Total	228	88	316	205	120	325
West Leg						
Approach	57	0	57	30	0	30
Departure	35	0	35	58	0	58
Total	92	0	92	88	0	88
Total Approaches						
Approach	1,614	88	1,702	1,580	120	1,700
Departure	1,614	88	1,702	1,580	120	1,700
Total	3,228	176	3,404	3,160	240	3,400

LSA

Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
2 Martinique Street-Project Driveway 1/Marshall Road						
NBL	0	23	23	0	16	16
NBT	0	3	3	0	1	1
NBR	0	11	11	0	8	8
SBL	22	0	22	28	0	28
SBT	0	1	1	0	3	3
SBR	12	0	12	1	0	1
EBL	7	0	7	0	0	0
EBT	102	15	117	93	49	142
EBR	0	8	8	0	26	26
WBL	0	4	4	0	14	14
WBT	107	42	149	111	29	140
WBR	9	0	9	26	0	26
North Leg						
Approach	34	1	35	29	3	32
Departure	16	3	19	26	1	27
Total	50	4	54	55	4	59
South Leg						
Approach	0	37	37	0	25	25
Departure	0	13	13	0	43	43
Total	0	50	50	0	68	68
East Leg						
Approach	116	46	162	137	43	180
Departure	124	26	150	121	57	178
Total	240	72	312	258	100	358
West Leg						
Approach	109	23	132	93	75	168
Departure	119	65	184	112	45	157
Total	228	88	316	205	120	325
Total Approaches						
Approach	259	107	366	259	146	405
Departure	259	107	366	259	146	405
Total	518	214	732	518	292	810

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

	AM Peak Hour			PM Peak Hour		
	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
3 Jamaica Street-Project Driveway 2/Marshall Road						
NBL	0	23	23	0	16	16
NBT	0	3	3	0	1	1
NBR	0	11	11	0	8	8
SBL	29	0	29	8	0	8
SBT	0	1	1	0	3	3
SBR	5	0	5	3	0	3
EBL	3	0	3	5	0	5
EBT	121	18	139	116	29	145
EBR	0	8	8	0	28	28
WBL	0	4	4	0	12	12
WBT	111	23	134	134	27	161
WBR	11	0	11	14	0	14
North Leg						
Approach	34	1	35	11	3	14
Departure	14	3	17	19	1	20
Total	48	4	52	30	4	34
South Leg						
Approach	0	37	37	0	25	25
Departure	0	13	13	0	43	43
Total	0	50	50	0	68	68
East Leg						
Approach	122	27	149	148	39	187
Departure	150	29	179	124	37	161
Total	272	56	328	272	76	348
West Leg						
Approach	124	26	150	121	57	178
Departure	116	46	162	137	43	180
Total	240	72	312	258	100	358
Total Approaches						
Approach	280	91	371	280	124	404
Departure	280	91	371	280	124	404
Total	560	182	742	560	248	808

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
4	**Otis Avenue/Marshall Road**						
NBL		60	19	79	6	13	19
NBT		0	0	0	0	0	0
NBR		286	21	307	128	15	143
SBL		0	0	0	0	0	0
SBT		0	0	0	0	0	0
SBR		0	0	0	0	0	0
EBL		0	0	0	0	0	0
EBT		145	22	167	128	16	144
EBR		28	7	35	28	21	49
WBL		117	7	124	248	25	273
WBT		102	8	110	168	26	194
WBR		0	0	0	0	0	0
North Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
South Leg							
	Approach	346	40	386	134	28	162
	Departure	145	14	159	276	46	322
	Total	491	54	545	410	74	484
East Leg							
	Approach	219	15	234	416	51	467
	Departure	431	43	474	256	31	287
	Total	650	58	708	672	82	754
West Leg							
	Approach	173	29	202	156	37	193
	Departure	162	27	189	174	39	213
	Total	335	56	391	330	76	406
Total Approaches							
	Approach	738	84	822	706	116	822
	Departure	738	84	822	706	116	822
	Total	1,476	168	1,644	1,412	232	1,644

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
5	**Golden Gate Drive/Marshall Road**						
NBL		0	0	0	0	0	0
NBT		0	0	0	0	0	0
NBR		0	0	0	0	0	0
SBL		280	0	280	245	0	245
SBT		0	0	0	0	0	0
SBR		67	1	68	102	5	107
EBL		150	3	153	49	4	53
EBT		281	40	321	207	27	234
EBR		0	0	0	0	0	0
WBL		0	0	0	0	0	0
WBT		152	14	166	314	46	360
WBR		326	0	326	206	0	206
North Leg							
	Approach	347	1	348	347	5	352
	Departure	476	3	479	255	4	259
	Total	823	4	827	602	9	611
South Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
East Leg							
	Approach	478	14	492	520	46	566
	Departure	561	40	601	452	27	479
	Total	1,039	54	1,093	972	73	1,045
West Leg							
	Approach	431	43	474	256	31	287
	Departure	219	15	234	416	51	467
	Total	650	58	708	672	82	754
Total Approaches							
	Approach	1,256	58	1,314	1,123	82	1,205
	Departure	1,256	58	1,314	1,123	82	1,205
	Total	2,512	116	2,628	2,246	164	2,410

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
6	**Seymour Avenue/Marshall Road**						
NBL		7	0	7	6	0	6
NBT		0	0	0	0	0	0
NBR		1	0	1	1	0	1
SBL		15	0	15	4	0	4
SBT		0	0	0	0	0	0
SBR		2	0	2	2	0	2
EBL		2	0	2	1	0	1
EBT		511	40	551	405	27	432
EBR		4	0	4	2	0	2
WBL		1	0	1	2	0	2
WBT		492	14	506	418	46	464
WBR		9	0	9	10	0	10
North Leg							
	Approach	17	0	17	6	0	6
	Departure	11	0	11	11	0	11
	Total	28	0	28	17	0	17
South Leg							
	Approach	8	0	8	7	0	7
	Departure	5	0	5	4	0	4
	Total	13	0	13	11	0	11
East Leg							
	Approach	502	14	516	430	46	476
	Departure	527	40	567	410	27	437
	Total	1,029	54	1,083	840	73	913
West Leg							
	Approach	517	40	557	408	27	435
	Departure	501	14	515	426	46	472
	Total	1,018	54	1,072	834	73	907
Total Approaches							
	Approach	1,044	54	1,098	851	73	924
	Departure	1,044	54	1,098	851	73	924
	Total	2,088	108	2,196	1,702	146	1,848

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
7	**Rivermont Street-Allan Drive/Marshall Road**						
NBL		1	0	1	2	0	2
NBT		0	0	0	2	0	2
NBR		1	0	1	1	0	1
SBL		87	0	87	48	0	48
SBT		5	0	5	0	0	0
SBR		41	0	41	29	0	29
EBL		9	0	9	27	0	27
EBT		507	40	547	375	27	402
EBR		1	0	1	2	0	2
WBL		1	0	1	2	0	2
WBT		489	14	503	408	46	454
WBR		31	0	31	93	0	93
North Leg							
	Approach	133	0	133	77	0	77
	Departure	40	0	40	122	0	122
	Total	173	0	173	199	0	199
South Leg							
	Approach	2	0	2	5	0	5
	Departure	7	0	7	4	0	4
	Total	9	0	9	9	0	9
East Leg							
	Approach	521	14	535	503	46	549
	Departure	595	40	635	424	27	451
	Total	1,116	54	1,170	927	73	1,000
West Leg							
	Approach	517	40	557	404	27	431
	Departure	531	14	545	439	46	485
	Total	1,048	54	1,102	843	73	916
Total Approaches							
	Approach	1,173	54	1,227	989	73	1,062
	Departure	1,173	54	1,227	989	73	1,062
	Total	2,346	108	2,454	1,978	146	2,124

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
8	**Jefferson Boulevard/Marshall Road**						
NBL		152	0	152	77	2	79
NBT		702	0	702	439	0	439
NBR		0	0	0	0	0	0
SBL		0	0	0	0	0	0
SBT		370	0	370	689	0	689
SBR		316	14	330	385	44	429
EBL		484	39	523	320	26	346
EBT		0	0	0	0	0	0
EBR		69	1	70	122	1	123
WBL		0	0	0	0	0	0
WBT		0	0	0	0	0	0
WBR		0	0	0	0	0	0
North Leg							
	Approach	686	14	700	1,074	44	1,118
	Departure	1,186	39	1,225	759	26	785
	Total	1,872	53	1,925	1,833	70	1,903
South Leg							
	Approach	854	0	854	516	2	518
	Departure	439	1	440	811	1	812
	Total	1,293	1	1,294	1,327	3	1,330
East Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
West Leg							
	Approach	553	40	593	442	27	469
	Departure	468	14	482	462	46	508
	Total	1,021	54	1,075	904	73	977
Total Approaches							
	Approach	2,093	54	2,147	2,032	73	2,105
	Departure	2,093	54	2,147	2,032	73	2,105
	Total	4,186	108	4,294	4,064	146	4,210

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Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
9	**Otis Avenue/Project Driveway 3**						
NBL			3	3		11	11
NBT		346	20	366	134	14	148
NBR			0	0		0	0
SBL			0	0		0	0
SBT		145	7	152	276	23	299
SBR			7	7		23	23
EBL			20	20		14	14
EBT			0	0		0	0
EBR			9	9		6	6
WBL			0	0		0	0
WBT			0	0		0	0
WBR			0	0		0	0
North Leg							
	Approach	145	14	159	276	46	322
	Departure	346	40	386	134	28	162
	Total	491	54	545	410	74	484
South Leg							
	Approach	346	23	369	134	25	159
	Departure	145	16	161	276	29	305
	Total	491	39	530	410	54	464
East Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
West Leg							
	Approach	0	29	29	0	20	20
	Departure	0	10	10	0	34	34
	Total	0	39	39	0	54	54
Total Approaches							
	Approach	491	66	557	410	91	501
	Departure	491	66	557	410	91	501
	Total	982	132	1,114	820	182	1,002

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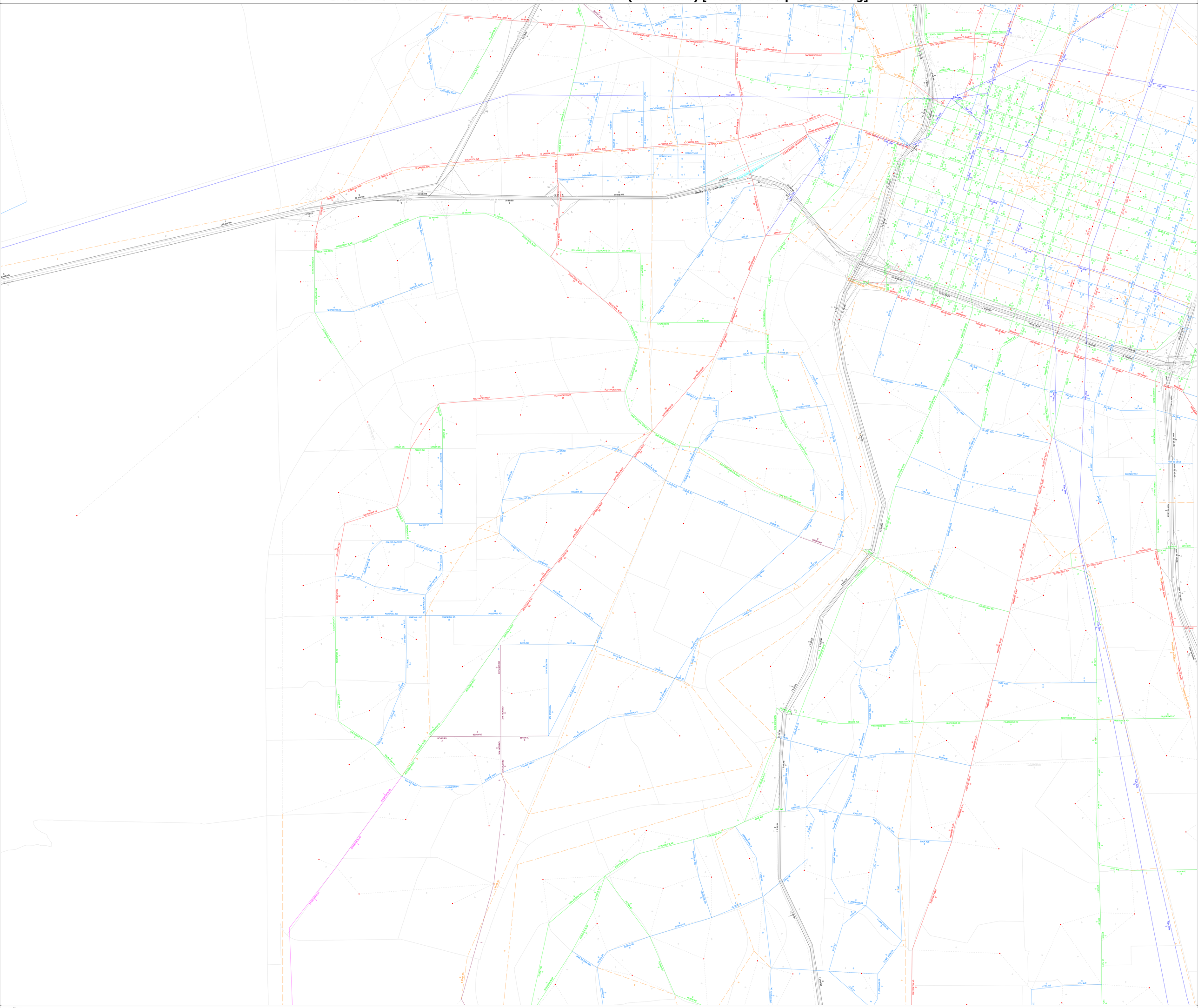
Table D.2: Build-Out Peak Hour Volume Summary
With Enterprise Crossing

		AM Peak Hour			PM Peak Hour		
		Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes	Balanced Build-Out NP Volumes	Net Project Trips	Build-Out w/ Project Volumes
10	**Otis Avenue/Project Driveway 4**						
NBL			3	3		11	11
NBT		346	3	349	134	11	145
NBR			0	0		0	0
SBL			0	0		0	0
SBT		145	9	154	276	6	282
SBR			7	7		23	23
EBL			20	20		14	14
EBT			0	0		0	0
EBR			9	9		6	6
WBL			0	0		0	0
WBT			0	0		0	0
WBR			0	0		0	0
North Leg							
	Approach	145	16	161	276	29	305
	Departure	346	23	369	134	25	159
	Total	491	39	530	410	54	464
South Leg							
	Approach	346	6	352	134	22	156
	Departure	145	18	163	276	12	288
	Total	491	24	515	410	34	444
East Leg							
	Approach	0	0	0	0	0	0
	Departure	0	0	0	0	0	0
	Total	0	0	0	0	0	0
West Leg							
	Approach	0	29	29	0	20	20
	Departure	0	10	10	0	34	34
	Total	0	39	39	0	54	54
Total Approaches							
	Approach	491	51	542	410	71	481
	Departure	491	51	542	410	71	481
	Total	982	102	1,084	820	142	962

APPENDIX E

SELECT ZONE DISTRIBUTION PLOTS

SACSIM23 - 2050 Peak hour Select Zone Distribution (Brar Farms) [Without Enterprise Crossing]



(Licensed to LSA Associates Inc)

SACSIM23 - 2050 Peak hour Select Zone Distribution (Brar Farms) [With Enterprise Crossing]



cube

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APPENDIX F

LEVEL OF SERVICE WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	34	15	47	23	40	8	579	80	36	163	5
Future Volume (veh/h)	15	34	15	47	23	40	8	579	80	36	163	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.95	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	37	16	51	25	43	9	623	86	39	175	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	162	60	225	72	85	21	925	127	80	1163	33
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.01	0.30	0.30	0.05	0.33	0.33
Sat Flow, veh/h	235	1077	396	523	476	565	1781	3116	429	1781	3527	100
Grp Volume(v), veh/h	69	0	0	119	0	0	9	355	354	39	88	92
Grp Sat Flow(s),veh/h/ln	1709	0	0	1564	0	0	1781	1777	1769	1781	1777	1851
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.2	6.2	6.2	0.8	1.2	1.2
Cycle Q Clear(g_c), s	1.2	0.0	0.0	2.4	0.0	0.0	0.2	6.2	6.2	0.8	1.2	1.2
Prop In Lane	0.23		0.23	0.43		0.36	1.00		0.24	1.00		0.05
Lane Grp Cap(c), veh/h	383	0	0	381	0	0	21	527	525	80	586	610
V/C Ratio(X)	0.18	0.00	0.00	0.31	0.00	0.00	0.42	0.67	0.68	0.49	0.15	0.15
Avail Cap(c_a), veh/h	1224	0	0	1138	0	0	253	706	703	258	711	741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	13.7	0.0	0.0	17.3	10.9	10.9	16.4	8.3	8.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	12.7	1.5	1.6	4.5	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.7	0.0	0.0	0.1	1.9	1.9	0.3	0.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.5	0.0	0.0	14.1	0.0	0.0	30.0	12.4	12.5	20.9	8.4	8.4
LnGrp LOS	B			B			C	B	B	C	A	A
Approach Vol, veh/h		69			119			718			219	
Approach Delay, s/veh		13.5			14.1			12.7			10.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	16.6		11.6	5.9	17.7		11.6				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	5.1	14.0		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	2.8	8.2		3.2	2.2	3.2		4.4				
Green Ext Time (p_c), s	0.0	2.1		0.2	0.0	0.6		0.5				

Intersection Summary		
HCM 7th Control Delay, s/veh		12.5
HCM 7th LOS		B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	131	100	9	27	9
Future Vol, veh/h	11	131	100	9	27	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	141	108	10	29	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	117	0	-	0	277	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	165	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1471	-	-	-	713	941
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	865	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1471	-	-	-	707	941
Mov Cap-2 Maneuver	-	-	-	-	707	-
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	865	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.58	0	10.04
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	139	-	-	-	753
HCM Lane V/C Ratio	0.008	-	-	-	0.051
HCM Ctrl Dly (s/v)	7.5	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	155	106	11	30	3
Future Vol, veh/h	3	155	106	11	30	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	167	114	12	32	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	126	0	-	0	293	120
Stage 1	-	-	-	-	120	-
Stage 2	-	-	-	-	173	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1461	-	-	-	698	932
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	857	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1461	-	-	-	696	932
Mov Cap-2 Maneuver	-	-	-	-	696	-
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	857	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.14	0	10.32
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	34	-	-	-	713
HCM Lane V/C Ratio	0.002	-	-	-	0.05
HCM Ctrl Dly (s/v)	7.5	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Intersection Delay, s/veh	23
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	67	365	184	246	295	37
Future Vol, veh/h	67	365	184	246	295	37
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	392	198	265	317	40
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	26	21.9	20.6
HCM LOS	D	C	C

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	0%	89%
Vol Thru, %	84%	43%	0%
Vol Right, %	0%	57%	11%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	432	430	332
LT Vol	67	0	295
Through Vol	365	184	0
RT Vol	0	246	37
Lane Flow Rate	465	462	357
Geometry Grp	1	1	1
Degree of Util (X)	0.766	0.719	0.642
Departure Headway (Hd)	5.933	5.6	6.479
Convergence, Y/N	Yes	Yes	Yes
Cap	604	638	553
Service Time	4.028	3.698	4.572
HCM Lane V/C Ratio	0.77	0.724	0.646
HCM Control Delay, s/veh	26	21.9	20.6
HCM Lane LOS	D	C	C
HCM 95th-tile Q	7	6	4.5

Intersection	
Intersection Delay, s/veh	29.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	643	1	3	439	29	1	0	2	58	3	14
Future Vol, veh/h	6	643	1	3	439	29	1	0	2	58	3	14
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	691	1	3	472	31	1	0	2	62	3	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	39.7	19.3	9.7	10.9
HCM LOS	E	C	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	1%	1%	77%
Vol Thru, %	0%	99%	93%	4%
Vol Right, %	67%	0%	6%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	650	471	75
LT Vol	1	6	3	58
Through Vol	0	643	439	3
RT Vol	2	1	29	14
Lane Flow Rate	3	699	506	81
Geometry Grp	1	1	1	1
Degree of Util (X)	0.006	0.928	0.709	0.151
Departure Headway (Hd)	6.645	4.882	5.042	6.728
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	539	748	719	535
Service Time	4.675	2.882	3.042	4.746
HCM Lane V/C Ratio	0.006	0.934	0.704	0.151
HCM Control Delay, s/veh	9.7	39.7	19.3	10.9
HCM Lane LOS	A	E	C	B
HCM 95th-tile Q	0	13	5.9	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	590	0	42	0	0	0	82	765	0	0	499	362
Future Volume (veh/h)	590	0	42	0	0	0	82	765	0	0	499	362
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	608	0	43	0	0	0	85	789	0	0	514	373
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	723	0	643	0	2	0	110	1594	0	2	1148	512
Arrive On Green	0.41	0.00	0.41	0.00	0.00	0.00	0.06	0.45	0.00	0.00	0.32	0.32
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1585
Grp Volume(v), veh/h	608	0	43	0	0	0	85	789	0	0	514	373
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1585
Q Serve(g_s), s	25.1	0.0	1.4	0.0	0.0	0.0	3.8	12.8	0.0	0.0	9.3	17.0
Cycle Q Clear(g_c), s	25.1	0.0	1.4	0.0	0.0	0.0	3.8	12.8	0.0	0.0	9.3	17.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	723	0	643	0	2	0	110	1594	0	2	1148	512
V/C Ratio(X)	0.84	0.00	0.07	0.00	0.00	0.00	0.77	0.50	0.00	0.00	0.45	0.73
Avail Cap(c_a), veh/h	1091	0	971	0	344	0	436	1594	0	436	2177	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	14.8	0.0	0.0	0.0	37.7	16.0	0.0	0.0	21.9	24.5
Incr Delay (d2), s/veh	4.8	0.0	0.1	0.0	0.0	0.0	4.3	0.3	0.0	0.0	0.4	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	0.0	0.5	0.0	0.0	0.0	1.7	4.6	0.0	0.0	3.6	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.7	0.0	14.9	0.0	0.0	0.0	42.0	16.2	0.0	0.0	22.3	27.3
LnGrp LOS	C		B				D	B			C	C
Approach Vol, veh/h		651			0			874			887	
Approach Delay, s/veh		25.9			0.0			18.8			24.4	
Approach LOS		C						B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	42.9		38.7	10.2	32.7		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	0.0	14.8		27.1	5.8	19.0		0.0				
Green Ext Time (p_c), s	0.0	5.1		6.0	0.1	7.4		0.0				

Intersection Summary			
HCM 7th Control Delay, s/veh		22.8	
HCM 7th LOS		C	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	18	10	91	38	22	8	166	53	47	492	16
Future Volume (veh/h)	3	18	10	91	38	22	8	166	53	47	492	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.97	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	19	11	98	41	24	9	178	57	51	529	17
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	188	99	297	86	39	21	743	230	99	1134	36
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.01	0.28	0.28	0.06	0.32	0.32
Sat Flow, veh/h	64	1093	578	804	499	225	1781	2660	823	1781	3513	113
Grp Volume(v), veh/h	33	0	0	163	0	0	9	117	118	51	267	279
Grp Sat Flow(s),veh/h/ln	1734	0	0	1528	0	0	1781	1777	1706	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	2.9	0.0	0.0	0.2	1.8	1.9	1.0	4.3	4.4
Cycle Q Clear(g_c), s	0.6	0.0	0.0	3.5	0.0	0.0	0.2	1.8	1.9	1.0	4.3	4.4
Prop In Lane	0.09		0.33	0.60		0.15	1.00		0.48	1.00		0.06
Lane Grp Cap(c), veh/h	406	0	0	421	0	0	21	496	477	99	573	597
V/C Ratio(X)	0.08	0.00	0.00	0.39	0.00	0.00	0.42	0.24	0.25	0.52	0.47	0.47
Avail Cap(c_a), veh/h	1211	0	0	1112	0	0	246	617	593	319	691	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	0.0	13.8	0.0	0.0	17.8	10.1	10.1	16.7	9.8	9.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.0	0.0	12.8	0.2	0.3	4.1	0.6	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.9	0.0	0.0	0.1	0.6	0.6	0.4	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.8	0.0	0.0	14.4	0.0	0.0	30.5	10.3	10.4	20.8	10.4	10.4
LnGrp LOS	B			B			C	B	B	C	B	B
Approach Vol, veh/h		33			163			244			597	
Approach Delay, s/veh		12.8			14.4			11.1			11.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	16.2		12.5	5.9	17.8		12.5				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	6.5	12.6		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	3.0	3.9		2.6	2.2	6.4		5.5				
Green Ext Time (p_c), s	0.0	0.8		0.1	0.0	1.9		0.7				

Intersection Summary	
HCM 7th Control Delay, s/veh	11.8
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	115	144	25	28	6
Future Vol, veh/h	1	115	144	25	28	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	122	153	27	30	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	180	0	-	0	291	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	124	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1396	-	-	-	700	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	901	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1396	-	-	-	699	878
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	901	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.07	0	10.22
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	16	-	-	-	725
HCM Lane V/C Ratio	0.001	-	-	-	0.05
HCM Ctrl Dly (s/v)	7.6	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	140	166	14	8	3
Future Vol, veh/h	3	140	166	14	8	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	143	169	14	8	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	326	177
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1391	-	-	-	669	867
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	667	867
Mov Cap-2 Maneuver	-	-	-	-	667	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	879	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.16	0	10.14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	38	-	-	-	712
HCM Lane V/C Ratio	0.002	-	-	-	0.016
HCM Ctrl Dly (s/v)	7.6	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	26
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	244	417	201	192	28
Future Vol, veh/h	11	244	417	201	192	28
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	260	444	214	204	30
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	12.7	35.8	13.7
HCM LOS	B	E	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	0%	87%
Vol Thru, %	96%	67%	0%
Vol Right, %	0%	33%	13%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	255	618	220
LT Vol	11	0	192
Through Vol	244	417	0
RT Vol	0	201	28
Lane Flow Rate	271	657	234
Geometry Grp	1	1	1
Degree of Util (X)	0.423	0.901	0.41
Departure Headway (Hd)	5.607	4.931	6.306
Convergence, Y/N	Yes	Yes	Yes
Cap	640	736	569
Service Time	3.66	2.972	4.36
HCM Lane V/C Ratio	0.423	0.893	0.411
HCM Control Delay, s/veh	12.7	35.8	13.7
HCM Lane LOS	B	E	B
HCM 95th-tile Q	2.1	11.8	2

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	374	1	4	498	63	2	1	2	34	0	6
Future Vol, veh/h	5	374	1	4	498	63	2	1	2	34	0	6
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	402	1	4	535	68	2	1	2	37	0	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	13.1	19.8	9.2	9.8
HCM LOS	B	C	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	1%	1%	85%
Vol Thru, %	20%	98%	88%	0%
Vol Right, %	40%	0%	11%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	380	565	40
LT Vol	2	5	4	34
Through Vol	1	374	498	0
RT Vol	2	1	63	6
Lane Flow Rate	5	409	608	43
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.534	0.752	0.074
Departure Headway (Hd)	6.146	4.707	4.457	6.183
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	586	764	808	574
Service Time	4.146	2.751	2.495	4.276
HCM Lane V/C Ratio	0.009	0.535	0.752	0.075
HCM Control Delay, s/veh	9.2	13.1	19.8	9.8
HCM Lane LOS	A	B	C	A
HCM 95th-tile Q	0	3.2	7.1	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	0	69	0	0	0	56	557	0	1	734	509
Future Volume (veh/h)	395	0	69	0	0	0	56	557	0	1	734	509
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	416	0	73	0	0	0	59	586	0	1	773	536
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	522	0	464	0	2	0	81	1759	0	2	1603	700
Arrive On Green	0.29	0.00	0.29	0.00	0.00	0.00	0.05	0.49	0.00	0.00	0.45	0.45
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1552
Grp Volume(v), veh/h	416	0	73	0	0	0	59	586	0	1	773	536
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1552
Q Serve(g_s), s	17.5	0.0	2.8	0.0	0.0	0.0	2.7	8.1	0.0	0.0	12.4	23.5
Cycle Q Clear(g_c), s	17.5	0.0	2.8	0.0	0.0	0.0	2.7	8.1	0.0	0.0	12.4	23.5
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	522	0	464	0	2	0	81	1759	0	2	1603	700
V/C Ratio(X)	0.80	0.00	0.16	0.00	0.00	0.00	0.73	0.33	0.00	0.41	0.48	0.77
Avail Cap(c_a), veh/h	1098	0	977	0	346	0	439	1759	0	439	2191	957
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	0.0	21.3	0.0	0.0	0.0	38.2	12.4	0.0	40.5	15.6	18.7
Incr Delay (d2), s/veh	4.0	0.0	0.2	0.0	0.0	0.0	4.7	0.1	0.0	36.0	0.3	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	1.0	0.0	0.0	0.0	1.2	2.8	0.0	0.0	4.4	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.5	0.0	21.5	0.0	0.0	0.0	42.9	12.5	0.0	76.4	15.9	21.9
LnGrp LOS	C		C				D	B		E	B	C
Approach Vol, veh/h		489			0			645			1310	
Approach Delay, s/veh		29.1			0.0			15.3			18.4	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	46.4		29.3	8.9	42.9		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	2.0	10.1		19.5	4.7	25.5		0.0				
Green Ext Time (p_c), s	0.0	4.1		4.3	0.0	11.1		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		19.7
HCM 7th LOS		B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	19	21	61	18	40	9	891	62	36	440	8
Future Volume (veh/h)	17	19	21	61	18	40	9	891	62	36	440	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.96	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	20	23	66	19	43	10	958	67	39	473	9
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	164	113	95	239	56	78	23	1151	81	79	1334	25
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.01	0.34	0.34	0.04	0.37	0.37
Sat Flow, veh/h	288	748	627	650	371	517	1781	3358	235	1781	3566	68
Grp Volume(v), veh/h	61	0	0	128	0	0	10	507	518	39	235	247
Grp Sat Flow(s),veh/h/ln	1662	0	0	1539	0	0	1781	1777	1816	1781	1777	1857
Q Serve(g_s), s	0.0	0.0	0.0	1.7	0.0	0.0	0.2	10.2	10.2	0.8	3.7	3.7
Cycle Q Clear(g_c), s	1.2	0.0	0.0	2.9	0.0	0.0	0.2	10.2	10.2	0.8	3.7	3.7
Prop In Lane	0.30		0.38	0.52		0.34	1.00		0.13	1.00		0.04
Lane Grp Cap(c), veh/h	371	0	0	373	0	0	23	609	623	79	664	695
V/C Ratio(X)	0.16	0.00	0.00	0.34	0.00	0.00	0.43	0.83	0.83	0.49	0.35	0.35
Avail Cap(c_a), veh/h	1081	0	0	1028	0	0	230	642	656	234	664	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	0.0	15.1	0.0	0.0	19.0	11.7	11.7	18.1	8.8	8.8
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	11.8	8.8	8.6	4.7	0.3	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.8	0.0	0.0	0.2	4.3	4.4	0.4	1.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.7	0.0	0.0	15.7	0.0	0.0	30.8	20.5	20.3	22.8	9.1	9.1
LnGrp LOS	B			B			C	C	C	C	A	A
Approach Vol, veh/h		61			128			1035			521	
Approach Delay, s/veh		14.7			15.7			20.5			10.1	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	19.4		12.2	6.0	20.6		12.2				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	5.1	14.0		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	2.8	12.2		3.2	2.2	5.7		4.9				
Green Ext Time (p_c), s	0.0	1.1		0.2	0.0	1.8		0.5				

Intersection Summary	
HCM 7th Control Delay, s/veh	16.8
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	102	107	9	22	12
Future Vol, veh/h	7	102	107	9	22	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	110	115	10	24	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	125	0	-	0	245	120
Stage 1	-	-	-	-	120	-
Stage 2	-	-	-	-	125	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1462	-	-	-	744	932
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	901	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1462	-	-	-	740	932
Mov Cap-2 Maneuver	-	-	-	-	740	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	901	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.48	0	9.73
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	116	-	-	-	798
HCM Lane V/C Ratio	0.005	-	-	-	0.046
HCM Ctrl Dly (s/v)	7.5	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	121	111	11	29	5
Future Vol, veh/h	3	121	111	11	29	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	130	119	12	31	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	131	0	-	0	262	125
Stage 1	-	-	-	-	125	-
Stage 2	-	-	-	-	137	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1454	-	-	-	727	925
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1454	-	-	-	725	925
Mov Cap-2 Maneuver	-	-	-	-	725	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	890	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.18	0	10.05
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	44	-	-	-	749
HCM Lane V/C Ratio	0.002	-	-	-	0.049
HCM Ctrl Dly (s/v)	7.5	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Intersection Delay, s/veh	28.1
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	150	281	152	326	280	67
Future Vol, veh/h	150	281	152	326	280	67
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	161	302	163	351	301	72
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	30.2	29.7	23.3
HCM LOS	D	D	C

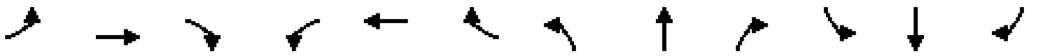
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	35%	0%	81%
Vol Thru, %	65%	32%	0%
Vol Right, %	0%	68%	19%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	431	478	347
LT Vol	150	0	280
Through Vol	281	152	0
RT Vol	0	326	67
Lane Flow Rate	463	514	373
Geometry Grp	1	1	1
Degree of Util (X)	0.804	0.82	0.69
Departure Headway (Hd)	6.246	5.741	6.658
Convergence, Y/N	Yes	Yes	Yes
Cap	579	632	541
Service Time	4.291	3.783	4.703
HCM Lane V/C Ratio	0.8	0.813	0.689
HCM Control Delay, s/veh	30.2	29.7	23.3
HCM Lane LOS	D	D	C
HCM 95th-tile Q	7.9	8.5	5.3

Intersection	
Intersection Delay, s/veh	23.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	507	1	1	489	31	1	0	1	87	5	41
Future Vol, veh/h	9	507	1	1	489	31	1	0	1	87	5	41
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	545	1	1	526	33	1	0	1	94	5	44
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	25.6	25.4	10	11.9
HCM LOS	D	D	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	2%	0%	65%
Vol Thru, %	0%	98%	94%	4%
Vol Right, %	50%	0%	6%	31%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	517	521	133
LT Vol	1	9	1	87
Through Vol	0	507	489	5
RT Vol	1	1	31	41
Lane Flow Rate	2	556	560	143
Geometry Grp	1	1	1	1
Degree of Util (X)	0.004	0.799	0.799	0.259
Departure Headway (Hd)	6.895	5.175	5.137	6.526
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	516	700	706	549
Service Time	4.975	3.209	3.171	4.58
HCM Lane V/C Ratio	0.004	0.794	0.793	0.26
HCM Control Delay, s/veh	10	25.6	25.4	11.9
HCM Lane LOS	A	D	D	B
HCM 95th-tile Q	0	8.1	8.1	1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	484	0	69	0	0	0	152	702	0	0	370	316
Future Volume (veh/h)	484	0	69	0	0	0	152	702	0	0	370	316
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	499	0	71	0	0	0	157	724	0	0	381	326
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	0	562	0	3	0	198	1693	0	3	1036	462
Arrive On Green	0.35	0.00	0.35	0.00	0.00	0.00	0.11	0.48	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1585
Grp Volume(v), veh/h	499	0	71	0	0	0	157	724	0	0	381	326
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1585
Q Serve(g_s), s	17.7	0.0	2.1	0.0	0.0	0.0	6.0	9.4	0.0	0.0	6.0	12.9
Cycle Q Clear(g_c), s	17.7	0.0	2.1	0.0	0.0	0.0	6.0	9.4	0.0	0.0	6.0	12.9
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	631	0	562	0	3	0	198	1693	0	3	1036	462
V/C Ratio(X)	0.79	0.00	0.13	0.00	0.00	0.00	0.79	0.43	0.00	0.00	0.37	0.71
Avail Cap(c_a), veh/h	1266	0	1127	0	399	0	506	1693	0	506	2526	1127
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	0.0	15.3	0.0	0.0	0.0	30.5	12.1	0.0	0.0	19.8	22.2
Incr Delay (d2), s/veh	3.2	0.0	0.1	0.0	0.0	0.0	2.7	0.2	0.0	0.0	0.3	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	0.7	0.0	0.0	0.0	2.5	3.1	0.0	0.0	2.2	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.6	0.0	15.5	0.0	0.0	0.0	33.2	12.3	0.0	0.0	20.1	25.0
LnGrp LOS	C		B				C	B			C	C
Approach Vol, veh/h		570			0			881			707	
Approach Delay, s/veh		22.6			0.0			16.0			22.4	
Approach LOS		C						B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	39.8		30.5	13.0	26.8		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	0.0	11.4		19.7	8.0	14.9		0.0				
Green Ext Time (p_c), s	0.0	5.1		5.3	0.1	5.6		0.0				

Intersection Summary			
HCM 7th Control Delay, s/veh		19.8	
HCM 7th LOS		B	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	14	71	23	19	14	491	51	33	830	21
Future Volume (veh/h)	5	11	14	71	23	19	14	491	51	33	830	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	12	15	76	25	20	15	528	55	35	892	23
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	104	108	284	55	34	34	1028	107	73	1198	31
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.02	0.32	0.32	0.04	0.34	0.34
Sat Flow, veh/h	137	756	788	864	402	251	1781	3244	337	1781	3539	91
Grp Volume(v), veh/h	32	0	0	121	0	0	15	288	295	35	448	467
Grp Sat Flow(s),veh/h/ln	1682	0	0	1517	0	0	1781	1777	1804	1781	1777	1853
Q Serve(g_s), s	0.0	0.0	0.0	2.0	0.0	0.0	0.3	4.7	4.7	0.7	7.9	7.9
Cycle Q Clear(g_c), s	0.6	0.0	0.0	2.6	0.0	0.0	0.3	4.7	4.7	0.7	7.9	7.9
Prop In Lane	0.16		0.47	0.63		0.17	1.00		0.19	1.00		0.05
Lane Grp Cap(c), veh/h	349	0	0	374	0	0	34	563	571	73	602	627
V/C Ratio(X)	0.09	0.00	0.00	0.32	0.00	0.00	0.43	0.51	0.52	0.48	0.74	0.74
Avail Cap(c_a), veh/h	1197	0	0	1129	0	0	251	631	641	326	706	737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	0.0	0.0	14.3	0.0	0.0	17.2	9.9	9.9	16.6	10.4	10.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	8.4	0.7	0.7	4.8	3.6	3.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.7	0.0	0.0	0.2	1.4	1.4	0.3	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.6	0.0	0.0	14.8	0.0	0.0	25.6	10.6	10.6	21.4	14.0	13.8
LnGrp LOS	B			B			C	B	B	C	B	B
Approach Vol, veh/h		32			121			598			950	
Approach Delay, s/veh		13.6			14.8			11.0			14.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	17.3		11.2	6.2	18.1		11.2				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	6.5	12.6		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	2.7	6.7		2.6	2.3	9.9		4.6				
Green Ext Time (p_c), s	0.0	1.7		0.1	0.0	2.1		0.5				

Intersection Summary		
HCM 7th Control Delay, s/veh		13.1
HCM 7th LOS		B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	93	111	26	28	1
Future Vol, veh/h	0	93	111	26	28	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	99	118	28	30	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	146	0	-	0	231	132
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	99	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1436	-	-	-	757	917
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	925	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1436	-	-	-	757	917
Mov Cap-2 Maneuver	-	-	-	-	757	-
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	925	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0	0	9.92
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1436	-	-	-	762
HCM Lane V/C Ratio	-	-	-	-	0.04
HCM Ctrl Dly (s/v)	0	-	-	-	9.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	116	134	14	8	3
Future Vol, veh/h	5	116	134	14	8	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	118	137	14	8	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	151	0	-	0	272	144
Stage 1	-	-	-	-	144	-
Stage 2	-	-	-	-	129	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1430	-	-	-	717	904
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	897	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1430	-	-	-	714	904
Mov Cap-2 Maneuver	-	-	-	-	714	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	897	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.31	0	9.82
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	74	-	-	-	758
HCM Lane V/C Ratio	0.004	-	-	-	0.015
HCM Ctrl Dly (s/v)	7.5	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	22.1
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	207	314	206	245	102
Future Vol, veh/h	49	207	314	206	245	102
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	220	334	219	261	109
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	14.1	28.4	18.7
HCM LOS	B	D	C

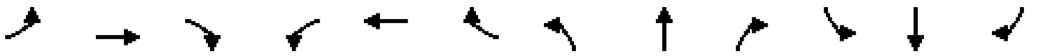
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	0%	71%
Vol Thru, %	81%	60%	0%
Vol Right, %	0%	40%	29%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	256	520	347
LT Vol	49	0	245
Through Vol	207	314	0
RT Vol	0	206	102
Lane Flow Rate	272	553	369
Geometry Grp	1	1	1
Degree of Util (X)	0.455	0.822	0.622
Departure Headway (Hd)	6.019	5.35	6.066
Convergence, Y/N	Yes	Yes	Yes
Cap	594	675	591
Service Time	4.103	3.419	4.137
HCM Lane V/C Ratio	0.458	0.819	0.624
HCM Control Delay, s/veh	14.1	28.4	18.7
HCM Lane LOS	B	D	C
HCM 95th-tile Q	2.4	8.7	4.3

Intersection	
Intersection Delay, s/veh	15.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	375	2	2	408	93	2	2	1	48	0	29
Future Vol, veh/h	27	375	2	2	408	93	2	2	1	48	0	29
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	403	2	2	439	100	2	2	1	52	0	31
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	14.3	17.1	9.4	10
HCM LOS	B	C	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	7%	0%	62%
Vol Thru, %	40%	93%	81%	0%
Vol Right, %	20%	0%	18%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	404	503	77
LT Vol	2	27	2	48
Through Vol	2	375	408	0
RT Vol	1	2	93	29
Lane Flow Rate	5	434	541	83
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.577	0.686	0.139
Departure Headway (Hd)	6.338	4.78	4.567	6.049
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	568	747	784	596
Service Time	4.341	2.85	2.631	4.049
HCM Lane V/C Ratio	0.009	0.581	0.69	0.139
HCM Control Delay, s/veh	9.4	14.3	17.1	10
HCM Lane LOS	A	B	C	A
HCM 95th-tile Q	0	3.7	5.5	0.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	0	122	0	0	0	77	439	0	0	689	385
Future Volume (veh/h)	320	0	122	0	0	0	77	439	0	0	689	385
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	337	0	128	0	0	0	81	462	0	0	725	405
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	469	0	418	0	3	0	106	1954	0	3	1451	634
Arrive On Green	0.26	0.00	0.26	0.00	0.00	0.00	0.06	0.55	0.00	0.00	0.41	0.41
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1552
Grp Volume(v), veh/h	337	0	128	0	0	0	81	462	0	0	725	405
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1552
Q Serve(g_s), s	10.9	0.0	4.1	0.0	0.0	0.0	2.9	4.3	0.0	0.0	9.7	13.3
Cycle Q Clear(g_c), s	10.9	0.0	4.1	0.0	0.0	0.0	2.9	4.3	0.0	0.0	9.7	13.3
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	469	0	418	0	3	0	106	1954	0	3	1451	634
V/C Ratio(X)	0.72	0.00	0.31	0.00	0.00	0.00	0.76	0.24	0.00	0.00	0.50	0.64
Avail Cap(c_a), veh/h	1398	0	1244	0	440	0	559	1954	0	559	2789	1218
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	0.0	18.8	0.0	0.0	0.0	29.5	7.4	0.0	0.0	14.0	15.1
Incr Delay (d2), s/veh	2.9	0.0	0.6	0.0	0.0	0.0	4.2	0.1	0.0	0.0	0.4	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	1.5	0.0	0.0	0.0	1.2	1.2	0.0	0.0	3.2	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.3	0.0	19.4	0.0	0.0	0.0	33.7	7.5	0.0	0.0	14.4	16.6
LnGrp LOS	C		B				C	A			B	B
Approach Vol, veh/h		465			0			543			1130	
Approach Delay, s/veh		22.9			0.0			11.4			15.2	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	41.3		22.4	9.0	32.3		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	0.0	6.3		12.9	4.9	15.3		0.0				
Green Ext Time (p_c), s	0.0	3.3		3.8	0.1	10.7		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		15.9
HCM 7th LOS		B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	34	15	49	23	73	8	579	81	48	163	5
Future Volume (veh/h)	15	34	15	49	23	73	8	579	81	48	163	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.95	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	37	16	53	25	78	9	623	87	52	175	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	156	192	69	197	68	136	21	899	125	100	1175	33
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.01	0.29	0.29	0.06	0.33	0.33
Sat Flow, veh/h	211	1105	397	389	393	783	1781	3111	433	1781	3527	100
Grp Volume(v), veh/h	69	0	0	156	0	0	9	355	355	52	88	92
Grp Sat Flow(s),veh/h/ln	1713	0	0	1566	0	0	1781	1777	1767	1781	1777	1851
Q Serve(g_s), s	0.0	0.0	0.0	1.7	0.0	0.0	0.2	6.6	6.6	1.1	1.3	1.3
Cycle Q Clear(g_c), s	1.2	0.0	0.0	3.3	0.0	0.0	0.2	6.6	6.6	1.1	1.3	1.3
Prop In Lane	0.23		0.23	0.34		0.50	1.00		0.25	1.00		0.05
Lane Grp Cap(c), veh/h	417	0	0	402	0	0	21	514	511	100	592	616
V/C Ratio(X)	0.17	0.00	0.00	0.39	0.00	0.00	0.42	0.69	0.69	0.52	0.15	0.15
Avail Cap(c_a), veh/h	1157	0	0	1077	0	0	239	669	665	244	673	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	14.0	0.0	0.0	18.3	11.8	11.8	17.1	8.7	8.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	12.8	2.1	2.1	4.2	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.9	0.0	0.0	0.1	2.2	2.2	0.5	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.4	0.0	0.0	14.6	0.0	0.0	31.0	13.8	13.9	21.3	8.8	8.8
LnGrp LOS	B			B			C	B	B	C	A	A
Approach Vol, veh/h		69			156			719			232	
Approach Delay, s/veh		13.4			14.6			14.1			11.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	16.9		12.8	5.9	18.5		12.8				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	5.1	14.0		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	3.1	8.6		3.2	2.2	3.3		5.3				
Green Ext Time (p_c), s	0.0	2.0		0.2	0.0	0.6		0.7				

Intersection Summary	
HCM 7th Control Delay, s/veh	13.6
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	11	138	6	6	119	9	16	3	18	27	1	9
Future Vol, veh/h	11	138	6	6	119	9	16	3	18	27	1	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	148	6	6	128	10	17	3	19	29	1	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	138	0	0	155	0	0	317	326	152	319	324	133
Stage 1	-	-	-	-	-	-	175	175	-	146	146	-
Stage 2	-	-	-	-	-	-	141	151	-	174	178	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1446	-	-	1425	-	-	636	592	895	633	594	916
Stage 1	-	-	-	-	-	-	827	754	-	857	776	-
Stage 2	-	-	-	-	-	-	862	773	-	828	752	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1446	-	-	1425	-	-	619	584	895	608	585	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	619	584	-	608	585	-
Stage 1	-	-	-	-	-	-	819	747	-	853	773	-
Stage 2	-	-	-	-	-	-	847	769	-	800	745	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.53	0.34	10.26	10.79
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	724	127	-	-	79	-	-	661
HCM Lane V/C Ratio	0.055	0.008	-	-	0.005	-	-	0.06
HCM Ctrl Dly (s/v)	10.3	7.5	0	-	7.5	0	-	10.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	174	6	6	115	11	16	3	18	30	1	3
Future Vol, veh/h	3	174	6	6	115	11	16	3	18	30	1	3
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	187	6	6	124	12	17	3	19	32	1	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.5	8.2	7.8	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	43%	2%	5%	88%
Vol Thru, %	8%	95%	87%	3%
Vol Right, %	49%	3%	8%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	183	132	34
LT Vol	16	3	6	30
Through Vol	3	174	115	1
RT Vol	18	6	11	3
Lane Flow Rate	40	197	142	37
Geometry Grp	1	1	1	1
Degree of Util (X)	0.05	0.233	0.169	0.049
Departure Headway (Hd)	4.519	4.258	4.277	4.851
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	794	848	842	740
Service Time	2.539	2.258	2.29	2.872
HCM Lane V/C Ratio	0.05	0.232	0.169	0.05
HCM Control Delay, s/veh	7.8	8.5	8.2	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.9	0.6	0.2

Intersection	
Intersection Delay, s/veh	34.8
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	435	208	246	295	38
Future Vol, veh/h	70	435	208	246	295	38
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	468	224	265	317	41
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	47.1	29.3	23.6
HCM LOS	E	D	C

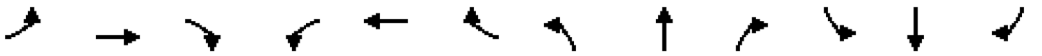
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	0%	89%
Vol Thru, %	86%	46%	0%
Vol Right, %	0%	54%	11%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	505	454	333
LT Vol	70	0	295
Through Vol	435	208	0
RT Vol	0	246	38
Lane Flow Rate	543	488	358
Geometry Grp	1	1	1
Degree of Util (X)	0.931	0.807	0.684
Departure Headway (Hd)	6.175	5.952	6.879
Convergence, Y/N	Yes	Yes	Yes
Cap	586	605	526
Service Time	4.22	3.998	4.927
HCM Lane V/C Ratio	0.927	0.807	0.681
HCM Control Delay, s/veh	47.1	29.3	23.6
HCM Lane LOS	E	D	C
HCM 95th-tile Q	11.9	8.1	5.2

Intersection	
Intersection Delay, s/veh	45.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	713	1	3	463	29	1	0	2	58	3	14
Future Vol, veh/h	6	713	1	3	463	29	1	0	2	58	3	14
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	767	1	3	498	31	1	0	2	62	3	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	64.9	21.6	9.9	11.2
HCM LOS	F	C	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	1%	1%	77%
Vol Thru, %	0%	99%	94%	4%
Vol Right, %	67%	0%	6%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	720	495	75
LT Vol	1	6	3	58
Through Vol	0	713	463	3
RT Vol	2	1	29	14
Lane Flow Rate	3	774	532	81
Geometry Grp	1	1	1	1
Degree of Util (X)	0.006	1.037	0.745	0.152
Departure Headway (Hd)	6.908	4.823	5.145	6.953
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	521	743	708	519
Service Time	4.908	2.916	3.145	4.953
HCM Lane V/C Ratio	0.006	1.042	0.751	0.156
HCM Control Delay, s/veh	9.9	64.9	21.6	11.2
HCM Lane LOS	A	F	C	B
HCM 95th-tile Q	0	18.7	6.7	0.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	659	0	43	0	0	0	82	765	0	0	499	386
Future Volume (veh/h)	659	0	43	0	0	0	82	765	0	0	499	386
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	679	0	44	0	0	0	85	789	0	0	514	398
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	769	0	684	0	2	0	110	1570	0	2	1155	515
Arrive On Green	0.43	0.00	0.43	0.00	0.00	0.00	0.06	0.44	0.00	0.00	0.32	0.32
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1585
Grp Volume(v), veh/h	679	0	44	0	0	0	85	789	0	0	514	398
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1585
Q Serve(g_s), s	32.9	0.0	1.5	0.0	0.0	0.0	4.4	15.0	0.0	0.0	10.7	21.3
Cycle Q Clear(g_c), s	32.9	0.0	1.5	0.0	0.0	0.0	4.4	15.0	0.0	0.0	10.7	21.3
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	769	0	684	0	2	0	110	1570	0	2	1155	515
V/C Ratio(X)	0.88	0.00	0.06	0.00	0.00	0.00	0.78	0.50	0.00	0.00	0.45	0.77
Avail Cap(c_a), veh/h	948	0	844	0	299	0	379	1570	0	379	1892	844
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	15.6	0.0	0.0	0.0	43.4	18.8	0.0	0.0	25.0	28.6
Incr Delay (d2), s/veh	9.2	0.0	0.1	0.0	0.0	0.0	4.4	0.3	0.0	0.0	0.4	3.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.6	0.0	0.5	0.0	0.0	0.0	2.0	5.6	0.0	0.0	4.3	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.7	0.0	15.7	0.0	0.0	0.0	47.8	19.1	0.0	0.0	25.4	32.1
LnGrp LOS	C		B				D	B			C	C
Approach Vol, veh/h		723			0			874			912	
Approach Delay, s/veh		32.6			0.0			21.9			28.3	
Approach LOS		C						C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	47.8		46.1	11.0	36.8		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	0.0	17.0		34.9	6.4	23.3		0.0				
Green Ext Time (p_c), s	0.0	4.7		5.6	0.1	7.3		0.0				

Intersection Summary			
HCM 7th Control Delay, s/veh		27.3	
HCM 7th LOS		C	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	9	3	334	160	7
Future Vol, veh/h	20	9	3	334	160	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	10	3	359	172	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	541	176	180	0	-	0
Stage 1	176	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	502	867	1396	-	-	-
Stage 1	855	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	500	867	1396	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	852	-	-	-	-	-
Stage 2	702	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.61	0.07	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	16	-	576	-	-
HCM Lane V/C Ratio	0.002	-	0.054	-	-
HCM Ctrl Dly (s/v)	7.6	0	11.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	9	3	317	162	7
Future Vol, veh/h	20	9	3	317	162	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	10	3	341	174	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	525	178	182	0	-	0
Stage 1	178	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	513	865	1393	-	-	-
Stage 1	853	-	-	-	-	-
Stage 2	715	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	511	865	1393	-	-	-
Mov Cap-2 Maneuver	511	-	-	-	-	-
Stage 1	850	-	-	-	-	-
Stage 2	715	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.49	0.07	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	17	-	586	-	-
HCM Lane V/C Ratio	0.002	-	0.053	-	-
HCM Ctrl Dly (s/v)	7.6	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	18	10	92	38	45	8	166	54	85	492	16
Future Volume (veh/h)	3	18	10	92	38	45	8	166	54	85	492	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.97	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	19	11	99	41	48	9	178	58	91	529	17
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	113	208	110	272	88	74	21	698	220	144	1169	38
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.26	0.26	0.08	0.33	0.33
Sat Flow, veh/h	57	1100	579	683	462	393	1781	2647	833	1781	3513	113
Grp Volume(v), veh/h	33	0	0	188	0	0	9	117	119	91	267	279
Grp Sat Flow(s),veh/h/ln	1736	0	0	1538	0	0	1781	1777	1703	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	3.3	0.0	0.0	0.2	2.0	2.1	1.9	4.5	4.6
Cycle Q Clear(g_c), s	0.6	0.0	0.0	4.3	0.0	0.0	0.2	2.0	2.1	1.9	4.5	4.6
Prop In Lane	0.09		0.33	0.53		0.26	1.00		0.49	1.00		0.06
Lane Grp Cap(c), veh/h	431	0	0	434	0	0	21	469	449	144	591	615
V/C Ratio(X)	0.08	0.00	0.00	0.43	0.00	0.00	0.42	0.25	0.26	0.63	0.45	0.45
Avail Cap(c_a), veh/h	1143	0	0	1048	0	0	232	583	559	301	652	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	0.0	14.3	0.0	0.0	18.9	11.1	11.2	17.1	10.1	10.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.7	0.0	0.0	12.8	0.3	0.3	4.5	0.5	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.2	0.0	0.0	0.1	0.6	0.6	0.8	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.9	0.0	0.0	15.0	0.0	0.0	31.7	11.4	11.5	21.6	10.6	10.6
LnGrp LOS	B			B			C	B	B	C	B	B
Approach Vol, veh/h		33			188			245			637	
Approach Delay, s/veh		12.9			15.0			12.2			12.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	16.2		13.6	6.0	18.9		13.6				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	6.5	12.6		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	3.9	4.1		2.6	2.2	6.6		6.3				
Green Ext Time (p_c), s	0.0	0.8		0.1	0.0	1.9		0.8				

Intersection Summary		
HCM 7th Control Delay, s/veh	12.7	
HCM 7th LOS	B	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	136	18	22	157	25	11	1	13	28	3	6
Future Vol, veh/h	1	136	18	22	157	25	11	1	13	28	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	145	19	23	167	27	12	1	14	30	3	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	194	0	0	164	0	0	372	397	154	374	393	180
Stage 1	-	-	-	-	-	-	156	156	-	227	227	-
Stage 2	-	-	-	-	-	-	215	240	-	147	166	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1380	-	-	1415	-	-	585	541	892	583	543	862
Stage 1	-	-	-	-	-	-	846	768	-	776	716	-
Stage 2	-	-	-	-	-	-	787	707	-	855	761	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1380	-	-	1415	-	-	566	530	892	561	533	862
Mov Cap-2 Maneuver	-	-	-	-	-	-	566	530	-	561	533	-
Stage 1	-	-	-	-	-	-	845	768	-	761	703	-
Stage 2	-	-	-	-	-	-	763	693	-	840	760	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.05	0.82	10.37	11.51
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	696	11	-	-	189	-	-	592
HCM Lane V/C Ratio	0.038	0.001	-	-	0.017	-	-	0.066
HCM Ctrl Dly (s/v)	10.4	7.6	0	-	7.6	0	-	11.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.2

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	156	18	22	190	14	11	1	13	8	3	3
Future Vol, veh/h	3	156	18	22	190	14	11	1	13	8	3	3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	159	18	22	194	14	11	1	13	8	3	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.3	8.7	7.8	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	2%	10%	57%
Vol Thru, %	4%	88%	84%	21%
Vol Right, %	52%	10%	6%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	177	226	14
LT Vol	11	3	22	8
Through Vol	1	156	190	3
RT Vol	13	18	14	3
Lane Flow Rate	26	181	231	14
Geometry Grp	1	1	1	1
Degree of Util (X)	0.033	0.207	0.264	0.019
Departure Headway (Hd)	4.613	4.121	4.123	4.839
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	780	860	862	744
Service Time	2.615	2.204	2.195	2.841
HCM Lane V/C Ratio	0.033	0.21	0.268	0.019
HCM Control Delay, s/veh	7.8	8.3	8.7	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.8	1.1	0.1

Intersection	
Intersection Delay, s/veh	47.6
Intersection LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	292	499	201	192	33
Future Vol, veh/h	15	292	499	201	192	33
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	311	531	214	204	35
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	15	72.4	14.8
HCM LOS	B	F	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	0%	85%
Vol Thru, %	95%	71%	0%
Vol Right, %	0%	29%	15%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	307	700	225
LT Vol	15	0	192
Through Vol	292	499	0
RT Vol	0	201	33
Lane Flow Rate	327	745	239
Geometry Grp	1	1	1
Degree of Util (X)	0.519	1.058	0.434
Departure Headway (Hd)	5.877	5.116	6.724
Convergence, Y/N	Yes	Yes	Yes
Cap	617	707	539
Service Time	3.877	3.144	4.724
HCM Lane V/C Ratio	0.53	1.054	0.443
HCM Control Delay, s/veh	15	72.4	14.8
HCM Lane LOS	B	F	B
HCM 95th-tile Q	3	19.4	2.2

Intersection	
Intersection Delay, s/veh	23.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	422	1	4	580	63	2	1	2	34	0	6
Future Vol, veh/h	5	422	1	4	580	63	2	1	2	34	0	6
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	454	1	4	624	68	2	1	2	37	0	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	15.3	30.5	9.5	10.2
HCM LOS	C	D	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	1%	1%	85%
Vol Thru, %	20%	99%	90%	0%
Vol Right, %	40%	0%	10%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	428	647	40
LT Vol	2	5	4	34
Through Vol	1	422	580	0
RT Vol	2	1	63	6
Lane Flow Rate	5	460	696	43
Geometry Grp	1	1	1	1
Degree of Util (X)	0.01	0.615	0.876	0.079
Departure Headway (Hd)	6.475	4.81	4.533	6.585
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	556	746	793	547
Service Time	4.479	2.873	2.587	4.587
HCM Lane V/C Ratio	0.009	0.617	0.878	0.079
HCM Control Delay, s/veh	9.5	15.3	30.5	10.2
HCM Lane LOS	A	C	D	B
HCM 95th-tile Q	0	4.3	11.1	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	442	0	70	0	0	0	58	557	0	1	734	589
Future Volume (veh/h)	442	0	70	0	0	0	58	557	0	1	734	589
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	465	0	74	0	0	0	61	586	0	1	773	620
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	556	0	495	0	2	0	79	1804	0	2	1651	721
Arrive On Green	0.31	0.00	0.31	0.00	0.00	0.00	0.04	0.51	0.00	0.00	0.46	0.46
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1552
Grp Volume(v), veh/h	465	0	74	0	0	0	61	586	0	1	773	620
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1552
Q Serve(g_s), s	23.2	0.0	3.2	0.0	0.0	0.0	3.2	9.3	0.0	0.1	14.2	34.0
Cycle Q Clear(g_c), s	23.2	0.0	3.2	0.0	0.0	0.0	3.2	9.3	0.0	0.1	14.2	34.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	556	0	495	0	2	0	79	1804	0	2	1651	721
V/C Ratio(X)	0.84	0.00	0.15	0.00	0.00	0.00	0.77	0.32	0.00	0.41	0.47	0.86
Avail Cap(c_a), veh/h	932	0	829	0	294	0	373	1804	0	373	1859	812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	23.7	0.0	0.0	0.0	45.2	13.9	0.0	47.7	17.5	22.8
Incr Delay (d2), s/veh	4.8	0.0	0.2	0.0	0.0	0.0	5.9	0.1	0.0	36.1	0.3	9.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	0.0	1.2	0.0	0.0	0.0	1.5	3.4	0.0	0.0	5.3	12.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.4	0.0	23.9	0.0	0.0	0.0	51.1	14.0	0.0	83.8	17.8	31.8
LnGrp LOS	D		C				D	B		F	B	C
Approach Vol, veh/h		539			0			647			1394	
Approach Delay, s/veh		33.8			0.0			17.5			24.1	
Approach LOS		C						B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	54.8		35.4	9.4	50.7		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	2.1	11.3		25.2	5.2	36.0		0.0				
Green Ext Time (p_c), s	0.0	4.0		4.6	0.0	8.4		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	24.5
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	6	11	142	293	23
Future Vol, veh/h	14	6	11	142	293	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	6	12	153	315	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	504	327	340	0	-	0
Stage 1	327	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	528	714	1219	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	854	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	522	714	1219	-	-	-
Mov Cap-2 Maneuver	522	-	-	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.59	0.57	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	129	-	568	-	-
HCM Lane V/C Ratio	0.01	-	0.038	-	-
HCM Ctrl Dly (s/v)	8	0	11.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	6	11	139	276	23
Future Vol, veh/h	14	6	11	139	276	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	6	12	149	297	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	482	309	322	0	-	0
Stage 1	309	-	-	-	-	-
Stage 2	173	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	543	731	1238	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	537	731	1238	-	-	-
Mov Cap-2 Maneuver	537	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	857	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.4	0.58	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	132	-	584	-	-
HCM Lane V/C Ratio	0.01	-	0.037	-	-
HCM Ctrl Dly (s/v)	7.9	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	19	21	63	18	103	9	891	63	58	440	8
Future Volume (veh/h)	17	19	21	63	18	103	9	891	63	58	440	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.96	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	20	23	68	19	111	10	958	68	62	473	9
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	153	125	191	57	173	23	1084	77	108	1323	25
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.32	0.32	0.06	0.37	0.37
Sat Flow, veh/h	269	771	630	396	286	870	1781	3353	238	1781	3566	68
Grp Volume(v), veh/h	61	0	0	198	0	0	10	508	518	62	235	247
Grp Sat Flow(s),veh/h/ln	1670	0	0	1553	0	0	1781	1777	1815	1781	1777	1857
Q Serve(g_s), s	0.0	0.0	0.0	2.9	0.0	0.0	0.2	11.6	11.6	1.5	4.1	4.1
Cycle Q Clear(g_c), s	1.2	0.0	0.0	4.9	0.0	0.0	0.2	11.6	11.6	1.5	4.1	4.1
Prop In Lane	0.30		0.38	0.34		0.56	1.00		0.13	1.00		0.04
Lane Grp Cap(c), veh/h	441	0	0	422	0	0	23	574	586	108	659	689
V/C Ratio(X)	0.14	0.00	0.00	0.47	0.00	0.00	0.43	0.88	0.88	0.57	0.36	0.36
Avail Cap(c_a), veh/h	973	0	0	931	0	0	208	580	592	212	659	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	0.0	15.7	0.0	0.0	21.0	13.8	13.8	19.6	9.8	9.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.8	0.0	0.0	12.0	15.0	14.7	4.7	0.3	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.4	0.0	0.0	0.2	5.9	6.0	0.7	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.4	0.0	0.0	16.5	0.0	0.0	33.0	28.7	28.5	24.3	10.1	10.1
LnGrp LOS	B			B			C	C	C	C	B	B
Approach Vol, veh/h		61			198			1036			544	
Approach Delay, s/veh		14.4			16.5			28.6			11.7	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	20.0		14.8	6.1	22.0		14.8				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	5.1	14.0		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	3.5	13.6		3.2	2.2	6.1		6.9				
Green Ext Time (p_c), s	0.0	0.2		0.2	0.0	1.7		0.9				

Intersection Summary	
HCM 7th Control Delay, s/veh	21.9
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	117	8	4	149	9	23	3	11	22	1	12
Future Vol, veh/h	7	117	8	4	149	9	23	3	11	22	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	126	9	4	160	10	25	3	12	24	1	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	170	0	0	134	0	0	315	324	130	316	323	165
Stage 1	-	-	-	-	-	-	145	145	-	174	174	-
Stage 2	-	-	-	-	-	-	169	178	-	142	149	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1407	-	-	1450	-	-	638	594	920	637	594	879
Stage 1	-	-	-	-	-	-	858	777	-	828	755	-
Stage 2	-	-	-	-	-	-	833	752	-	860	774	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1407	-	-	1450	-	-	622	589	920	619	589	879
Mov Cap-2 Maneuver	-	-	-	-	-	-	622	589	-	619	589	-
Stage 1	-	-	-	-	-	-	853	772	-	825	753	-
Stage 2	-	-	-	-	-	-	816	749	-	841	769	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.4	0.18	10.58	10.53
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	685	94	-	-	44	-	-	688
HCM Lane V/C Ratio	0.058	0.005	-	-	0.003	-	-	0.055
HCM Ctrl Dly (s/v)	10.6	7.6	0	-	7.5	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	139	8	4	134	11	23	3	11	29	1	5
Future Vol, veh/h	3	139	8	4	134	11	23	3	11	29	1	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	149	9	4	144	12	25	3	12	31	1	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.3	8.2	7.9	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	62%	2%	3%	83%
Vol Thru, %	8%	93%	90%	3%
Vol Right, %	30%	5%	7%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	150	149	35
LT Vol	23	3	4	29
Through Vol	3	139	134	1
RT Vol	11	8	11	5
Lane Flow Rate	40	161	160	38
Geometry Grp	1	1	1	1
Degree of Util (X)	0.051	0.191	0.189	0.05
Departure Headway (Hd)	4.633	4.265	4.255	4.769
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	775	845	848	753
Service Time	2.651	2.268	2.259	2.787
HCM Lane V/C Ratio	0.052	0.191	0.189	0.05
HCM Control Delay, s/veh	7.9	8.3	8.2	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.7	0.7	0.2

Intersection	
Intersection Delay, s/veh	35.2
Intersection LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	153	321	166	326	280	68
Future Vol, veh/h	153	321	166	326	280	68
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	345	178	351	301	73
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	42	35.7	25.1
HCM LOS	E	E	D

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	32%	0%	80%
Vol Thru, %	68%	34%	0%
Vol Right, %	0%	66%	20%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	474	492	348
LT Vol	153	0	280
Through Vol	321	166	0
RT Vol	0	326	68
Lane Flow Rate	510	529	374
Geometry Grp	1	1	1
Degree of Util (X)	0.897	0.867	0.711
Departure Headway (Hd)	6.336	5.898	6.843
Convergence, Y/N	Yes	Yes	Yes
Cap	571	614	528
Service Time	4.388	3.949	4.893
HCM Lane V/C Ratio	0.893	0.862	0.708
HCM Control Delay, s/veh	42	35.7	25.1
HCM Lane LOS	E	E	D
HCM 95th-tile Q	10.6	9.9	5.7

Intersection	
Intersection Delay, s/veh	28.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	547	1	1	503	31	1	0	1	87	5	41
Future Vol, veh/h	9	547	1	1	503	31	1	0	1	87	5	41
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	588	1	1	541	33	1	0	1	94	5	44
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	32.6	28.7	10.2	12.1
HCM LOS	D	D	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	2%	0%	65%
Vol Thru, %	0%	98%	94%	4%
Vol Right, %	50%	0%	6%	31%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	557	535	133
LT Vol	1	9	1	87
Through Vol	0	547	503	5
RT Vol	1	1	31	41
Lane Flow Rate	2	599	575	143
Geometry Grp	1	1	1	1
Degree of Util (X)	0.004	0.867	0.832	0.265
Departure Headway (Hd)	7.068	5.214	5.209	6.661
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	503	695	696	538
Service Time	5.161	3.254	3.251	4.721
HCM Lane V/C Ratio	0.004	0.862	0.826	0.266
HCM Control Delay, s/veh	10.2	32.6	28.7	12.1
HCM Lane LOS	B	D	D	B
HCM 95th-tile Q	0	10.3	9.1	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	523	0	70	0	0	0	152	702	0	0	370	330
Future Volume (veh/h)	523	0	70	0	0	0	152	702	0	0	370	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	539	0	72	0	0	0	157	724	0	0	381	340
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	663	0	590	0	2	0	196	1676	0	2	1043	465
Arrive On Green	0.37	0.00	0.37	0.00	0.00	0.00	0.11	0.47	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1585
Grp Volume(v), veh/h	539	0	72	0	0	0	157	724	0	0	381	340
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1585
Q Serve(g_s), s	20.8	0.0	2.3	0.0	0.0	0.0	6.6	10.3	0.0	0.0	6.5	14.7
Cycle Q Clear(g_c), s	20.8	0.0	2.3	0.0	0.0	0.0	6.6	10.3	0.0	0.0	6.5	14.7
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	663	0	590	0	2	0	196	1676	0	2	1043	465
V/C Ratio(X)	0.81	0.00	0.12	0.00	0.00	0.00	0.80	0.43	0.00	0.00	0.37	0.73
Avail Cap(c_a), veh/h	1168	0	1039	0	368	0	467	1676	0	467	2330	1039
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	15.7	0.0	0.0	0.0	33.1	13.4	0.0	0.0	21.3	24.2
Incr Delay (d2), s/veh	3.5	0.0	0.1	0.0	0.0	0.0	2.9	0.2	0.0	0.0	0.3	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	0.0	0.8	0.0	0.0	0.0	2.8	3.5	0.0	0.0	2.5	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.0	0.0	15.9	0.0	0.0	0.0	36.0	13.6	0.0	0.0	21.6	27.4
LnGrp LOS	C		B				D	B			C	C
Approach Vol, veh/h		611			0			881			721	
Approach Delay, s/veh		23.9			0.0			17.6			24.3	
Approach LOS		C						B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	42.3		34.0	13.6	28.7		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	0.0	12.3		22.8	8.6	16.7		0.0				
Green Ext Time (p_c), s	0.0	5.0		5.6	0.1	5.7		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		21.5
HCM 7th LOS		C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	9	3	366	152	7
Future Vol, veh/h	20	9	3	366	152	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	10	3	394	163	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	567	167	171	0	-	0
Stage 1	167	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	485	877	1406	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	483	877	1406	-	-	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	677	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.79	0.06	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	15	-	562	-	-
HCM Lane V/C Ratio	0.002	-	0.056	-	-
HCM Ctrl Dly (s/v)	7.6	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	9	3	349	154	7
Future Vol, veh/h	20	9	3	349	154	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	10	3	375	166	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	551	169	173	0	-	0
Stage 1	169	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	495	875	1404	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	494	875	1404	-	-	-
Mov Cap-2 Maneuver	494	-	-	-	-	-
Stage 1	858	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.67	0.06	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	15	-	571	-	-
HCM Lane V/C Ratio	0.002	-	0.055	-	-
HCM Ctrl Dly (s/v)	7.6	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	11	14	72	23	63	14	491	52	107	830	21
Future Volume (veh/h)	5	11	14	72	23	63	14	491	52	107	830	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.97	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	12	15	77	25	68	15	528	56	115	892	23
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	128	137	138	235	63	108	34	857	91	164	1195	31
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.02	0.26	0.26	0.09	0.34	0.34
Sat Flow, veh/h	107	782	785	562	359	614	1781	3236	342	1781	3539	91
Grp Volume(v), veh/h	32	0	0	170	0	0	15	289	295	115	448	467
Grp Sat Flow(s),veh/h/ln	1674	0	0	1536	0	0	1781	1777	1802	1781	1777	1853
Q Serve(g_s), s	0.0	0.0	0.0	2.7	0.0	0.0	0.3	5.5	5.5	2.4	8.5	8.5
Cycle Q Clear(g_c), s	0.6	0.0	0.0	3.8	0.0	0.0	0.3	5.5	5.5	2.4	8.5	8.5
Prop In Lane	0.16		0.47	0.45		0.40	1.00		0.19	1.00		0.05
Lane Grp Cap(c), veh/h	403	0	0	406	0	0	34	470	477	164	600	626
V/C Ratio(X)	0.08	0.00	0.00	0.42	0.00	0.00	0.44	0.61	0.62	0.70	0.75	0.75
Avail Cap(c_a), veh/h	1106	0	0	1043	0	0	233	585	593	302	654	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	0.0	14.5	0.0	0.0	18.6	12.4	12.4	16.9	11.2	11.2
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.7	0.0	0.0	8.5	1.3	1.3	5.3	4.3	4.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.1	0.0	0.0	0.2	1.8	1.8	1.0	3.1	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.3	0.0	0.0	15.2	0.0	0.0	27.1	13.7	13.7	22.2	15.5	15.4
LnGrp LOS	B			B			C	B	B	C	B	B
Approach Vol, veh/h		32			170			599			1030	
Approach Delay, s/veh		13.3			15.2			14.0			16.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	16.2		13.0	6.2	19.0		13.0				
Change Period (Y+Rc), s	5.5	6.1		* 6.3	5.5	6.1		6.3				
Max Green Setting (Gmax), s	6.5	12.6		* 23	5.0	14.1		23.0				
Max Q Clear Time (g_c+I1), s	4.4	7.5		2.6	2.3	10.5		5.8				
Green Ext Time (p_c), s	0.0	1.5		0.1	0.0	1.8		0.7				

Intersection Summary	
HCM 7th Control Delay, s/veh	15.3
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	142	26	14	140	26	16	1	8	28	3	1
Future Vol, veh/h	0	142	26	14	140	26	16	1	8	28	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	151	28	15	149	28	17	1	9	30	3	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	177	0	0	179	0	0	345	371	165	344	371	163
Stage 1	-	-	-	-	-	-	165	165	-	193	193	-
Stage 2	-	-	-	-	-	-	180	206	-	152	179	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1400	-	-	1397	-	-	609	559	880	610	559	882
Stage 1	-	-	-	-	-	-	837	762	-	809	741	-
Stage 2	-	-	-	-	-	-	821	731	-	851	751	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1400	-	-	1397	-	-	598	552	880	596	552	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	598	552	-	596	552	-
Stage 1	-	-	-	-	-	-	837	762	-	800	732	-
Stage 2	-	-	-	-	-	-	807	722	-	841	751	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0.59	10.65	11.39
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	664	1400	-	-	136	-	-	597
HCM Lane V/C Ratio	0.04	-	-	-	0.011	-	-	0.057
HCM Ctrl Dly (s/v)	10.7	0	-	-	7.6	0	-	11.4
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	145	28	12	161	14	16	1	8	8	3	3
Future Vol, veh/h	5	145	28	12	161	14	16	1	8	8	3	3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	148	29	12	164	14	16	1	8	8	3	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.2	8.3	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	64%	3%	6%	57%
Vol Thru, %	4%	81%	86%	21%
Vol Right, %	32%	16%	7%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	178	187	14
LT Vol	16	5	12	8
Through Vol	1	145	161	3
RT Vol	8	28	14	3
Lane Flow Rate	26	182	191	14
Geometry Grp	1	1	1	1
Degree of Util (X)	0.033	0.205	0.218	0.019
Departure Headway (Hd)	4.687	4.06	4.109	4.752
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	768	874	864	758
Service Time	2.688	2.133	2.179	2.753
HCM Lane V/C Ratio	0.034	0.208	0.221	0.018
HCM Control Delay, s/veh	7.8	8.2	8.3	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.8	0.8	0.1

Intersection	
Intersection Delay, s/veh	29.8
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	234	360	206	245	107
Future Vol, veh/h	53	234	360	206	245	107
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	249	383	219	261	114
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay, s/veh	16.3	42.1	21.2
HCM LOS	C	E	C

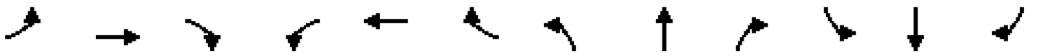
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	0%	70%
Vol Thru, %	82%	64%	0%
Vol Right, %	0%	36%	30%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	287	566	352
LT Vol	53	0	245
Through Vol	234	360	0
RT Vol	0	206	107
Lane Flow Rate	305	602	374
Geometry Grp	1	1	1
Degree of Util (X)	0.533	0.92	0.665
Departure Headway (Hd)	6.285	5.619	6.393
Convergence, Y/N	Yes	Yes	Yes
Cap	574	650	569
Service Time	4.311	3.619	4.393
HCM Lane V/C Ratio	0.531	0.926	0.657
HCM Control Delay, s/veh	16.3	42.1	21.2
HCM Lane LOS	C	E	C
HCM 95th-tile Q	3.1	12	4.9

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	402	2	2	454	93	2	2	1	48	0	29
Future Vol, veh/h	27	402	2	2	454	93	2	2	1	48	0	29
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	432	2	2	488	100	2	2	1	52	0	31
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	15.7	20.7	9.6	10.3
HCM LOS	C	C	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	6%	0%	62%
Vol Thru, %	40%	93%	83%	0%
Vol Right, %	20%	0%	17%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	431	549	77
LT Vol	2	27	2	48
Through Vol	2	402	454	0
RT Vol	1	2	93	29
Lane Flow Rate	5	463	590	83
Geometry Grp	1	1	1	1
Degree of Util (X)	0.01	0.623	0.757	0.143
Departure Headway (Hd)	6.537	4.843	4.619	6.229
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	550	737	773	580
Service Time	4.543	2.925	2.692	4.229
HCM Lane V/C Ratio	0.009	0.628	0.763	0.143
HCM Control Delay, s/veh	9.6	15.7	20.7	10.3
HCM Lane LOS	A	C	C	B
HCM 95th-tile Q	0	4.4	7.2	0.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	346	0	123	0	0	0	79	439	0	0	689	429
Future Volume (veh/h)	346	0	123	0	0	0	79	439	0	0	689	429
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	364	0	129	0	0	0	83	462	0	0	725	452
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	488	0	434	0	3	0	108	1976	0	3	1497	654
Arrive On Green	0.27	0.00	0.27	0.00	0.00	0.00	0.06	0.56	0.00	0.00	0.42	0.42
Sat Flow, veh/h	1781	0	1585	0	1870	0	1781	3647	0	1781	3554	1552
Grp Volume(v), veh/h	364	0	129	0	0	0	83	462	0	0	725	452
Grp Sat Flow(s),veh/h/ln	1781	0	1585	0	1870	0	1781	1777	0	1781	1777	1552
Q Serve(g_s), s	13.0	0.0	4.5	0.0	0.0	0.0	3.2	4.6	0.0	0.0	10.4	16.6
Cycle Q Clear(g_c), s	13.0	0.0	4.5	0.0	0.0	0.0	3.2	4.6	0.0	0.0	10.4	16.6
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	488	0	434	0	3	0	108	1976	0	3	1497	654
V/C Ratio(X)	0.75	0.00	0.30	0.00	0.00	0.00	0.77	0.23	0.00	0.00	0.48	0.69
Avail Cap(c_a), veh/h	1273	0	1133	0	401	0	509	1976	0	509	2540	1109
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	23.2	0.0	20.1	0.0	0.0	0.0	32.4	7.9	0.0	0.0	14.7	16.5
Incr Delay (d2), s/veh	3.2	0.0	0.5	0.0	0.0	0.0	4.3	0.1	0.0	0.0	0.3	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	1.6	0.0	0.0	0.0	1.4	1.4	0.0	0.0	3.6	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.4	0.0	20.6	0.0	0.0	0.0	36.7	8.0	0.0	0.0	15.1	18.4
LnGrp LOS	C		C				D	A			B	B
Approach Vol, veh/h		493			0			545			1177	
Approach Delay, s/veh		24.9			0.0			12.4			16.3	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	45.2		24.8	9.4	35.8		0.0				
Change Period (Y+Rc), s	5.2	6.3		5.6	5.2	* 6.3		5.2				
Max Green Setting (Gmax), s	20.0	30.0		50.0	20.0	* 50		15.0				
Max Q Clear Time (g_c+I1), s	0.0	6.6		15.0	5.2	18.6		0.0				
Green Ext Time (p_c), s	0.0	3.3		4.1	0.1	10.8		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		17.3
HCM 7th LOS		B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	6	11	148	299	23
Future Vol, veh/h	14	6	11	148	299	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	6	12	159	322	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	517	334	346	0	-	0
Stage 1	334	-	-	-	-	-
Stage 2	183	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	519	708	1213	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	513	708	1213	-	-	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	849	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.69	0.55	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	125	-	559	-	-
HCM Lane V/C Ratio	0.01	-	0.038	-	-
HCM Ctrl Dly (s/v)	8	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	6	11	145	282	23
Future Vol, veh/h	14	6	11	145	282	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	6	12	156	303	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	495	316	328	0	-	0
Stage 1	316	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	534	725	1232	-	-	-
Stage 1	739	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	528	725	1232	-	-	-
Mov Cap-2 Maneuver	528	-	-	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	851	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.5	0.56	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	127	-	575	-	-
HCM Lane V/C Ratio	0.01	-	0.037	-	-
HCM Ctrl Dly (s/v)	8	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

MOVEMENT SUMMARY

Site: [4] Ints 4 Otis/Marshall (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 2 | Cumulative NoEnterprise NP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	62	2.4	62	2.4	0.306	6.2	LOS A	1.6	41.4	0.42	0.24	0.42	11.0
18	R2	All MCs	275	2.4	275	2.4	0.306	6.2	LOS A	1.6	41.4	0.42	0.24	0.42	15.8
Approach			338	2.4	338	2.4	0.306	6.2	LOS A	1.6	41.4	0.42	0.24	0.42	14.9
East: Marshall Road															
1	L2	All MCs	128	2.4	128	2.4	0.188	4.4	LOS A	0.9	23.6	0.21	0.08	0.21	16.8
6	T1	All MCs	110	2.4	110	2.4	0.188	4.4	LOS A	0.9	23.6	0.21	0.08	0.21	17.5
Approach			238	2.4	238	2.4	0.188	4.4	LOS A	0.9	23.6	0.21	0.08	0.21	17.1
West: Marshall Road															
2	T1	All MCs	189	2.4	189	2.4	0.192	4.7	LOS A	0.9	23.6	0.31	0.15	0.31	19.7
12	R2	All MCs	37	2.4	37	2.4	0.192	4.7	LOS A	0.9	23.6	0.31	0.15	0.31	16.3
Approach			226	2.4	226	2.4	0.192	4.7	LOS A	0.9	23.6	0.31	0.15	0.31	19.2
All Vehicles			801	2.4	801	2.4	0.306	5.2	LOS A	1.6	41.4	0.32	0.17	0.32	16.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (2)] Ints 4 Otis/Marshall (2) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 3 | Cumulative NoEnterprise NP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	6	2.4	6	2.4	0.119	4.1	LOS A	0.5	13.5	0.30	0.15	0.30	12.2
18	R2	All MCs	131	2.4	131	2.4	0.119	4.1	LOS A	0.5	13.5	0.30	0.15	0.30	17.8
Approach			138	2.4	138	2.4	0.119	4.1	LOS A	0.5	13.5	0.30	0.15	0.30	17.5
East: Marshall Road															
1	L2	All MCs	261	2.4	261	2.4	0.357	4.9	LOS A	2.3	57.8	0.07	0.01	0.07	16.4
6	T1	All MCs	217	2.4	217	2.4	0.357	4.9	LOS A	2.3	57.8	0.07	0.01	0.07	17.1
Approach			478	2.4	478	2.4	0.357	4.9	LOS A	2.3	57.8	0.07	0.01	0.07	16.7
West: Marshall Road															
2	T1	All MCs	143	2.4	143	2.4	0.169	5.1	LOS A	0.8	19.3	0.43	0.27	0.43	19.3
12	R2	All MCs	29	2.4	29	2.4	0.169	5.1	LOS A	0.8	19.3	0.43	0.27	0.43	16.0
Approach			172	2.4	172	2.4	0.169	5.1	LOS A	0.8	19.3	0.43	0.27	0.43	18.8
All Vehicles			788	2.4	788	2.4	0.357	4.8	LOS A	2.3	57.8	0.19	0.09	0.19	17.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (3)] Ints 4 Otis/Marshall (3) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 4 | Cumulative NoEnterprise WP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	66	2.4	66	2.4	0.360	7.0	LOS A	2.0	50.4	0.49	0.30	0.49	10.6
18	R2	All MCs	315	2.4	315	2.4	0.360	7.0	LOS A	2.0	50.4	0.49	0.30	0.49	15.2
Approach			381	2.4	381	2.4	0.360	7.0	LOS A	2.0	50.4	0.49	0.30	0.49	14.4
East: Marshall Road															
1	L2	All MCs	142	2.4	142	2.4	0.210	4.6	LOS A	1.1	27.0	0.22	0.08	0.22	16.6
6	T1	All MCs	123	2.4	123	2.4	0.210	4.6	LOS A	1.1	27.0	0.22	0.08	0.22	17.4
Approach			265	2.4	265	2.4	0.210	4.6	LOS A	1.1	27.0	0.22	0.08	0.22	17.0
West: Marshall Road															
2	T1	All MCs	228	2.4	228	2.4	0.229	5.1	LOS A	1.1	29.1	0.34	0.17	0.34	19.3
12	R2	All MCs	38	2.4	38	2.4	0.229	5.1	LOS A	1.1	29.1	0.34	0.17	0.34	15.9
Approach			266	2.4	266	2.4	0.229	5.1	LOS A	1.1	29.1	0.34	0.17	0.34	18.9
All Vehicles			911	2.4	911	2.4	0.360	5.8	LOS A	2.0	50.4	0.36	0.20	0.36	16.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (4)] Ints 4 Otis/Marshall (4) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 5 | Cumulative NoEnterprise WP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	9	2.4	9	2.4	0.149	4.5	LOS A	0.7	17.3	0.34	0.19	0.34	12.0
18	R2	All MCs	159	2.4	159	2.4	0.149	4.5	LOS A	0.7	17.3	0.34	0.19	0.34	17.4
Approach			168	2.4	168	2.4	0.149	4.5	LOS A	0.7	17.3	0.34	0.19	0.34	17.1
East: Marshall Road															
1	L2	All MCs	308	2.4	308	2.4	0.428	5.5	LOS A	3.0	77.5	0.09	0.02	0.09	16.0
6	T1	All MCs	265	2.4	265	2.4	0.428	5.5	LOS A	3.0	77.5	0.09	0.02	0.09	16.7
Approach			572	2.4	572	2.4	0.428	5.5	LOS A	3.0	77.5	0.09	0.02	0.09	16.3
West: Marshall Road															
2	T1	All MCs	171	2.4	171	2.4	0.209	5.7	LOS A	1.0	24.4	0.48	0.32	0.48	18.7
12	R2	All MCs	32	2.4	32	2.4	0.209	5.7	LOS A	1.0	24.4	0.48	0.32	0.48	15.4
Approach			203	2.4	203	2.4	0.209	5.7	LOS A	1.0	24.4	0.48	0.32	0.48	18.2
All Vehicles			943	2.4	943	2.4	0.428	5.4	LOS A	3.0	77.5	0.22	0.11	0.22	16.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (5)] Ints 4 Otis/Marshall (5) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 6 | Cumulative Enterprise NP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	65	2.4	65	2.4	0.326	6.2	LOS A	1.8	45.8	0.39	0.21	0.39	11.0
18	R2	All MCs	308	2.4	308	2.4	0.326	6.2	LOS A	1.8	45.8	0.39	0.21	0.39	15.8
Approach			372	2.4	372	2.4	0.326	6.2	LOS A	1.8	45.8	0.39	0.21	0.39	15.0
East: Marshall Road															
1	L2	All MCs	126	2.4	126	2.4	0.187	4.4	LOS A	0.9	23.4	0.21	0.08	0.21	16.8
6	T1	All MCs	110	2.4	110	2.4	0.187	4.4	LOS A	0.9	23.4	0.21	0.08	0.21	17.5
Approach			235	2.4	235	2.4	0.187	4.4	LOS A	0.9	23.4	0.21	0.08	0.21	17.1
West: Marshall Road															
2	T1	All MCs	156	2.4	156	2.4	0.158	4.4	LOS A	0.7	18.7	0.29	0.14	0.29	20.1
12	R2	All MCs	30	2.4	30	2.4	0.158	4.4	LOS A	0.7	18.7	0.29	0.14	0.29	16.7
Approach			186	2.4	186	2.4	0.158	4.4	LOS A	0.7	18.7	0.29	0.14	0.29	19.6
All Vehicles			794	2.4	794	2.4	0.326	5.2	LOS A	1.8	45.8	0.32	0.15	0.32	16.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (6)] Ints 4 Otis/Marshall (6) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 7 | Cumulative Enterprise NP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	6	2.4	6	2.4	0.124	4.1	LOS A	0.6	14.1	0.30	0.15	0.30	12.2
18	R2	All MCs	138	2.4	138	2.4	0.124	4.1	LOS A	0.6	14.1	0.30	0.15	0.30	17.8
Approach			144	2.4	144	2.4	0.124	4.1	LOS A	0.6	14.1	0.30	0.15	0.30	17.5
East: Marshall Road															
1	L2	All MCs	267	2.4	267	2.4	0.334	4.7	LOS A	2.0	52.2	0.07	0.01	0.07	16.4
6	T1	All MCs	181	2.4	181	2.4	0.334	4.7	LOS A	2.0	52.2	0.07	0.01	0.07	17.1
Approach			447	2.4	447	2.4	0.334	4.7	LOS A	2.0	52.2	0.07	0.01	0.07	16.7
West: Marshall Road															
2	T1	All MCs	138	2.4	138	2.4	0.165	5.0	LOS A	0.7	18.8	0.43	0.28	0.43	19.3
12	R2	All MCs	30	2.4	30	2.4	0.165	5.0	LOS A	0.7	18.8	0.43	0.28	0.43	16.0
Approach			168	2.4	168	2.4	0.165	5.0	LOS A	0.7	18.8	0.43	0.28	0.43	18.8
All Vehicles			759	2.4	759	2.4	0.334	4.7	LOS A	2.0	52.2	0.19	0.10	0.19	17.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (7)] Ints 4 Otis/Marshall (7) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 8 | Cumulative Enterprise WP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	85	2.4	85	2.4	0.372	6.9	LOS A	2.1	54.6	0.44	0.25	0.44	10.7
18	R2	All MCs	330	2.4	330	2.4	0.372	6.9	LOS A	2.1	54.6	0.44	0.25	0.44	15.3
Approach			415	2.4	415	2.4	0.372	6.9	LOS A	2.1	54.6	0.44	0.25	0.44	14.3
East: Marshall Road															
1	L2	All MCs	133	2.4	133	2.4	0.204	4.6	LOS A	1.0	25.9	0.25	0.10	0.25	16.6
6	T1	All MCs	118	2.4	118	2.4	0.204	4.6	LOS A	1.0	25.9	0.25	0.10	0.25	17.3
Approach			252	2.4	252	2.4	0.204	4.6	LOS A	1.0	25.9	0.25	0.10	0.25	17.0
West: Marshall Road															
2	T1	All MCs	180	2.4	180	2.4	0.186	4.7	LOS A	0.9	22.6	0.31	0.16	0.31	19.8
12	R2	All MCs	38	2.4	38	2.4	0.186	4.7	LOS A	0.9	22.6	0.31	0.16	0.31	16.4
Approach			217	2.4	217	2.4	0.186	4.7	LOS A	0.9	22.6	0.31	0.16	0.31	19.2
All Vehicles			884	2.4	884	2.4	0.372	5.7	LOS A	2.1	54.6	0.36	0.18	0.36	16.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [4 (8)] Ints 4 Otis/Marshall (8) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 9 | Cumulative Enterprise WP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Otis															
3	L2	All MCs	20	2.4	20	2.4	0.152	4.4	LOS A	0.7	17.8	0.33	0.17	0.33	12.0
18	R2	All MCs	154	2.4	154	2.4	0.152	4.4	LOS A	0.7	17.8	0.33	0.17	0.33	17.3
Approach			174	2.4	174	2.4	0.152	4.4	LOS A	0.7	17.8	0.33	0.17	0.33	16.7
East: Marshall Road															
1	L2	All MCs	294	2.4	294	2.4	0.380	5.6	LOS A	2.5	63.1	0.14	0.03	0.14	15.8
6	T1	All MCs	209	2.4	209	2.4	0.380	5.6	LOS A	2.5	63.1	0.14	0.03	0.14	16.5
Approach			502	2.4	502	2.4	0.380	5.6	LOS A	2.5	63.1	0.14	0.03	0.14	16.1
West: Marshall Road															
2	T1	All MCs	155	2.4	155	2.4	0.210	5.6	LOS A	1.0	24.7	0.47	0.31	0.47	18.7
12	R2	All MCs	53	2.4	53	2.4	0.210	5.6	LOS A	1.0	24.7	0.47	0.31	0.47	15.3
Approach			208	2.4	208	2.4	0.210	5.6	LOS A	1.0	24.7	0.47	0.31	0.47	17.9
All Vehicles			884	2.4	884	2.4	0.380	5.4	LOS A	2.5	63.1	0.25	0.13	0.25	16.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

MOVEMENT SUMMARY

Site: [6] Ints 6 Seymour/Marshall (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 2 | Cumulative No Enterprise NP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	8	2.0	8	2.0	0.013	5.5	LOS A	0.0	1.2	0.57	0.43	0.57	17.9
8	T1	All MCs	0	2.0	0	2.0	0.013	5.5	LOS A	0.0	1.2	0.57	0.43	0.57	15.0
18	R2	All MCs	1	2.0	1	2.0	0.013	5.5	LOS A	0.0	1.2	0.57	0.43	0.57	19.6
Approach			9	2.0	9	2.0	0.013	5.5	LOS A	0.0	1.2	0.57	0.43	0.57	18.1
East: Marshall Road															
1	L2	All MCs	1	2.0	1	2.0	0.360	5.1	LOS A	2.3	58.5	0.09	0.02	0.09	22.9
6	T1	All MCs	473	2.0	473	2.0	0.360	5.1	LOS A	2.3	58.5	0.09	0.02	0.09	19.8
16	R2	All MCs	9	2.0	9	2.0	0.360	5.1	LOS A	2.3	58.5	0.09	0.02	0.09	17.2
Approach			483	2.0	483	2.0	0.360	5.1	LOS A	2.3	58.5	0.09	0.02	0.09	19.7
North: Seymour Avenue															
7	L2	All MCs	16	2.0	16	2.0	0.023	4.6	LOS A	0.1	2.2	0.50	0.37	0.50	17.2
4	T1	All MCs	0	2.0	0	2.0	0.023	4.6	LOS A	0.1	2.2	0.50	0.37	0.50	18.0
14	R2	All MCs	2	2.0	2	2.0	0.023	4.6	LOS A	0.1	2.2	0.50	0.37	0.50	14.9
Approach			18	2.0	18	2.0	0.023	4.6	LOS A	0.1	2.2	0.50	0.37	0.50	17.0
West: Marshall Road															
5	L2	All MCs	3	2.0	3	2.0	0.484	6.5	LOS A	3.8	96.3	0.15	0.03	0.15	12.6
2	T1	All MCs	635	2.0	635	2.0	0.484	6.5	LOS A	3.8	96.3	0.15	0.03	0.15	21.0
12	R2	All MCs	5	2.0	5	2.0	0.484	6.5	LOS A	3.8	96.3	0.15	0.03	0.15	20.6
Approach			644	2.0	644	2.0	0.484	6.5	LOS A	3.8	96.3	0.15	0.03	0.15	20.9

All Vehicles	1154	2.0	1154	2.0	0.484	5.9	LOS A	3.8	96.3	0.14	0.04	0.14	20.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (2)] Ints 6 Seymour/Marshall (2) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 3 | Cumulative No Enterprise NP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	6	2.0	6	2.0	0.009	4.2	LOS A	0.0	0.9	0.47	0.29	0.47	18.6
8	T1	All MCs	0	2.0	0	2.0	0.009	4.2	LOS A	0.0	0.9	0.47	0.29	0.47	15.7
18	R2	All MCs	1	2.0	1	2.0	0.009	4.2	LOS A	0.0	0.9	0.47	0.29	0.47	20.3
Approach			8	2.0	8	2.0	0.009	4.2	LOS A	0.0	0.9	0.47	0.29	0.47	18.8
East: Marshall Road															
1	L2	All MCs	2	2.0	2	2.0	0.395	5.2	LOS A	2.7	68.0	0.08	0.01	0.08	22.9
6	T1	All MCs	516	2.0	516	2.0	0.395	5.2	LOS A	2.7	68.0	0.08	0.01	0.08	19.7
16	R2	All MCs	13	2.0	13	2.0	0.395	5.2	LOS A	2.7	68.0	0.08	0.01	0.08	17.1
Approach			531	2.0	531	2.0	0.395	5.2	LOS A	2.7	68.0	0.08	0.01	0.08	19.7
North: Seymour Avenue															
7	L2	All MCs	4	2.0	4	2.0	0.008	4.7	LOS A	0.0	0.8	0.52	0.35	0.52	17.5
4	T1	All MCs	0	2.0	0	2.0	0.008	4.7	LOS A	0.0	0.8	0.52	0.35	0.52	18.3
14	R2	All MCs	2	2.0	2	2.0	0.008	4.7	LOS A	0.0	0.8	0.52	0.35	0.52	15.1
Approach			7	2.0	7	2.0	0.008	4.7	LOS A	0.0	0.8	0.52	0.35	0.52	16.8
West: Marshall Road															
5	L2	All MCs	1	2.0	1	2.0	0.305	4.5	LOS A	1.8	45.8	0.06	0.01	0.06	13.8
2	T1	All MCs	408	2.0	408	2.0	0.305	4.5	LOS A	1.8	45.8	0.06	0.01	0.06	22.6
12	R2	All MCs	2	2.0	2	2.0	0.305	4.5	LOS A	1.8	45.8	0.06	0.01	0.06	22.1
Approach			411	2.0	411	2.0	0.305	4.5	LOS A	1.8	45.8	0.06	0.01	0.06	22.5

All Vehicles	956	2.0	956	2.0	0.395	4.9	LOS A	2.7	68.0	0.08	0.02	0.08	20.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (3)] Ints 6 Seymour/Marshall (3) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 4 | Cumulative NoEnterprise WP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	8	2.0	8	2.0	0.014	5.9	LOS A	0.1	1.3	0.59	0.47	0.59	17.7
8	T1	All MCs	0	2.0	0	2.0	0.014	5.9	LOS A	0.1	1.3	0.59	0.47	0.59	14.8
18	R2	All MCs	1	2.0	1	2.0	0.014	5.9	LOS A	0.1	1.3	0.59	0.47	0.59	19.4
Approach			9	2.0	9	2.0	0.014	5.9	LOS A	0.1	1.3	0.59	0.47	0.59	17.9
East: Marshall Road															
1	L2	All MCs	1	2.0	1	2.0	0.380	5.2	LOS A	2.5	63.5	0.10	0.02	0.10	22.8
6	T1	All MCs	499	2.0	499	2.0	0.380	5.2	LOS A	2.5	63.5	0.10	0.02	0.10	19.7
16	R2	All MCs	9	2.0	9	2.0	0.380	5.2	LOS A	2.5	63.5	0.10	0.02	0.10	17.1
Approach			509	2.0	509	2.0	0.380	5.2	LOS A	2.5	63.5	0.10	0.02	0.10	19.6
North: Seymour Avenue															
7	L2	All MCs	16	2.0	16	2.0	0.023	4.8	LOS A	0.1	2.3	0.51	0.38	0.51	17.1
4	T1	All MCs	0	2.0	0	2.0	0.023	4.8	LOS A	0.1	2.3	0.51	0.38	0.51	17.9
14	R2	All MCs	2	2.0	2	2.0	0.023	4.8	LOS A	0.1	2.3	0.51	0.38	0.51	14.8
Approach			18	2.0	18	2.0	0.023	4.8	LOS A	0.1	2.3	0.51	0.38	0.51	16.9
West: Marshall Road															
5	L2	All MCs	3	2.0	3	2.0	0.541	7.0	LOS A	4.7	120.4	0.17	0.04	0.17	12.3
2	T1	All MCs	711	2.0	711	2.0	0.541	7.0	LOS A	4.7	120.4	0.17	0.04	0.17	20.6
12	R2	All MCs	5	2.0	5	2.0	0.541	7.0	LOS A	4.7	120.4	0.17	0.04	0.17	20.2
Approach			719	2.0	719	2.0	0.541	7.0	LOS A	4.7	120.4	0.17	0.04	0.17	20.5

All Vehicles	1255	2.0	1255	2.0	0.541	6.3	LOS A	4.7	120.4	0.15	0.04	0.15	20.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (4)] Ints 6 Seymour/Marshall (4) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 5 | Cumulative NoEnterprise WP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	6	2.0	6	2.0	0.009	4.4	LOS A	0.0	0.9	0.49	0.32	0.49	18.5
8	T1	All MCs	0	2.0	0	2.0	0.009	4.4	LOS A	0.0	0.9	0.49	0.32	0.49	15.6
18	R2	All MCs	1	2.0	1	2.0	0.009	4.4	LOS A	0.0	0.9	0.49	0.32	0.49	20.2
Approach			8	2.0	8	2.0	0.009	4.4	LOS A	0.0	0.9	0.49	0.32	0.49	18.7
East: Marshall Road															
1	L2	All MCs	2	2.0	2	2.0	0.461	5.6	LOS A	3.5	88.8	0.09	0.01	0.09	22.6
6	T1	All MCs	604	2.0	604	2.0	0.461	5.6	LOS A	3.5	88.8	0.09	0.01	0.09	19.4
16	R2	All MCs	13	2.0	13	2.0	0.461	5.6	LOS A	3.5	88.8	0.09	0.01	0.09	16.8
Approach			619	2.0	619	2.0	0.461	5.6	LOS A	3.5	88.8	0.09	0.01	0.09	19.4
North: Seymour Avenue															
7	L2	All MCs	4	2.0	4	2.0	0.009	5.2	LOS A	0.0	0.9	0.55	0.40	0.55	17.1
4	T1	All MCs	0	2.0	0	2.0	0.009	5.2	LOS A	0.0	0.9	0.55	0.40	0.55	17.9
14	R2	All MCs	2	2.0	2	2.0	0.009	5.2	LOS A	0.0	0.9	0.55	0.40	0.55	14.7
Approach			7	2.0	7	2.0	0.009	5.2	LOS A	0.0	0.9	0.55	0.40	0.55	16.5
West: Marshall Road															
5	L2	All MCs	1	2.0	1	2.0	0.344	4.8	LOS A	2.1	54.5	0.07	0.01	0.07	13.6
2	T1	All MCs	459	2.0	459	2.0	0.344	4.8	LOS A	2.1	54.5	0.07	0.01	0.07	22.3
12	R2	All MCs	2	2.0	2	2.0	0.344	4.8	LOS A	2.1	54.5	0.07	0.01	0.07	21.9
Approach			462	2.0	462	2.0	0.344	4.8	LOS A	2.1	54.5	0.07	0.01	0.07	22.3

All Vehicles	1096	2.0	1096	2.0	0.461	5.3	LOS A	3.5	88.8	0.09	0.02	0.09	20.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (5)] Ints 6 Seymour/Marshall (5) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 6 | Cumulative Enterprise NP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	8	2.0	8	2.0	0.012	5.0	LOS A	0.0	1.1	0.53	0.39	0.53	18.2
8	T1	All MCs	0	2.0	0	2.0	0.012	5.0	LOS A	0.0	1.1	0.53	0.39	0.53	15.3
18	R2	All MCs	1	2.0	1	2.0	0.012	5.0	LOS A	0.0	1.1	0.53	0.39	0.53	19.8
Approach			9	2.0	9	2.0	0.012	5.0	LOS A	0.0	1.1	0.53	0.39	0.53	18.4
East: Marshall Road															
1	L2	All MCs	1	2.0	1	2.0	0.402	5.4	LOS A	2.8	69.9	0.09	0.02	0.09	22.8
6	T1	All MCs	529	2.0	529	2.0	0.402	5.4	LOS A	2.8	69.9	0.09	0.02	0.09	19.6
16	R2	All MCs	10	2.0	10	2.0	0.402	5.4	LOS A	2.8	69.9	0.09	0.02	0.09	17.0
Approach			540	2.0	540	2.0	0.402	5.4	LOS A	2.8	69.9	0.09	0.02	0.09	19.6
North: Seymour Avenue															
7	L2	All MCs	16	2.0	16	2.0	0.024	4.9	LOS A	0.1	2.3	0.53	0.40	0.53	17.0
4	T1	All MCs	0	2.0	0	2.0	0.024	4.9	LOS A	0.1	2.3	0.53	0.40	0.53	17.8
14	R2	All MCs	2	2.0	2	2.0	0.024	4.9	LOS A	0.1	2.3	0.53	0.40	0.53	14.7
Approach			18	2.0	18	2.0	0.024	4.9	LOS A	0.1	2.3	0.53	0.40	0.53	16.8
West: Marshall Road															
5	L2	All MCs	2	2.0	2	2.0	0.418	5.8	LOS A	2.9	74.0	0.14	0.03	0.14	13.0
2	T1	All MCs	549	2.0	549	2.0	0.418	5.8	LOS A	2.9	74.0	0.14	0.03	0.14	21.5
12	R2	All MCs	4	2.0	4	2.0	0.418	5.8	LOS A	2.9	74.0	0.14	0.03	0.14	21.0
Approach			556	2.0	556	2.0	0.418	5.8	LOS A	2.9	74.0	0.14	0.03	0.14	21.4

All Vehicles	1123	2.0	1123	2.0	0.418	5.6	LOS A	2.9	74.0	0.13	0.03	0.13	20.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (6)] Ints 6 Seymour/Marshall (6) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 7 | Cumulative Enterprise NP PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	6	2.0	6	2.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.31	0.48	18.6
8	T1	All MCs	0	2.0	0	2.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.31	0.48	15.7
18	R2	All MCs	1	2.0	1	2.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.31	0.48	20.2
Approach			8	2.0	8	2.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.31	0.48	18.8
East: Marshall Road															
1	L2	All MCs	2	2.0	2	2.0	0.344	4.8	LOS A	2.1	54.6	0.07	0.01	0.07	23.1
6	T1	All MCs	449	2.0	449	2.0	0.344	4.8	LOS A	2.1	54.6	0.07	0.01	0.07	19.9
16	R2	All MCs	11	2.0	11	2.0	0.344	4.8	LOS A	2.1	54.6	0.07	0.01	0.07	17.4
Approach			462	2.0	462	2.0	0.344	4.8	LOS A	2.1	54.6	0.07	0.01	0.07	19.9
North: Seymour Avenue															
7	L2	All MCs	4	2.0	4	2.0	0.008	4.4	LOS A	0.0	0.8	0.49	0.31	0.49	17.7
4	T1	All MCs	0	2.0	0	2.0	0.008	4.4	LOS A	0.0	0.8	0.49	0.31	0.49	18.5
14	R2	All MCs	2	2.0	2	2.0	0.008	4.4	LOS A	0.0	0.8	0.49	0.31	0.49	15.3
Approach			7	2.0	7	2.0	0.008	4.4	LOS A	0.0	0.8	0.49	0.31	0.49	17.0
West: Marshall Road															
5	L2	All MCs	1	2.0	1	2.0	0.326	4.6	LOS A	2.0	50.4	0.07	0.01	0.07	13.7
2	T1	All MCs	435	2.0	435	2.0	0.326	4.6	LOS A	2.0	50.4	0.07	0.01	0.07	22.4
12	R2	All MCs	2	2.0	2	2.0	0.326	4.6	LOS A	2.0	50.4	0.07	0.01	0.07	22.0
Approach			439	2.0	439	2.0	0.326	4.6	LOS A	2.0	50.4	0.07	0.01	0.07	22.4

All Vehicles	915	2.0	915	2.0	0.344	4.7	LOS A	2.1	54.6	0.08	0.02	0.08	21.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (7)] Ints 6 Seymour/Marshall (7) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 8 | Cumulative Enterprise WP AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	8	2.0	8	2.0	0.012	5.2	LOS A	0.0	1.2	0.55	0.41	0.55	18.0
8	T1	All MCs	0	2.0	0	2.0	0.012	5.2	LOS A	0.0	1.2	0.55	0.41	0.55	15.2
18	R2	All MCs	1	2.0	1	2.0	0.012	5.2	LOS A	0.0	1.2	0.55	0.41	0.55	19.7
Approach			9	2.0	9	2.0	0.012	5.2	LOS A	0.0	1.2	0.55	0.41	0.55	18.2
East: Marshall Road															
1	L2	All MCs	1	2.0	1	2.0	0.414	5.4	LOS A	2.9	73.2	0.10	0.02	0.10	22.7
6	T1	All MCs	544	2.0	544	2.0	0.414	5.4	LOS A	2.9	73.2	0.10	0.02	0.10	19.5
16	R2	All MCs	10	2.0	10	2.0	0.414	5.4	LOS A	2.9	73.2	0.10	0.02	0.10	16.9
Approach			555	2.0	555	2.0	0.414	5.4	LOS A	2.9	73.2	0.10	0.02	0.10	19.5
North: Seymour Avenue															
7	L2	All MCs	16	2.0	16	2.0	0.024	5.0	LOS A	0.1	2.3	0.53	0.41	0.53	17.0
4	T1	All MCs	0	2.0	0	2.0	0.024	5.0	LOS A	0.1	2.3	0.53	0.41	0.53	17.7
14	R2	All MCs	2	2.0	2	2.0	0.024	5.0	LOS A	0.1	2.3	0.53	0.41	0.53	14.6
Approach			18	2.0	18	2.0	0.024	5.0	LOS A	0.1	2.3	0.53	0.41	0.53	16.8
West: Marshall Road															
5	L2	All MCs	2	2.0	2	2.0	0.450	6.1	LOS A	3.3	84.2	0.14	0.03	0.14	12.8
2	T1	All MCs	592	2.0	592	2.0	0.450	6.1	LOS A	3.3	84.2	0.14	0.03	0.14	21.2
12	R2	All MCs	4	2.0	4	2.0	0.450	6.1	LOS A	3.3	84.2	0.14	0.03	0.14	20.8
Approach			599	2.0	599	2.0	0.450	6.1	LOS A	3.3	84.2	0.14	0.03	0.14	21.2

All Vehicles	1181	2.0	1181	2.0	0.450	5.8	LOS A	3.3	84.2	0.13	0.03	0.13	20.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6 (8)] Ints 6 Seymour/Marshall (8) (Roundabout)
Output produced by SIDRA INTERSECTION Version: 10.0.9.250

NA
Site Category: (None)
Roundabout
Site Scenario: 9 | Cumulative Enterprise WP PM

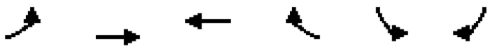
Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Seymour Avenue															
3	L2	All MCs	6	2.0	6	2.0	0.009	4.5	LOS A	0.0	0.9	0.49	0.33	0.49	18.5
8	T1	All MCs	0	2.0	0	2.0	0.009	4.5	LOS A	0.0	0.9	0.49	0.33	0.49	15.6
18	R2	All MCs	1	2.0	1	2.0	0.009	4.5	LOS A	0.0	0.9	0.49	0.33	0.49	20.1
Approach			8	2.0	8	2.0	0.009	4.5	LOS A	0.0	0.9	0.49	0.33	0.49	18.7
East: Marshall Road															
1	L2	All MCs	2	2.0	2	2.0	0.381	5.1	LOS A	2.5	64.0	0.08	0.01	0.08	23.0
6	T1	All MCs	499	2.0	499	2.0	0.381	5.1	LOS A	2.5	64.0	0.08	0.01	0.08	19.8
16	R2	All MCs	11	2.0	11	2.0	0.381	5.1	LOS A	2.5	64.0	0.08	0.01	0.08	17.2
Approach			512	2.0	512	2.0	0.381	5.1	LOS A	2.5	64.0	0.08	0.01	0.08	19.7
North: Seymour Avenue															
7	L2	All MCs	4	2.0	4	2.0	0.008	4.6	LOS A	0.0	0.8	0.51	0.34	0.51	17.5
4	T1	All MCs	0	2.0	0	2.0	0.008	4.6	LOS A	0.0	0.8	0.51	0.34	0.51	18.3
14	R2	All MCs	2	2.0	2	2.0	0.008	4.6	LOS A	0.0	0.8	0.51	0.34	0.51	15.1
Approach			7	2.0	7	2.0	0.008	4.6	LOS A	0.0	0.8	0.51	0.34	0.51	16.9
West: Marshall Road															
5	L2	All MCs	1	2.0	1	2.0	0.348	4.8	LOS A	2.2	55.5	0.07	0.01	0.07	13.6
2	T1	All MCs	465	2.0	465	2.0	0.348	4.8	LOS A	2.2	55.5	0.07	0.01	0.07	22.3
12	R2	All MCs	2	2.0	2	2.0	0.348	4.8	LOS A	2.2	55.5	0.07	0.01	0.07	21.9
Approach			468	2.0	468	2.0	0.348	4.8	LOS A	2.2	55.5	0.07	0.01	0.07	22.3

All Vehicles	994	2.0	994	2.0	0.381	4.9	LOS A	2.5	64.0	0.08	0.02	0.08	20.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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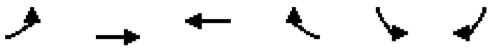
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	435	208	246	295	38
Future Volume (veh/h)	70	435	208	246	295	38
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	75	468	224	265	317	41
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	154	624	353	417	396	51
Arrive On Green	0.45	0.45	0.45	0.45	0.26	0.26
Sat Flow, veh/h	115	1380	781	924	1551	201
Grp Volume(v), veh/h	543	0	0	489	359	0
Grp Sat Flow(s),veh/h/ln	1495	0	0	1704	1757	0
Q Serve(g_s), s	4.4	0.0	0.0	8.9	7.7	0.0
Cycle Q Clear(g_c), s	13.3	0.0	0.0	8.9	7.7	0.0
Prop In Lane	0.14			0.54	0.88	0.11
Lane Grp Cap(c), veh/h	777	0	0	770	449	0
V/C Ratio(X)	0.70	0.00	0.00	0.63	0.80	0.00
Avail Cap(c_a), veh/h	1242	0	0	1272	806	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.3	0.0	0.0	8.5	14.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.9	3.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	0.0	2.1	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.4	0.0	0.0	9.4	17.4	0.0
LnGrp LOS	B			A	B	
Approach Vol, veh/h		543	489		359	
Approach Delay, s/veh		10.4	9.4		17.4	
Approach LOS		B	A		B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		24.5		15.8		24.5
Change Period (Y+Rc), s		6.3		5.5		* 6.3
Max Green Setting (Gmax), s		29.7		18.5		* 30
Max Q Clear Time (g_c+I1), s		15.3		9.7		10.9
Green Ext Time (p_c), s		2.9		0.8		3.0

Intersection Summary	
HCM 7th Control Delay, s/veh	11.9
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



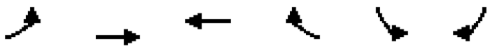
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	292	499	201	192	33
Future Volume (veh/h)	15	292	499	201	192	33
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	311	531	214	204	35
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	111	906	654	264	268	46
Arrive On Green	0.52	0.52	0.52	0.52	0.18	0.18
Sat Flow, veh/h	28	1755	1268	511	1488	255
Grp Volume(v), veh/h	327	0	0	745	240	0
Grp Sat Flow(s),veh/h/ln	1783	0	0	1778	1750	0
Q Serve(g_s), s	0.1	0.0	0.0	13.6	5.1	0.0
Cycle Q Clear(g_c), s	13.7	0.0	0.0	13.6	5.1	0.0
Prop In Lane	0.05			0.29	0.85	0.15
Lane Grp Cap(c), veh/h	1017	0	0	918	316	0
V/C Ratio(X)	0.32	0.00	0.00	0.81	0.76	0.00
Avail Cap(c_a), veh/h	1468	0	0	1399	810	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.5	0.0	0.0	7.8	15.1	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.2	3.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	3.0	2.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.7	0.0	0.0	10.0	18.9	0.0
LnGrp LOS	A			B	B	
Approach Vol, veh/h		327	745		240	
Approach Delay, s/veh		5.7	10.0		18.9	
Approach LOS		A	B		B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	26.4	12.5	26.4
Change Period (Y+Rc), s	6.3	5.5	* 6.3
Max Green Setting (Gmax), s	30.2	18.0	* 31
Max Q Clear Time (g_c+I1), s	15.7	7.1	15.6
Green Ext Time (p_c), s	1.5	0.5	4.5

Intersection Summary	
HCM 7th Control Delay, s/veh	10.6
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



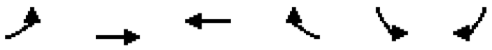
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	321	166	326	280	68
Future Volume (veh/h)	153	321	166	326	280	68
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	165	345	178	351	301	73
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	229	440	303	598	350	85
Arrive On Green	0.54	0.54	0.54	0.54	0.25	0.25
Sat Flow, veh/h	267	816	562	1109	1396	339
Grp Volume(v), veh/h	510	0	0	529	375	0
Grp Sat Flow(s),veh/h/ln	1083	0	0	1671	1740	0
Q Serve(g_s), s	13.4	0.0	0.0	12.0	11.5	0.0
Cycle Q Clear(g_c), s	25.4	0.0	0.0	12.0	11.5	0.0
Prop In Lane	0.32			0.66	0.80	0.19
Lane Grp Cap(c), veh/h	669	0	0	901	436	0
V/C Ratio(X)	0.76	0.00	0.00	0.59	0.86	0.00
Avail Cap(c_a), veh/h	913	0	0	1210	559	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.7	0.0	0.0	8.7	20.1	0.0
Incr Delay (d2), s/veh	2.6	0.0	0.0	0.6	10.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0	3.1	5.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.3	0.0	0.0	9.3	30.6	0.0
LnGrp LOS	B			A	C	
Approach Vol, veh/h		510	529		375	
Approach Delay, s/veh		15.3	9.3		30.6	
Approach LOS		B	A		C	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	36.5	19.5	36.5
Change Period (Y+Rc), s	6.3	5.5	* 6.3
Max Green Setting (Gmax), s	40.2	18.0	* 41
Max Q Clear Time (g_c+I1), s	27.4	13.5	14.0
Green Ext Time (p_c), s	2.8	0.5	3.7

Intersection Summary	
HCM 7th Control Delay, s/veh	17.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	234	360	206	245	107
Future Volume (veh/h)	53	234	360	206	245	107
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	56	249	383	219	261	114
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	145	507	485	277	323	141
Arrive On Green	0.43	0.43	0.43	0.43	0.27	0.27
Sat Flow, veh/h	89	1168	1117	639	1192	521
Grp Volume(v), veh/h	305	0	0	602	376	0
Grp Sat Flow(s),veh/h/ln	1257	0	0	1755	1717	0
Q Serve(g_s), s	1.2	0.0	0.0	11.8	8.2	0.0
Cycle Q Clear(g_c), s	13.0	0.0	0.0	11.8	8.2	0.0
Prop In Lane	0.18			0.36	0.69	0.30
Lane Grp Cap(c), veh/h	652	0	0	762	465	0
V/C Ratio(X)	0.47	0.00	0.00	0.79	0.81	0.00
Avail Cap(c_a), veh/h	1118	0	0	1321	794	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.0	0.0	0.0	9.7	13.6	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.9	3.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	3.1	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	8.5	0.0	0.0	11.6	17.0	0.0
LnGrp LOS	A			B	B	
Approach Vol, veh/h		305	602		376	
Approach Delay, s/veh		8.5	11.6		17.0	
Approach LOS		A	B		B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		23.7		16.3		23.7
Change Period (Y+Rc), s		6.3		5.5		* 6.3
Max Green Setting (Gmax), s		29.7		18.5		* 30
Max Q Clear Time (g_c+I1), s		15.0		10.2		13.8
Green Ext Time (p_c), s		1.5		0.8		3.6

Intersection Summary	
HCM 7th Control Delay, s/veh	12.5
HCM 7th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX G

VMT CALCULATION WORKSHEETS

LSA

Appendix G
VMT Calculations
Brar Farms Residential Development

2024	Brar Farms (project)	SACOG Region*	West Sacramento**
Total Households (a)	259		
Population (b)	943		
Internal-Internal (II) VMT ('c)	14,069		
II VMT per capita (d = c/b)	14.92		
IX VMT per capita (within model boundary) ('e)	2.77		
IX VMT per capita (outside SACOG) (f)	3.19		
VMT per capita (g = d + e + f)	20.88	17.43	16.43

** : Regional Threshold: 20.50 * 0.85 = 17.43*

***: City Threshold: 19.33 * 0.85 = 16.43*