Attachment 9.A

Traffic Impact Analysis

West Bay Yards

Olympia, Washington

Prepared For:
West Bay Development Group, LLC

Prepared By:
SCJ Alliance
8730 Tallon Lane NE, Suite 200
Lacey, WA 98516
360.352.1465

February 2022

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Traffic Impact Analysis

Project Information

Project:	West Bay Yards
Prepared for:	Brandon Smith, PE West Bay Development Group, LLC 4822 Rural Rd SW Tumwater, WA 98512

Reviewing Agency

Jurisdiction:	City of Olympia

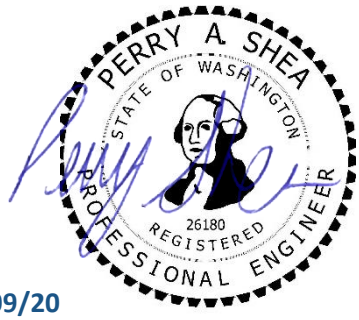
Project Representative

Prepared by:	SCJ Alliance 8730 Tallon Lane NE, Suite 200 Lacey, WA 98516 360.352.1465 scjalliance.com
Contact:	Ryan Shea, PTP, Senior Transportation Planner Perry Shea, PE, Principal
Project Reference:	SCJ #3264.02 Path: N:\Projects\3264 Milestones Companies\3264.02 West Bay Multi-Family\Phase 06 - Traffic Impact Analysis\Report\Traffic Impact Analysis 2022-0204.docx

Signature

The technical material and data contained in the Traffic Impact Analysis were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

Prepared by Ryan Shea, PTP, Senior Transportation Planner



02/09/20

Approved by Perry Shea, PE, Principal

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1 Introduction

1.1 Project Overview

West Bay Development Group, LLC. plans to construct the *West Bay Yards* project east of West Bay Drive and north of Harrison Avenue in Olympia, WA. The proposed project includes residential units, restaurant space, retail space, and waterfront amenities.

Figure 1 illustrates the site vicinity and the transportation network serving the project area.

Figure 1. Site Vicinity Map

1.2 Study Context

A Traffic Scoping Analysis was prepared and submitted to the City of Olympia on June 3, 2020 which outlined the trip generation and distribution/assignment assumptions. A Traffic Impact Analysis report was then prepared to provide the traffic analysis and project information based on scoping analysis comments and City of Olympia TIA guidelines, for City of Olympia in reviewing the development proposal, which was submitted to the City of Olympia in May 2021. During the public review period several comments were submitted to the city regarding the technical elements of the traffic impact analysis report. This report has been prepared to incorporate these comments.

This report describes the existing and forecasted PM peak period operation of the following intersections:

- Deschutes Parkway at Olympic Way/5th Avenue
- 5th Avenue at Simmons Street
- 4th Avenue at Simmons Street
- 4th Avenue at Olympic Way
- Harrison Avenue at West Bay Drive
- Brawne Avenue at West Bay Dive
- Harrison Avenue at Division Street
- South Driveway at West Bay Drive
- Center Driveway at West Bay Drive
- North Driveway at West Bay Drive

Operational analysis has been prepared for existing 2020 PM peak hour conditions and forecasted 2027 PM peak hour conditions with and without completion of the development. Additional analysis of the Harrison Avenue at West Bay Drive intersection during the AM peak hour has also been performed.

2 Project Description

2.1 Development Proposal

The proposed *West Bay Yards* project will consist of 478 apartment units approximately 6,300 square feet of restaurant space, and 4,400 square feet of café/coffee house space. There will also be 3,200 square feet of commercial space and 2,400 square feet of office space, which will be spread out among the five apartment unit buildings. The site will also provide waterfront amenities with a 30-foot waterfront trail buffer and a kayak/boat rental. A total of 826 parking stalls will be provided, with 113 of these stalls located at ground level, and the remaining 713 stalls located below ground. The proposed project will also provide 408 long term bicycle storage spaces and 66 short term spaces.

The project is planning construction over three phases:

- Phase 1 – The restaurant, café/coffee house, and residential buildings 2 and 3 (center)
- Phase 2 – Residential buildings 4 and 5 (north end)
- Phase 3 – Residential building 1 (south end)

For purposes of this report the full build out and horizon year of completion of Phase 3 are being used.

Direct access to the project will be provided by three full access driveways on West Bay Drive NW. The southern and northern driveways will serve the below ground parking and the center driveway will serve the ground level parking. The southern access will be located approximately 1,600 feet north of Brawne Avenue NW. The center driveway will be located approximately 250 feet north of the southern driveway and the northern driveway will be located approximately 400 feet north of the center driveway. The preliminary site plan is provided on **Figure 2**.

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West Bay Yards
Traffic Impact Analysis

Figure 2
Preliminary Site Plan

3 Existing Conditions

3.1 Area Land Uses

The *West Bay Yards* project will be located east of West Bay Drive and north of Harrison Avenue in Olympia, WA. The site is currently undeveloped. The adjacent land uses largely includes residential with a mix of commercial, recreational and office properties. North of the project site there are business activities that generate logging truck activity during the day. West Bay Park and Garfield Nature Trail Park are located south of the project site and the West Bay Marina is located to the north.

3.2 Roadway Inventory

3.2.1 West Bay Drive

West Bay Drive is classified by City of Olympia as major collector. In the project vicinity, West Bay Drive is a two-lane roadway providing one travel lane in each direction. The roadway has street lighting and sidewalks on the west side of the roadway with a posted speed limit of 30 mph.

West Bay Drive, as presented in the City of Olympia Street Safety Plan, has two segments in the vicinity of the project site with 85th percentile speeds of 5.0-7.7 mph higher than posted speeds and one segment with 10.5 -14.6 mph higher than posted speeds. The segments with 5.0-7.7 mph higher speeds include a segment south of Brawne Avenue and a segment just south of the Schneider Hill Road/West Bay Drive intersection. The segment with 10.5 – 14.6 mph higher speeds is located just north of the Schneider Hill Road/West Bay Drive intersection. The City of Olympia Street Safety Plan also identified one speeding related collision at the Brawne Avenue/West Bay Drive intersection.

3.2.2 Brawne Avenue

Brawne Avenue is classified by City of Olympia as neighborhood collector. Brawne Avenue is a two-lane roadway providing one travel lane in each direction. The roadway has street lighting and sidewalks on the north side of the roadway with a posted speed limit of 25 mph.

3.2.3 Olympic Way

Olympic Way is classified by City of Olympia as arterial. Olympic Way, south of Harrison Avenue, is a four-lane roadway providing two travel lanes in each direction. South of 4th Avenue, Olympic Way transitions to a two-lane roadway providing one travel lane in each direction. The roadway provides street lighting, sidewalks, and curb and gutter along both sides of the road. The roadway has a speed limit of 25 mph.

3.2.4 Harrison Avenue

Harrison Avenue is classified by the City of Olympia as arterial. In the study area, Harrison Avenue is a four-lane roadway providing two travel lanes in each direction. The roadway provides street lighting, sidewalks, and curb and gutter along both sides of the road and has a posted speed limit of 25 mph.

3.2.5 4th Avenue

In the study area, 4th Avenue is classified by City of Olympia as arterial. Along the 4th Avenue bridge, this roadway provides three lanes with one eastbound travel lane and two westbound travel lanes. East of the 4th Avenue bridge, 4th Avenue widens to a four-lane roadway providing two travel lanes in each

direction. The roadway provides street lighting, sidewalks, and curb and gutter along both sides of the road and has posted speed limit of 25 mph.

3.2.6 5th Avenue

In the study area, 5th Avenue is classified by City of Olympia as major collector. 5th Avenue is a four-lane roadway that provides two travel lanes in each direction. Street lighting, sidewalks, and curb and gutter are provided along both sides of the road and has a posted speed limit of 25 mph.

3.2.7 Simmons Street

Simmons Street is classified by the City of Olympia as major collector. This roadway provides one travel lane in each direction with bicycle shared lane markings. Simmons Street provides on-street parking, street lighting, sidewalks, and curb and gutter along both sides of the road and has a speed limit of 25 mph.

3.2.8 Deschutes Parkway

In the study area, Deschutes Parkway is classified by City of Olympia as major collector. Deschutes Parkway is a two-lane roadway that provides one travel lane in each direction. Bicycle lanes are provided along both sides of the road and on-street parking, street lighting, sidewalks, and curb and gutter are provided on the east side of the road. This roadway has a posted speed limit of 35 mph.

3.2.9 Division Street

In the study area, Division Street is classified by City of Olympia as arterial. South of Harrison Avenue, Division Street is a four-lane roadway providing two travel lanes in each direction and is a two-lane roadway providing north of Harrison Avenue. The roadway provides street lighting, sidewalks, and curb and gutter along both sides of the road and has a posted speed limit of 30 mph.

3.2.10 Harrison Avenue at West Bay Drive

This is a three-legged intersection that operates under roundabout control. Harrison Avenue and Olympic Way, the eastbound and northbound approaches, are the primary route between downtown Olympia and west Olympia and each provide two travel lanes. West Bay Drive, the southbound approach, is a much lower volume approach and provides a single travel lane.

Public comments included a description of occasional vehicle queues on West Bay Drive during both peak hours. To better understand the existing vehicle queuing, traffic volume data and back of queue observations were collected on Thursday, October 28th during the AM peak period (7:00-9:00) and the PM peak period (4:00-6:00). For the vehicle queuing the maximum queue every five minutes was recorded. During the AM peak period the longest observed vehicle queue on West Bay Drive was six vehicles, at 7:40 am. The rest of the max queue observations ranged between one-five vehicles. During the PM peak hour, the maximum observed queue was fifteen vehicles, which occurred at 5:05 pm. This was immediately followed by an observed queue of thirteen vehicles. All other observed queues ranged from two-eight vehicles. These queue observations, in combination with the counted traffic volumes, were used to calibrate the intersection analysis, which is described in more detail in Section 6.2.

A summary of the existing intersection channelization and control type for each of the study intersections is provided in **Figure 3.**

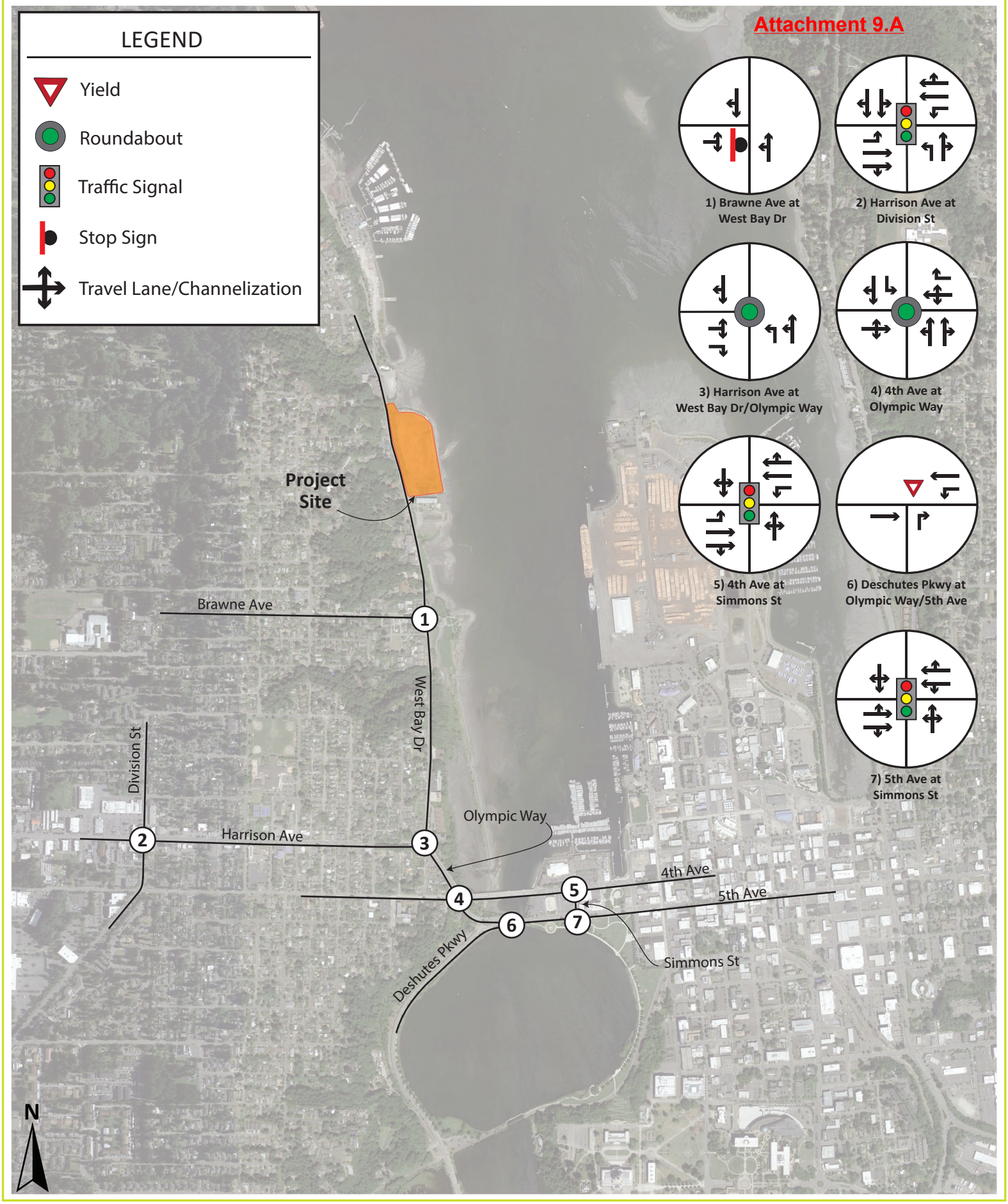

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Figure 3
Intersection Channelization and Control

3.3 Traffic Volume Data

Traffic Counts were provided by the City of Olympia for the following locations:

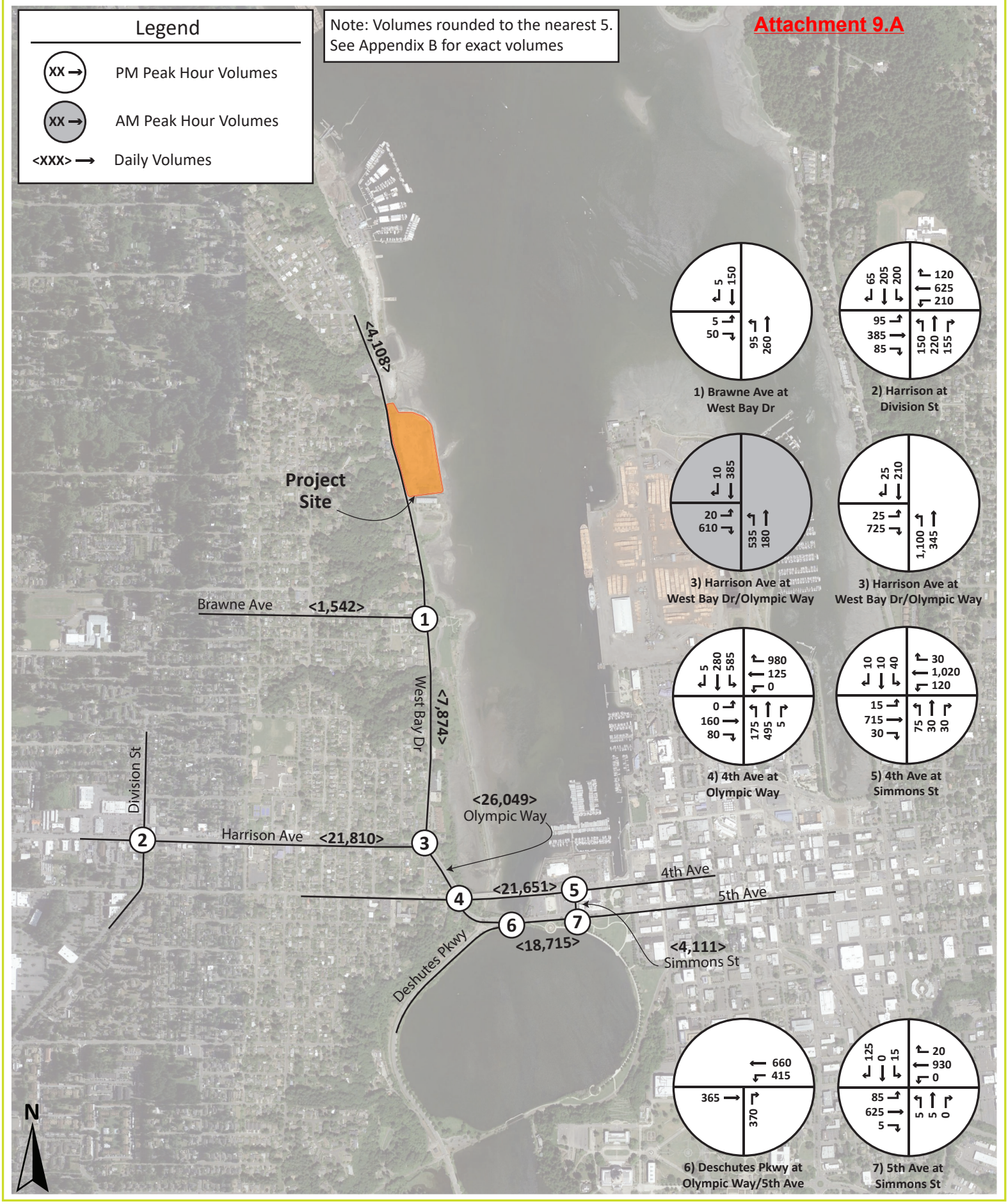
- Deschutes Parkway/Olympic Way/ 5th Avenue (2015)
- 5th Avenue/Simmons Street (2019)
- 4th Avenue /Simmons Street (2019)
- 4th Avenue /Olympic Way (2019)
- Harrison Avenue /West Bay Drive/Olympic Way (2018)
- Brawne Avenue/West Bay Drive (2017)
- Harrison Avenue/Division Street (2019)

The City of Olympia also provided existing annual daily traffic (ADT) volumes for several roadway locations within the study area:

- Schneider Hill Road south of West Bay Drive (2017)
- Brawne Avenue west of West Bay Drive (2018)
- Harrison Avenue west of West Bay Drive (2018)
- West Bay Drive north of Harrison Avenue (2018)
- Olympia Way south of Harrison Avenue (2019)
- 4th Avenue Bridge (2019)
- 5th Avenue Bridge (2019)
- Simmons Street north of 5th Avenue (2018)

All of these traffic counts were collected between 2015 and 2019, represent Pre-COVID 19 conditions, and were all considered current at the direction of the City of Olympia. These counts were then adjusted to calculate the two-hour peak average, which is the analysis standard for the City of Olympia. Additionally, these traffic counts all include the number of trucks by approach.

The existing 2020 traffic volumes for the study intersections are presented in **Figure 4**. The turning movement count diagrams and daily count data are provided in **Appendix A**



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West Bay Yards
Traffic Impact Analysis

Figure 4
Existing 2020 Traffic Volumes

3.4 Crash History

The Washington Department of Transportation provides crash data for study area roadways. The data was collected over the five-year span between January 1, 2015 and December 31, 2019 and reviewed for the study area intersections. The total crashes by severity are provided in **Table 1**.

Table 1. Existing Crash Severity by Study Intersection

Intersection	Fatal	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	Unknown	Total
Deschutes Pkwy/5th Ave/Olympic Way	0	1	1	2	8	0	12
5th Ave/Simmons St	0	0	1	4	12	0	17
4th Ave/Simmons St	0	1	1	5	7	0	14
4th Ave/Olympic Way	0	0	1	1	31	2	35
Harrison Ave/West Bay Dr/Olympic Way	0	1	0	3	23	0	27
Harrison Ave/Division St	0	1	0	12	26	1	40
Brawne Ave/West Bay Dr	0	0	1	1	3	0	5
Total Crashes	**0**	**4**	**5**	**28**	**110**	**3**	**150**

Overall, approximately 75% of all the reported crashes were classified as property damage only (no apparent injury). Four crashes were reported with a suspected serious injury, each occurring at a different intersection. There were no fatal crashes reported.

3.5 Transit and Non-Motorized Facilities

Intercity Transit currently serves the City of Olympia with transit services providing connections to Tumwater, Lacey, and Yelm. The closest transit stop is located along Bowman Avenue approximately 0.60 miles west of the project.

Sidewalks are currently provided along the west side of West Bay Drive. There are currently no designated bicycle paths in the vicinity of the project site. The Woodard Avenue NW trailhead is located west of the project, approximately 2,000 feet north of Brawne Avenue, and serves as a connection for residents in northwest Olympia to the west bay waterfront and parks.

4 Project Traffic Characteristics

The project-related characteristics having the most effect on area traffic conditions are peak hour trip generation and the directional distribution of traffic volumes on the surrounding roadway network.

4.1 Site-Generated Traffic Volumes

Vehicle trip generation was estimated using the trip generation rates contained in the City of Olympia's Transportation Impact Fee Update dated November 2016 and the Missing Middle Trip Generation memo dated December 6, 2018. City of Olympia trip generation rates are provided with the variable 1,000-sf. The following land-use categories were used:

- Apartments (Land-use code 221)
- Restaurant (Land-use code 931)
- Commercial Office (Land-use code 710,715,750)
- Miscellaneous Retail (Land-use code 820)

To account for the proposed outdoor seating area for the restaurant space, the variable seats was determined to be most applicable. Since the City of Olympia does not provide rates for the variable seats, the ITE trip generation rate (contained in the 11th edition of the Trip Generation Manual) was used for land use code "Quality Restaurant" (land use code 931).The project also proposes to include waterfront amenities and will provide seven parking stalls to accommodate the use. To account for these trips, it was assumed each stall would generate one trip during each of the peak hours, therefore producing 7 trips.

Internal Capture

Internal capture calculations were prepared to reflect on-site interaction between the mix of uses in the proposed *West Bay Multi-Family* project. The internal trip discount for the PM peak period was derived from the methodology of the 3rd edition of the Trip Generation Handbook by ITE. Based on these calculations, the proposed project is anticipated to have an overall internal capture rate of 15% during the weekday PM peak hour.

Pass-By

It is anticipated that this project will attract some traffic from people already driving on the area roadways. These trips are not new trips added to the local roadways (primary trips) but represent "pass-by" trips according to the following definition:

> *Pass-by trips*: Pass-by trips are trips made as an intermediate stop from an origin to a primary destination (i.e., stopping to shop on the way home from work) by vehicles passing directly by the project driveway.

The pass-by percentage for Restaurant used in the City's transportation impact fee calculation is 44%. The pass-by trips were assumed to come from both directions of West Bay Drive, 65% from northbound and 35% from southbound.

Table 2 shows the trip generation characteristics for Apartments and Restaurant for the PM peak period.

Table 2. PM Peak Hour Trip Generation Characteristics

Site Plan Designation	Land Use (Land Use Code)	Unit	Trip Rate	Internal Capture Rate	Pass-By Rate	Enter %	Exit %
Apartments	Apartment (221)	Dwelling Units	0.44	10%	0%	61%	39%
Café/Coffee House	Restaurant (931)	ksqft	7.49	19%	44%	63%	37%
Restaurant	Restaurant (931)	Seats	0.28*	19%	44%	67%	33%
Office	Commercial-Office (710,715,750)	ksqft	2.69	0%	0%	17%	83%
Commercial	Miscellaneous Retail (820)	ksqft	3.71	75%	34%	48%	52%
Water Amenity Parking	N/A	Stall	1.0	0%	0	50%	50%

*ITE Trip Generation Rate

The total trip generation expected from this project is calculated by applying the unit measure for each land use category to the appropriate trip generation rate. The PM peak hour trip generation for the proposed *West Bay Yards* project is shown in **Table 3** below.

Table 3. PM Peak Hour Project Trip Generation

Land Use Category	Size	Total Trips	Internal Capture Trips	Pass-By Trips	New-to-Network Total	Enter %	Exit %
Apartments	478	210	13	0	197	120	77
Café/Coffee House	4.4	33	6	12	15	9	6
Restaurant	250	70	14	25	31	21	10
Office	2.4	6	0	0	6	1	5
Commercial	3.2	12	9	1	2	1	1
Water Amenity Parking	7	7	0	0	7	4	3
Total	-	338	50	38	250	151	99

Trip generation calculations were also performed for the AM peak hour to support the analysis of the Harrison Avenue at West Bay Drive intersection analysis. The AM and PM peak hour trip generation calculations are provided in Appendix B.

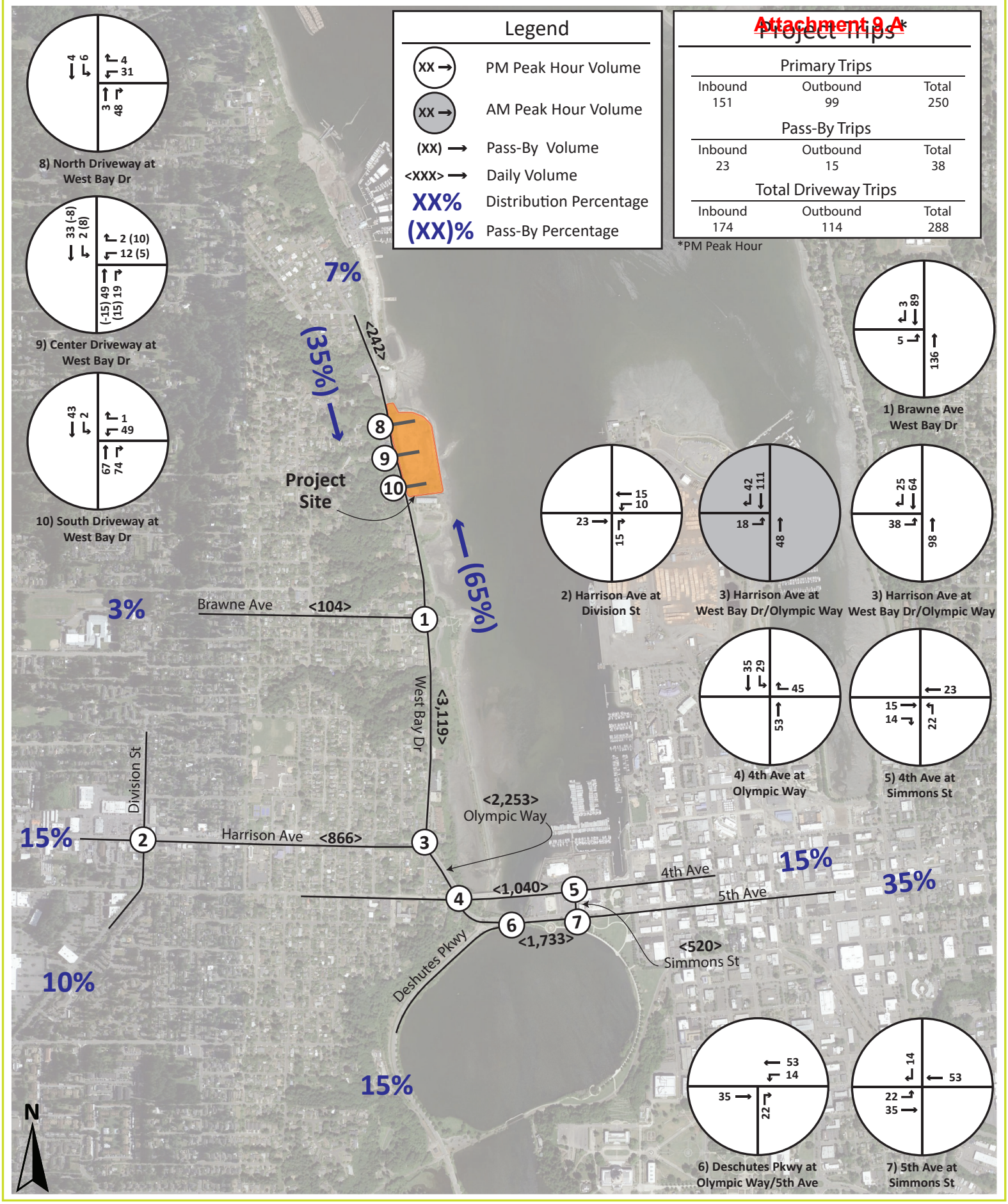
Based on the typical pass-by rates for the land uses included in the proposed *West Bay Yards* project, it is projected that the project will generate 38 pass-by trips during the PM peak hour. This equates to 19 vehicles currently travelling on West Bay Drive entering and then exiting the site. Given the lower overall volumes on West Bay Drive, this was checked against the total number of existing vehicles on the road.

It is standard practice to accept at least 10 percent of the existing roadway traffic as pass-by trips. The existing volume count at Brawne Avenue and West Bay Drive show a total of 420 vehicles on West Bay Drive north of Brawne Avenue. This means that the full 38 pass-by trips make up approximately 9 percent of the total roadway traffic, indicating that the calculated pass-by trips are reasonable for the existing volumes on West Bay Drive.

4.2 Site Traffic Distribution and Assignment

For this study, the regional distribution of traffic to and from the proposed project was determined using the Thurston Regional Planning Council (TRPC) travel demand model. A select zone analysis was performed for Traffic Analysis Zone (TAZ) 415, which contains the proposed project. This zone was reconnected to West Bay Drive to better approximate the specific location of the proposed project. The select zone analysis is included in **Appendix B**.

The resultant traffic distribution percentages and site traffic assignments on the existing roadway network are shown on **Figure 5.**



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West Bay Yards
Traffic Impact Analysis

Figure 5
Site-Generated Traffic Volumes

5 Future Traffic Conditions

5.1 Roadway Network Improvements

The City of Olympia Comprehensive Plan (2019) recommends the following roadway improvements within the vicinity of the *West Bay Yards* project:

- The West Bay Corridor Study was completed in 2004 and identifies the need for pedestrian improvements at Brawne Avenue, and at the Woodard Avenue Trailhead. The proposed *West Bay Yards* project includes providing a pedestrian crossing with a center lane refuge island connecting to the Woodard Avenue Trailhead.
- The City of Olympia has planned bicycle improvements along West Bay Drive from Olympic Way to Schneider Hill Road.

5.2 Future Traffic Volumes

Traffic volume forecasts were prepared for PM peak hour conditions for the 2027 opening year. The future traffic volume forecast includes non-specific background traffic growth, pipeline development traffic and estimated traffic generated by the proposed *West Bay Yards* project.

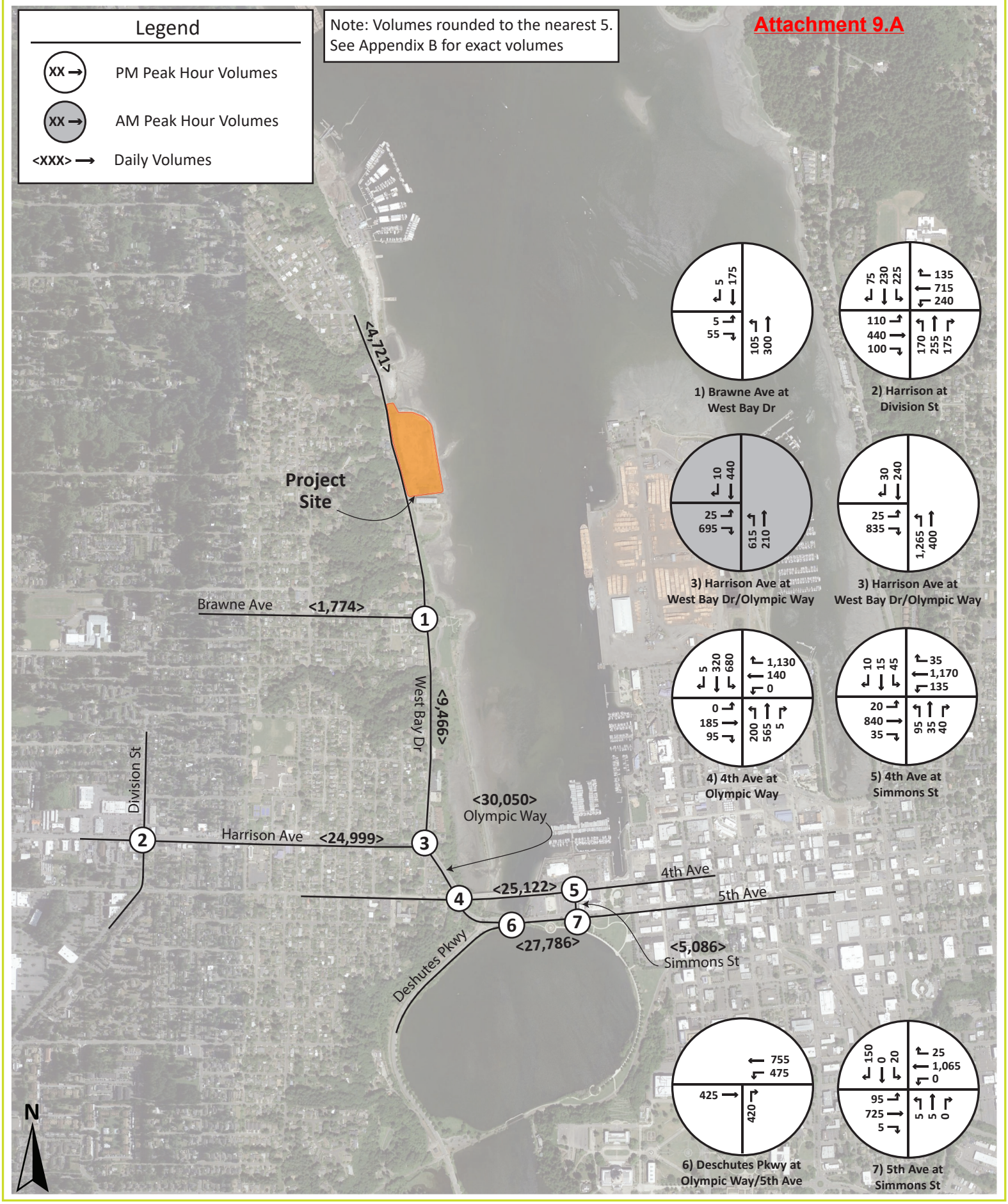
For the non-specific background traffic growth, a 2.0 percent annual growth rate (non-compounded) was used. This growth rate was provided by the City of Olympia.

There are three major development "pipeline" projects identified by City of Olympia to be included in the volume forecasts. Two of the three pipeline projects (State and Water and The Lurana) did not include trip assignments, for these projects a trip generation and assignment were performed. These calculations are included in **Appendix B**.

- State and Water development includes 60 residential units, 893 square feet of retail space and 1,822 square feet of restaurant space. The project is located at 207 State Avenue in Downtown Olympia.
- The Lurana development includes 44 residential units, 2,411 square feet of retail space and 1,830 square feet of office space. The project is located at 210 State Avenue in Downtown Olympia
- Views on 5th development includes 138 residential units, 1,004 square feet of retail space, a 920 square foot health club and 5,485 square feet of restaurant space. The project is located on the north side of 5th Avenue between Simmons Street and Sylvester Street in Downtown Olympia.

The projected 2027 traffic volumes without *West Bay Yards* are shown on **Figure 6.** The projected 2027 traffic volumes with the project are shown on **Figure 7.**

The traffic volume calculations for the study intersections are included in **Appendix B**.



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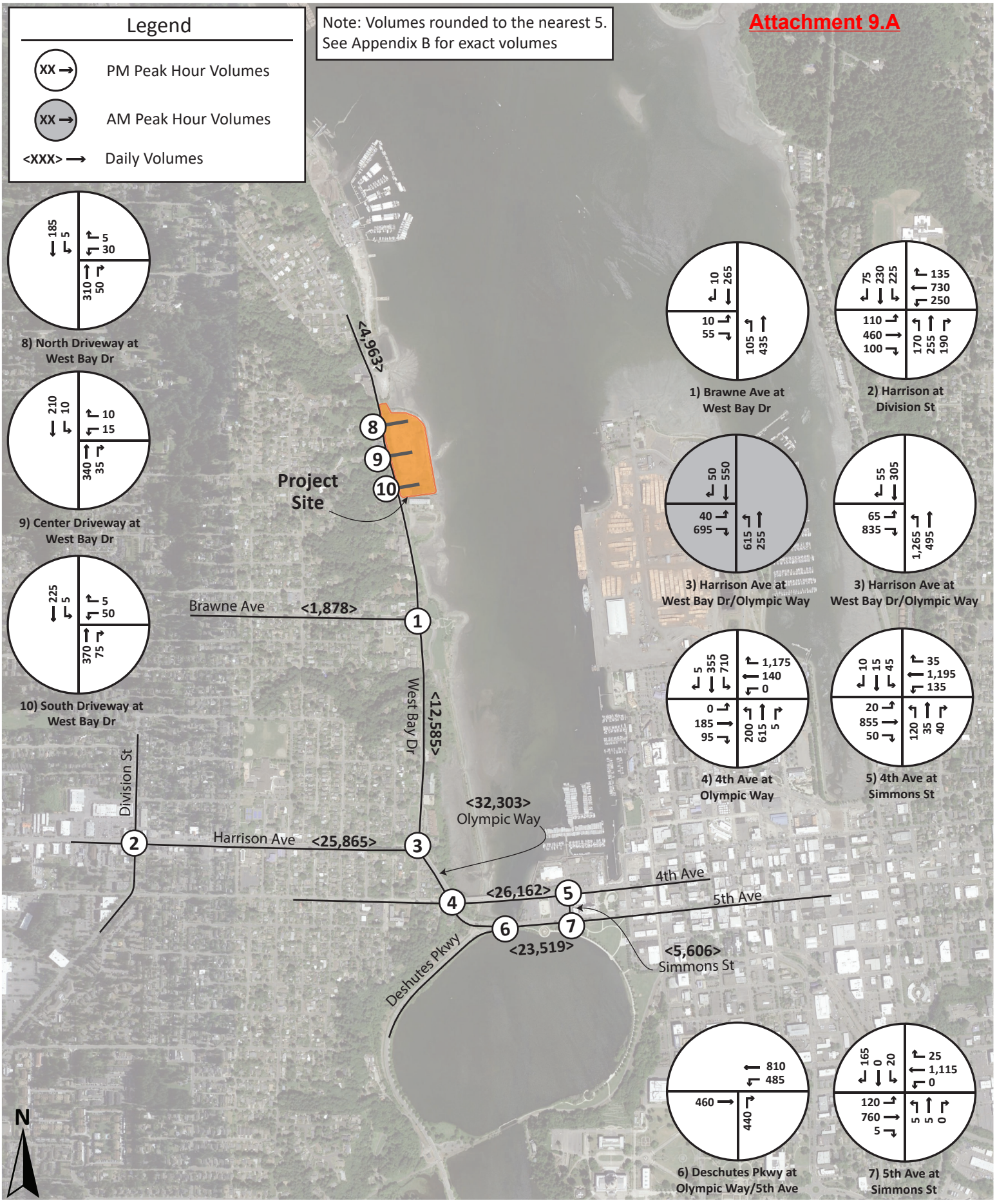
West Bay Yards
Traffic Impact Analysis

Figure 6
2027 Traffic Volumes
Without Project



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West Bay Yards
Traffic Impact Analysis

Figure 7
2027 Traffic Volumes
With Project

6 Traffic Operations Analysis

Traffic analyses were conducted to identify any deficiencies within the study area for the PM peak hour in the 2020 base year and the 2027 project opening year.

6.1 Level of Service

The acknowledged source for determining overall capacity for arterial segments and independent intersections is the current edition of the *Highway Capacity Manual* (HCM) published by the Transportation Research Board (TRB).

Intersection analysis was performed using the Synchro software package. This software implements the methods of the 6th Edition HCM. Capacity analysis results are described in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a street or highway during a specific time interval. LOS ranges from A (very little delay) to F (long delays and congestion).

City of Olympia identifies a Level of Service E standard for the Downtown area and Urban Corridors and Level of Service D for the rest of the city and Urban Growth Area.

6.1.1 Intersection Operations

For signalized intersections, the overall LOS grade represents the weighted average of all movements at the intersection. For intersections under minor street stop-sign control, the LOS of the most difficult movement (typically the minor street left turn) represents the intersection level of service. The LOS/delay criteria for stop sign-controlled intersections are different than for signalized intersections because driver expectation is that a signalized intersection is designed to carry higher traffic volumes and experience greater delay.

The software does not provide level of service results for the unusual geometric control conditions present at Deschutes Pkwy/Olympic Way/5th Ave. For this location the level of service results were reported from the SimTraffic simulations.

Table 4 shows the Level of Service criteria for stop-controlled intersections and signalized intersections.

Table 4. Level of Service Criteria for Intersections

Level of Service	Signalized Intersection Average Control Delay (seconds/vehicle)	Stop-Controlled Intersection Average Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

6.2 Intersection Analysis

The analysis was conducted for the following scenarios:

- Existing 2020 traffic volumes
- Projected 2027 background traffic volumes without the *West Bay Yards* project
- Projected 2027 traffic volumes with the *West Bay Yards* project

The operational analysis results of the study intersections for the PM peak hour are provided in **Table 5**. It should be noted that the PM peak hour analysis represents the two-hour peak average volumes, which focuses on the two-hour peak period performance and does not focus on short-duration congestion issues.

The intersection control and channelization are documented above in Figure 3. The LOS analysis worksheets are included in **Appendix C.**

Table 5. PM Peak Hour Intersection Level of Service

	Intersection	Control Type	LOS Standard	Base Year 2020	Projected 2027	
					Without Project	With Project
				LOS (Delay)	LOS (Delay)	LOS (Delay)
1	Brawne Ave/West Bay Dr	TWSC[1]	D	B (10.1)	B (10.3)	B (12.3)
2	Harrison Ave/Division St	Signal	E	C (34.3)	D (44.7)	D (46.2)
3	Harrison Ave/West Bay Dr/Olympic Way	RAB[2]	E	A (1.0)	A (1.3)	A (2.8)
4	4th Ave/Olympic Way	RAB[2]	E	A (3.2)	A (5.4)	A (6.9)
5	4th Ave/Simmons St	Signal	E	B (11.7)	B (13.2)	B (13.9)
6	Deschutes Pkwy/Olympic Way/5th Ave	Yield	E	B (11.5)	C (22.3)	D (33.6)
7	5th Ave/Simmons St	Signal	E	A (7.8)	A (9.2)	B (10.6)
8	North Driveway/West Bay Dr	TWSC[1]	D	-	-	B (12.8)
9	Center Driveway/West Bay Dr	TWSC[1]	D	-	-	B (12.6)
10	South Driveway/West Bay Dr	TWSC[1]	D	-	-	C (15.1)

1. Two-Way Stop-Control
2. Roundabout

6.2.1 Brawne Avenue/West Bay Drive

This intersection operates as a tee intersection with stop control for the eastbound approach. During the PM peak hour this intersection operates at LOS B during the existing 2020 scenario. For the 2027 horizon with and without the *West Bay Yards* project, the intersection is projected to operate at LOS B.

6.2.2 Harrison Avenue/Division Street

This four-leg intersection operates under traffic signal-control. During the PM peak hour this intersection operates at LOS C during the existing 2020 scenario. For the 2027 horizon with and without the *West Bay Yards* project, the intersection is projected to operate at LOS D

6.2.3 Harrison Avenue/West Bay Drive/Olympic Way

This three-leg intersection operates under roundabout control. As described above, existing AM and PM peak period queue observations were collected to assist in calibrating the operational analysis at this intersection. The method for calibrating roundabout analysis in the Sidra software program is to adjust the environment factor, which affects how aggressive drivers use available gaps. Based on the observed max queues and associated traffic volumes, an environment factor of 1.90 would be needed to approximate the observed queues. For context, WSDOT maintains Sidra policy settings for all roundabout analysis on state facilities. Included in those settings are environmental factor values of 1.10 for newly constructed roundabouts and a value of 1.00 for long-range analysis, with the rationale that as drivers acclimate to the roundabout, they will become more comfortable accepting smaller gaps. That is consistent with the Sidra default values of 1.20 for a new two-lane roundabout and a recommended 1.10 value for future conditions analysis. In the context of these two sources, an environment factor of 1.90 is outside what is typically used, especially considering that this roundabout has been in operation for many years.

Based on the prevailing guidance for the environment factor values, a value of 1.20 has been used for the southbound approach of this intersection. This factor is on the outer edge of the recommended range of values for new roundabouts and will better reflect the existing performance than the typical value 0f 1.00-1.10 for established roundabouts. Furthermore, we believe that as traffic volumes increase over time vehicles will seek to use shorter gaps, which will better reflect an environment factor of 1.20 than the potential value of 1.90. Furthermore, it should be noted that the City of Olympia analysis guidelines include a two-hour peak average analysis period, with the goal of designing for the worst two-hour time period and not short-duration operational issues. Using an environment factor of 1.20 is consistent with this policy.

As shown in Table 5, with this calibration factor in place, during the PM peak hour this intersection currently operates at LOS A and remains LOS A during the 2027 horizon with and without project. However, to provide a more complete picture of the projected operations of this intersection, the analysis results for each approach are provided in **Table 6**, for both the PM peak hour and the AM peak hour.

Table 6. Harrison Avenue/West Bay Drive/Olympic Way Operational Summary

	AM Peak Hour			PM Peak Hour		
		Projected 2027			Projected 2027	
	Base Year 2021	Without Project	With Project	Base Year 2021	Without Project	With Project
Approach	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)
Northbound	A (0.1)	A (0.1)	A (0.2)	A (0.2)	A (0.2)	A (0.6)
Southbound	A (4.0)	B (10.8)	B (12.7)	A (6.1)	A (8.4)	B (16.4)
Eastbound	A (1.9)	A (2.7)	A (3.9)	A (1.0)	A (1.2)	A (1.6)
Total Intersection	**A (1.6)**	**A (3.5)**	**A (4.8)**	**A (1.0)**	**A (1.3)**	**A (2.8)**

The AM peak hour currently operates at LOS A for each approach. In the 2027 horizon with and without the project the southbound approach is projected to operate at LOS B, with an average delay of 10.8 seconds without the project and an average delay of 12.9 seconds with the project.

The PM peak hour is also currently operating at LOS A for all three approaches and is projected to remain at LOS for each approach in the 2027 without project scenario. With completion of the project the southbound approach is projected to operate at LOS B, with an average delay of 16.4 seconds.

6.2.4 4th Avenue/Olympic Way

This four-leg intersection operates under roundabout control. During the PM peak hour this intersection currently operates at LOS A and remains LOS A during the 2027 horizon with and without project.

6.2.5 4th Avenue/Simmons Street

This four-leg intersection operates under traffic signal-control. During the PM peak hour this intersection currently operates at LOS B and remains LOS B during the 2027 horizon with and without project.

6.2.6 Deschutes Parkway/Olympic Way/5th Avenue

This three-leg intersection operates as yield control for the westbound slight left turn for traffic continuing onto southbound Deschutes Parkway. During the PM peak hour, this intersection operates at LOS B during existing 2020 and LOS C during 2027 without the project. For the 2027 horizon with the *West Bay Yards* project, the intersection is projected to operate at LOS D.

6.2.7 5th Avenue/Simmons Street

This four-leg intersection operates under traffic signal-control. During the PM peak hour, the intersection operates at LOS A during existing 2020 and 2027 horizon without project. With the project, the intersection is projected to operate at LOS B.

6.2.8 North Driveway/West Bay Drive

This intersection will operate as a tee intersection with stop control for the westbound approach during the PM peak hour, the intersection is projected to operate at LOS B.

6.2.9 Center Driveway/West Bay Drive

This intersection will operate as a tee intersection with stop control for the westbound approach. During the PM peak hour, the intersection is projected to operate at LOS B.

6.2.10 South Driveway/West Bay Drive

This intersection will operate as a tee intersection with stop control for the westbound approach. During the PM peak hour, the intersection is projected to operate at LOS C.

6.3 Local Area Project Impacts

6.3.1 Brawne Avenue Neighborhoods

As shown on Figure 4, the proposed *West Bay Yards* project is expected to add 8 PM peak hour trips and 104 daily trips to Brawne Avenue. The impact of these trips will be greatest at the Brawne Avenue/West Bay Drive intersection. As discussed in Section 6.2, this intersection is projected to operate at LOS B, indicating there will be no notable impacts to the surrounding neighborhoods. In the event that Brawne Avenue is closed, due to either construction or inclement weather/ice, these trips would be expected to divert to other routes to west Olympia. Given the low volume of project traffic expected to use Brawne Avenue, this infrequent diversion of traffic will not result in any adverse impacts.

6.3.2 Schneider Hill Road

Additionally, Figure 4 shows that the project is expected to add 17 PM peak hour trips and 242 daily trips to and from West Bay Drive north of the site. Most of these trips are expected to travel north via Schneider Hill Road. In the event that Schneider Hill Road is closed to due construction or icy conditions, these volumes would be expected to divert so any number of other local connections to west Olympia. Given the low volume of project traffic expected to use Schneider Hill Road, this infrequent diversion of traffic will not result in any adverse impacts.

6.3.3 Impacts During Project Construction

During construction of the on-site improvements associated with the proposed *West Bay Yards* project, both existing travel lanes on West Bay Drive would remain open. During construction of the site driveway intersections, it is anticipated that there will be intermittent times when one travel lane along the project frontage may be closed to expedite construction of the proposed intersection speed tables. These closures are expected to be limited to construction activity.

6.3.4 Brawne Avenue/West Bay Drive Sight Distance

During the public comment period for the initial TIA review comments were received regarding the existing intersection sight distance for the Brawne Avenue/West Bay Drive intersection. This issue is being addressed by the City of Olympia, which will be improving sight distance at this intersection by relocating the streetlight pole, mailbox cluster, and vegetation north of Brawne Avenue on the west side of West Bay Drive. These changes are expected to provide drivers a clear sight-line at 15 feet from the edge of the travel lane on West bay Drive.

6.4 West Bay Drive Corridor

6.4.1 Existing Truck Volumes

Currently there are land uses at the north end of West Bay Drive that generate truck activity, and specifically logging truck activity, on a daily basis. As discussed in Section 3.3, the existing traffic data used in this report included a specific count of the truck volumes for each approach at each study intersection. These truck volumes were used in the intersection operational analysis described in Section 6.2. For West Bay Drive at Brawne Avenue there were zero trucks counted in the two-hour period. For West Bay Drive approaching Harrison Avenue there were 22 counted trucks and buses, equating to a truck percentage of 1.3% for the two-hour period. The data from these two counts indicate that during the PM peak hour truck volumes are a very small portion of the total traffic. This is typical of many roadways, with truck activity focused outside the PM peak period.

During the morning and afternoon time periods it is likely that higher truck volumes are present on West Bay Drive, overlapping with lower overall vehicular volumes. During these times there is also pedestrian activity, which currently co-exists with the existing trucks. The pedestrian experience on West Bay Drive is discussed in more detail below, in Section 6.5.

6.4.2 Travel Time between Brawne Avenue and Harrison Avenue/West Bay Drive intersection

To help assess the impacts to existing traffic on West Bay Drive, a travel time comparison has been performed for vehicles travelling south on West Bay Drive. This comparison was performed for the AM and PM peak hours and calculates the existing and projected travel times for vehicles travelling south from Brawne Avenue through the roundabout at West Bay Drive/Harrison Avenue. These results are shown in **Table 7**.

Table 7. West Bay Drive Travel Time Comparison Summary

		Projected 2027	
	Base Year 2021	**Without Project**	**With Project**
Time Period	Seconds	Seconds	Seconds
AM Peak Hour	60 seconds	67 seconds	69 seconds
PM Peak Hour	62 seconds	64 seconds	72 seconds

For the travel time between Brawne Avenue and Harrison Avenue the link distance (2,450 feet) and posted travel speed (30 mph) were used. This travel time was then added to the southbound approach delay from the intersection analysis to calculate the total time to travel southbound on West Bay Drive from Brawne Avenue through the West Bay Drive/Harrison Avenue intersection. As shown in Table 7, during both peak hours the average travel time is projected to increase by 10 seconds or less.

6.5 Project Site Frontage

6.5.1 Current Roadway Standard

The current roadway standard for this portion of West Bay Drive, Standard Plan 4-2G5, includes a center lane that would serve as a two-way left turn lane (TWLTL). Center lanes provide locations for vehicles to

wait when making a left turn maneuver that doesn't impede the main travel lane and can provide a significant operational and safety benefit in some cases. They can also serve as refuge for vehicles making a left turn from a side street, allowing for a two-stage left turn maneuver. This benefit is especially important as intersection operations begin to decline for the minor street approach.

In the case of West Bay Drive along the proposed project frontage, the typical benefits of a center lane are minimal. Due to the project site location, it is expected that the majority of entering traffic will come from northbound West Bay Drive and make a right turn into the site, as shown on Figure 5. This greatly reduces the operational benefit of the center lane for left turns entering the project site. A left-turn lane warrant analysis was performed for each of the proposed site driveways using the city of Olympia left turn warrant (EDDS 4I.140 Figure 6) to determine if they would meet the thresholds for a left-turn pocket. This warrant compares the advancing volume, the opposing volume, and the percentage of trucks within the advancing volume. For all three driveways the percentage of trucks in the advancing volume is less than 5 percent. None of the three proposed driveways meet warrants for a left-turn lane. The warrant sheet is included in **Appendix D**.

Assessing the value of the center turn lane as it relates to facilitation of two-stage left-turn maneuvers from the minor street, or in this case site driveway, is based largely on the projected operational performance of the intersection. As documented in Section 6.2, the north and center driveways are projected to operate at LOS B, while the south driveway is projected to operate at LOS C. These operational results, which do not include the benefit of a two-stage left-turn maneuver, indicate that the site driveways will operate well without the center lane.

For both of these center lane assessments the projected 2027 volumes indicate minimal vehicular benefit. As traffic volumes increase on West Bay Drive over time, the potential benefit of the center lane may change. To help determine how long the two-lane roadway would be sufficient to serve the vehicular traffic, a sensitivity analysis was performed. This analysis, which uses the established background growth rate documented in Section 5.2, assessed projected 2047 conditions, 20 years from the expected year of opening. Left turn lane warrants for each of the three proposed driveways were reassessed and none of the driveways meet the warrant in the with the 2047 volumes. Operational analysis of the three site driveways was also reassessed for the projected 2047 conditions and all three driveways are projected to operate at LOS C or better. These additional warrants and operational analysis worksheets are included in **Appendix D**.

Regarding bicyclist and pedestrian impacts, the center lane would either:

- Increase the crossing distance on West Bay Drive, thus increasing the exposure and risk of each crossing OR;
- Provide a refuge in the center lane, converting the single existing crossing into two shorter crossings. It should be noted that this treatment would eliminate the ability for vehicles to use the center lane for two-stage left-turn maneuvers.

Crosswalk islands do provide safety benefit to bicyclists and pedestrians but are increasingly beneficial as the roadway width increases and are typically implemented on four-lane or five-lane roadways.

6.5.2 Proposed Roadway Design

City of Olympia staff have indicated that speeding is a concern on this portion of West Bay Drive, which is discussed above in Section 3.2. In lieu of the identified center lane the project proposes a speed mitigation plan including raised intersection treatments at each site driveway.

Raised asphalt intersections are proposed at the northern and southern project limits. These locations were chosen in an effort to slow down traffic speeds through the entire project frontage. A raised stamped concrete intersection is proposed near the middle of the site which is also the main entrance to the site. **Figure 8** provides cross sections for the proposed roadway design along the project frontage on West Bay Drive between the proposed raised intersections. **Figure 9** provides the design details for the proposed raised intersections.

Figure 8. West Bay Drive Project Frontage Cross Section

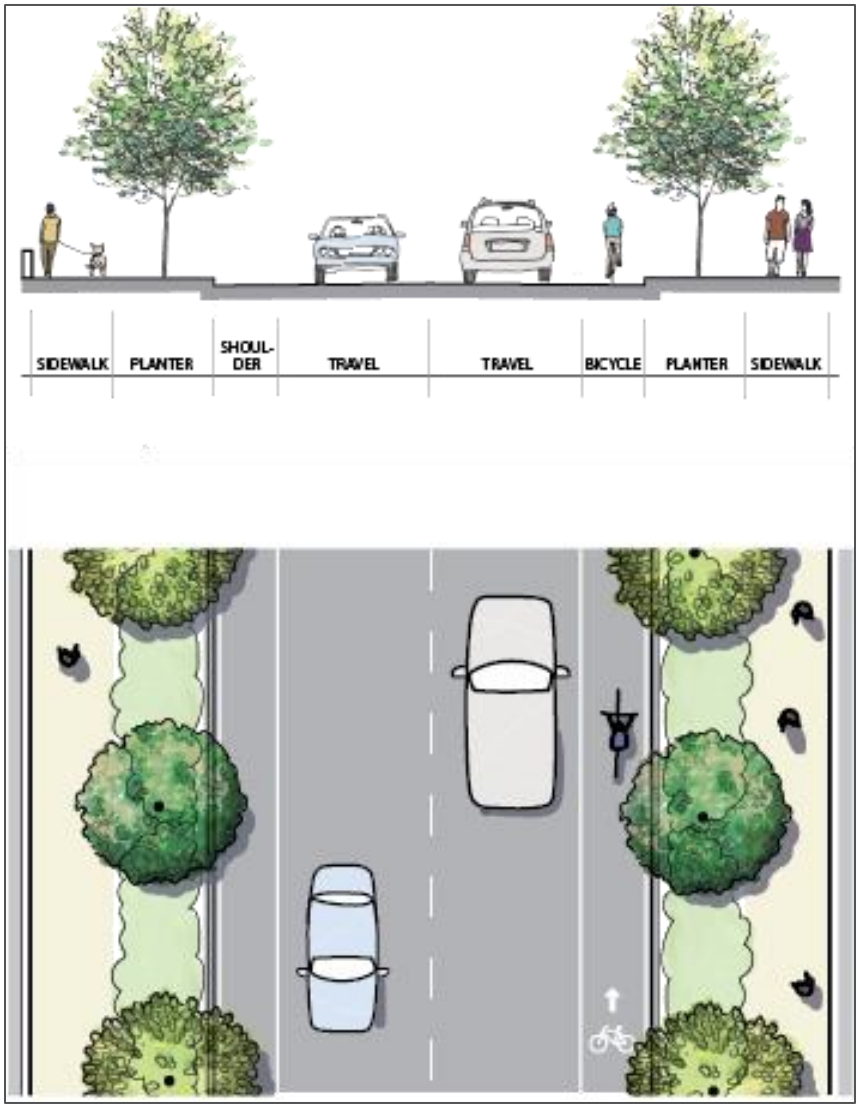
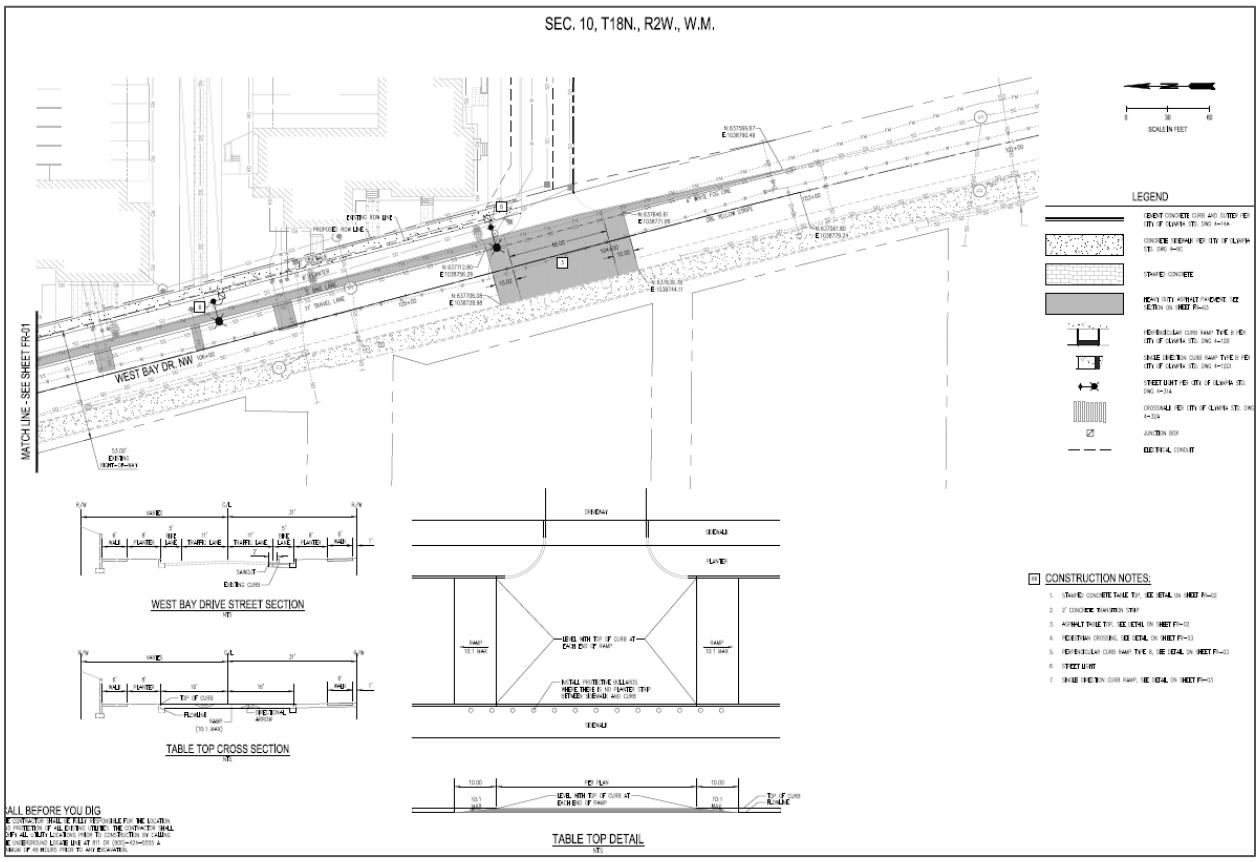


Figure 9. West Bay Drive Raised Intersection Design Details



Raised intersections also provide a safety benefit to pedestrians and bicyclists. In addition to reducing the vehicular travel speeds, they also make the pedestrians and bicyclists more visible to vehicles on the road.

A deviation request is being prepared and submitted concurrent to this report to advance this proposed roadway design. It is understood that there are existing logging trucks travelling on West Bay Drive along the project frontage. These intersection treatments will be designed to accommodate all existing vehicle types on West Bay Drive.

6.6 Non-Motorized Facilities

Currently West Bay Drive provides sidewalks on the west side of the road through the project area. In the immediate vicinity of the proposed project this sidewalk is separated by a planter strip on the north end before transitioning to the sidewalk being located alongside the road. The existing non-motorized facilities are shown in **Figure 10**.

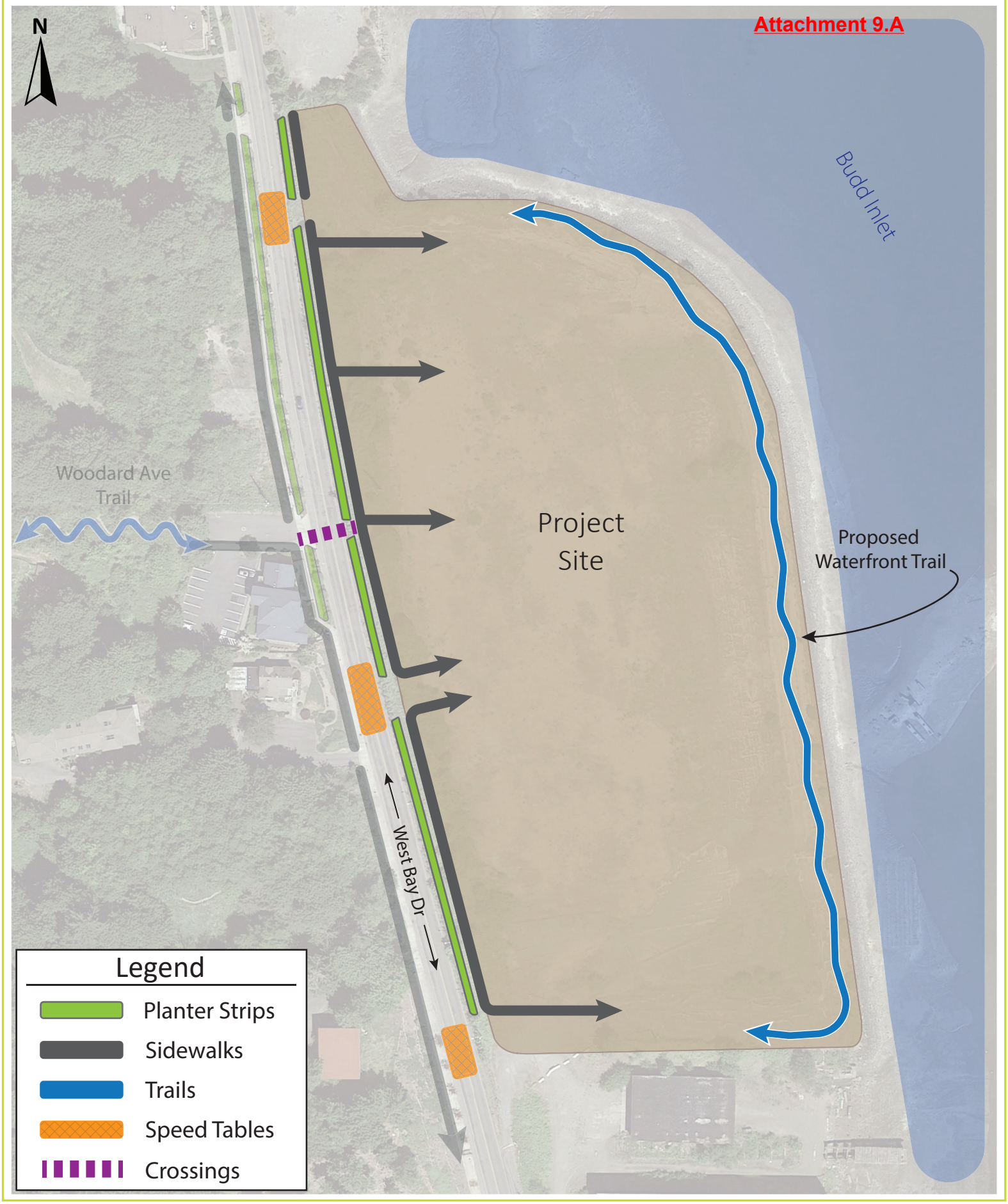
SCJ ALLIANCE
ENGINEERING AND PLANNING SERVICES

West Bay Yards
Traffic Impact Analysis

Figure 10
Existing West Bay Dr
Non-motorized Facilities

As part of the proposed project, frontage improvements will be constructed, meeting the dimensions shown on standard drawing plan 4-2G5. The frontage improvements consist of a 5-feet wide bike lane, 8-feet wide planter strip, and 6-feet wide sidewalk on the east side of West Bay Drive. The project is also proposing to construct a pedestrian crossing across West Bay Drive to provide access to the Woodard Avenue NW trailhead, which will include a center lane refuge island. Additionally, as discussed in Section 6.5, the project is proposing to construct three raised intersection treatments at each of the site driveways. The proposed project will also construct waterfront amenities, including a 30-foot waterfront trail buffer, a kayak launch, and transient moorage. The proposed non-motorized facilities are shown in **Figure 11**.

A small parking lot, containing seven stalls, will be provided at the north end of the site to provide additional access to these amenities. The proposed project will also provide 417 long term bicycle storage spaces and 48 short term spaces.



SCJ ALLIANCE
ENGINEERING AND PLANNING SERVICES

West Bay Yards
Traffic Impact Analysis

Figure 11
Proposed West Bay Dr
Non-motorized Facilities

7 Mitigation Measures

The proposed project will add 250 PM peak hour vehicle trips to the existing street system during the PM peak our at completion. The overall effect of the new trips will be negligible to the function and operations of the transportation network, as documented in this study.

However, the project will be responsible for several localized improvements as part of the development proposal that will benefit both vehicular and pedestrian modes. These include:

7.1 West Bay Drive Frontage Improvements

The development will construct frontage improvements along West Bay Drive, which will include sidewalks, street lighting, bike lanes and landscaping. These improvements will be consistent with the City of Olympia standard plan 4-48A of the EDDS.

7.2 Speed Mitigation Plan

The development will construct three raised island intersection treatments, one at each site driveway, to mitigation the existing travel speeds on West Bay Drive and improve pedestrian and bicyclist safety. The northern and southern intersections will provide a raised asphalt treatment and the center driveway will provide a raised stamped concrete treatment.

7.3 Non-Motorized Facilities

The development plans to construct a pedestrian crossing across West Bay Drive with a center lane refuge island, to provide access to the Woodard Avenue NW trailhead, and several waterfront amenities, including a 30-foot waterfront trail buffer, a kayak launch, and transient moorage. The development will also provide 417 long term bicycle storage spaces and 48 short term spaces for residents and visitors.

8 Summary and Conclusions

West Bay Development Group, LLC proposes to construct the *West Bay Yards* project, which will consist of 478 apartment units approximately 6,300 square feet of restaurant space, 4,400 square feet of café/coffee house space, 3,200 square feet of commercial space, and 2,400 square feet of office space. The site will also provide waterfront amenities with a 30-foot waterfront trail buffer and a kayak/boat rental. A total of 805 parking stalls will be provided, with 115 of these stalls located at ground level, and the remaining 690 stalls located below ground. The proposed project will also provide 417 long term bicycle storage spaces and 48 short term spaces

At full occupancy and operation, the project is estimated to generate 250 trip ends during the PM peak hour. An evaluation of the existing 2020 and project opening year (2027) with and without the project traffic was performed. All of the study intersections currently operate within the City of Olympia level of service standard and are projected to continue remain within the adopted level of service standard.

As part of the proposed project, frontage improvements will be constructed meeting the dimensions shown on standard drawing plan 4-2G5. The frontage improvements consist of a 5-feet wide bike lane, 8-feet wide planter strip, and 6-feet wide sidewalk on the east side of West Bay Drive. Additionally, the project is proposing to construct a pedestrian crossing across West Bay Drive to provide access to the Woodard Avenue NW trailhead, which will include a center lane refuge island.

The project also proposes to construct raised asphalt intersections at the northern and southern project limits. These locations were chosen in an effort to slow down traffic speeds through the entire project frontage and improve pedestrian and bicyclist safety. A raised stamped concrete intersection is proposed near the middle of the site which is also the main entrance to the site.

Appendix A

Traffic Volume Counts

City of Olympia

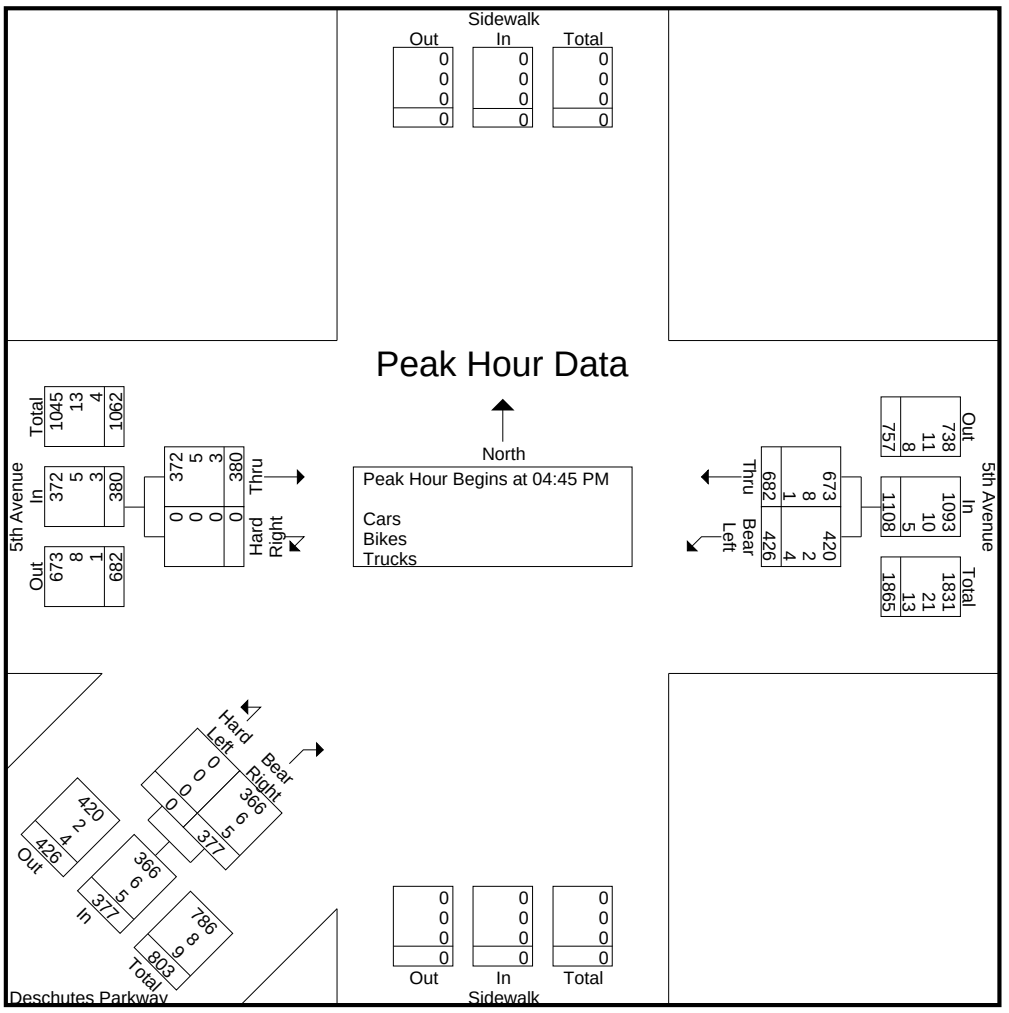
Public Works Department
Transportation Engineering

Attachment 9.A

Deschutes Parkway
5th Avenue
Weather: Sunny, Warm
Counted by: John L

File Name : Deschutes-5th
Site Code : 00000584
Start Date : 4/22/2015
Page No : 5

	From North	5th Avenue From East			From South	Deschutes Parkway From Southwest			5th Avenue From West			
Start Time	App. Total	Thru	Bear Left	App. Total	App. Total	Bear Right	Hard Left	App. Total	Hard Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 04:45 PM												
04:45 PM	0	154	91	245	0	75	0	75	0	92	92	412
05:00 PM	0	200	126	326	0	100	0	100	0	100	100	526
05:15 PM	0	198	114	312	0	109	0	109	0	93	93	514
05:30 PM	0	130	95	225	0	93	0	93	0	95	95	413
Total Volume	0	682	426	1108	0	377	0	377	0	380	380	1865
% App. Total		61.6	38.4			100	0		0	100		
PHF	.000	.853	.845	.850	.000	.865	.000	.865	.000	.950	.950	.886
Cars	0	673	420	1093	0	366	0	366	0	372	372	1831
% Cars	0	98.7	98.6	98.6	0	97.1	0	97.1	0	97.9	97.9	98.2
Bikes	0	8	2	10	0	6	0	6	0	5	5	21
% Bikes	0	1.2	0.5	0.9	0	1.6	0	1.6	0	1.3	1.3	1.1
Trucks	0	1	4	5	0	5	0	5	0	3	3	13
% Trucks	0	0.1	0.9	0.5	0	1.3	0	1.3	0	0.8	0.8	0.7



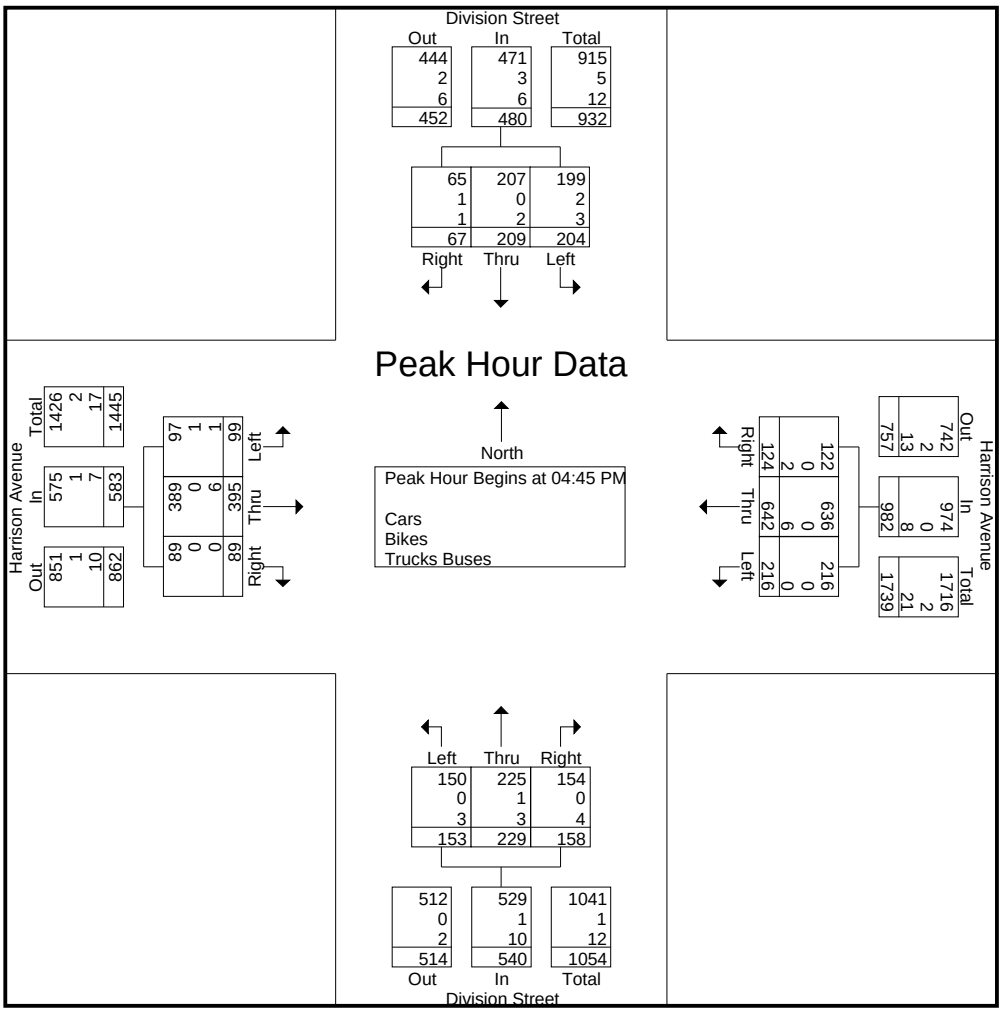
City of Olympia
Public Works Department
Transportation Planning & Engineering

Attachment 9.A

Division Street
Harrison Avenue
Weather:
Counted by: John L

File Name : Division-Harrison
Site Code : 00000005
Start Date : 9/11/2019
Page No : 5

	Division Street From North				Harrison Avenue From East				Division Street From South				Harrison Avenue From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	15	**69**	54	**138**	15	162	**61**	238	41	57	40	138	19	100	20	139	653
05:00 PM	15	47	47	109	33	**179**	54	**266**	35	61	34	130	24	**114**	28	**166**	**671**
05:15 PM	17	51	**62**	130	37	140	53	230	34	47	31	112	**27**	94	21	142	614
05:30 PM	**20**	42	41	103	**39**	161	48	248	**48**	**64**	**48**	**160**	19	87	**30**	136	647
Total Volume	67	209	204	480	124	642	216	982	158	229	153	540	89	395	99	583	2585
% App. Total	14	43.5	42.5		12.6	65.4	22		29.3	42.4	28.3		15.3	67.8	17		
PHF	.838	.757	.823	.870	.795	.897	.885	.923	.823	.895	.797	.844	.824	.866	.825	.878	.963
Cars	65	207	199	471	122	636	216	974	154	225	150	529	89	389	97	575	2549
% Cars	97.0	99.0	97.5	98.1	98.4	99.1	100	99.2	97.5	98.3	98.0	98.0	100	98.5	98.0	98.6	98.6
Bikes	1	0	2	3	0	0	0	0	0	1	0	1	0	0	1	1	5
% Bikes	1.5	0	1.0	0.6	0	0	0	0	0	0.4	0	0.2	0	0	1.0	0.2	0.2
Trucks Buses	1	2	3	6	2	6	0	8	4	3	3	10	0	6	1	7	31
% Trucks Buses	1.5	1.0	1.5	1.3	1.6	0.9	0	0.8	2.5	1.3	2.0	1.9	0	1.5	1.0	1.2	1.2



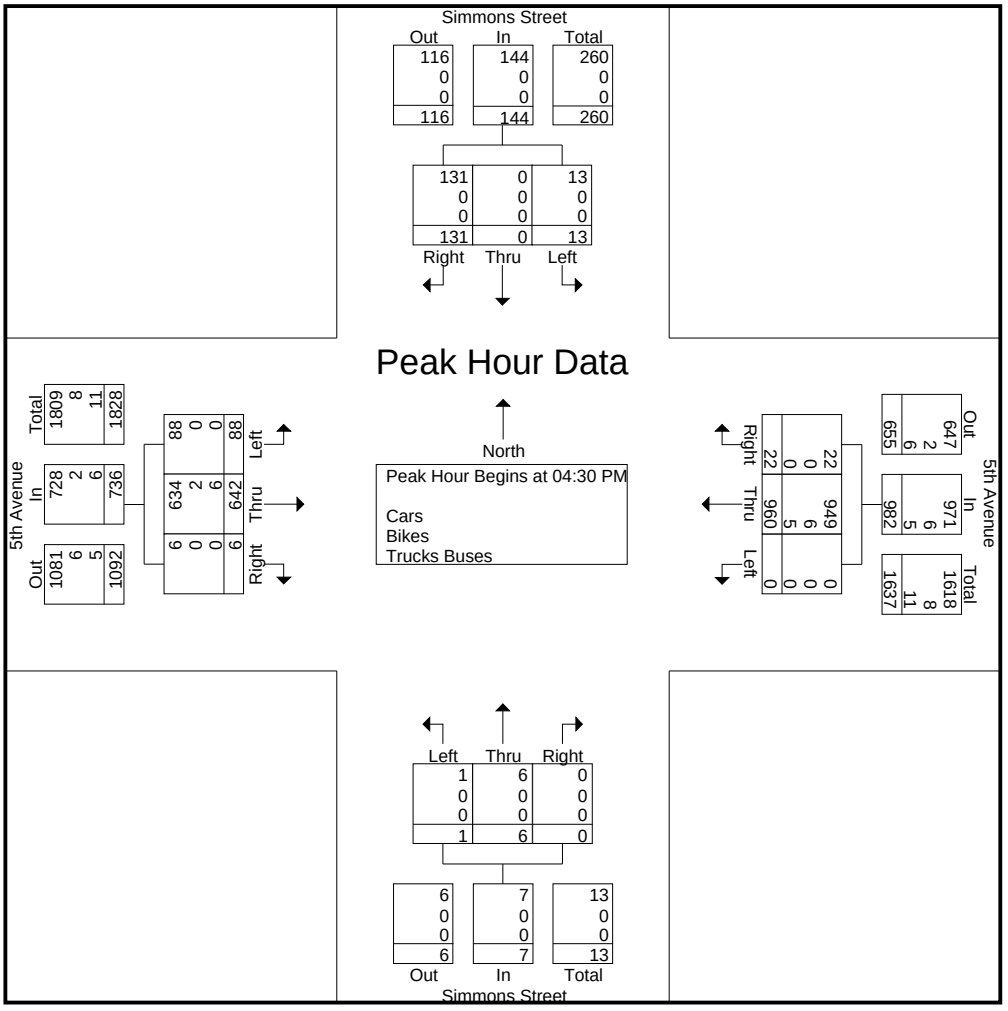
City of Olympia
Public Works Department
Transportation Planning & Engineering

Attachment 9.A

Simmons Street
5th Avenue
Weather: Sun/Clouds
Counted by: John L

File Name : Simmons-5th
Site Code : 00000066
Start Date : 3/12/2019
Page No : 5

	Simmons Street From North				5th Avenue From East				Simmons Street From South				5th Avenue From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	24	0	2	26	5	232	0	237	0	1	0	1	**2**	149	18	169	433
04:45 PM	30	0	3	33	**7**	207	0	214	0	**2**	0	2	1	152	23	176	425
05:00 PM	**40**	0	1	41	3	**286**	0	**289**	0	1	0	1	1	170	20	191	**522**
05:15 PM	37	0	**7**	**44**	7	235	0	242	0	2	**1**	**3**	2	**171**	**27**	**200**	489
Total Volume	131	0	13	144	22	960	0	982	0	6	1	7	6	642	88	736	1869
% App. Total	91	0	9		2.2	97.8	0		0	85.7	14.3		0.8	87.2	12		
PHF	.819	.000	.464	.818	.786	.839	.000	.849	.000	.750	.250	.583	.750	.939	.815	.920	.895
Cars	131	0	13	144	22	949	0	971	0	6	1	7	6	634	88	728	1850
% Cars	100	0	100	100	100	98.9	0	98.9	0	100	100	100	100	98.8	100	98.9	99.0
Bikes	0	0	0	0	0	6	0	6	0	0	0	0	0	2	0	2	8
% Bikes	0	0	0	0	0	0.6	0	0.6	0	0	0	0	0	0.3	0	0.3	0.4
Trucks Buses	0	0	0	0	0	5	0	5	0	0	0	0	0	6	0	6	11
% Trucks Buses	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0	0.9	0	0.8	0.6



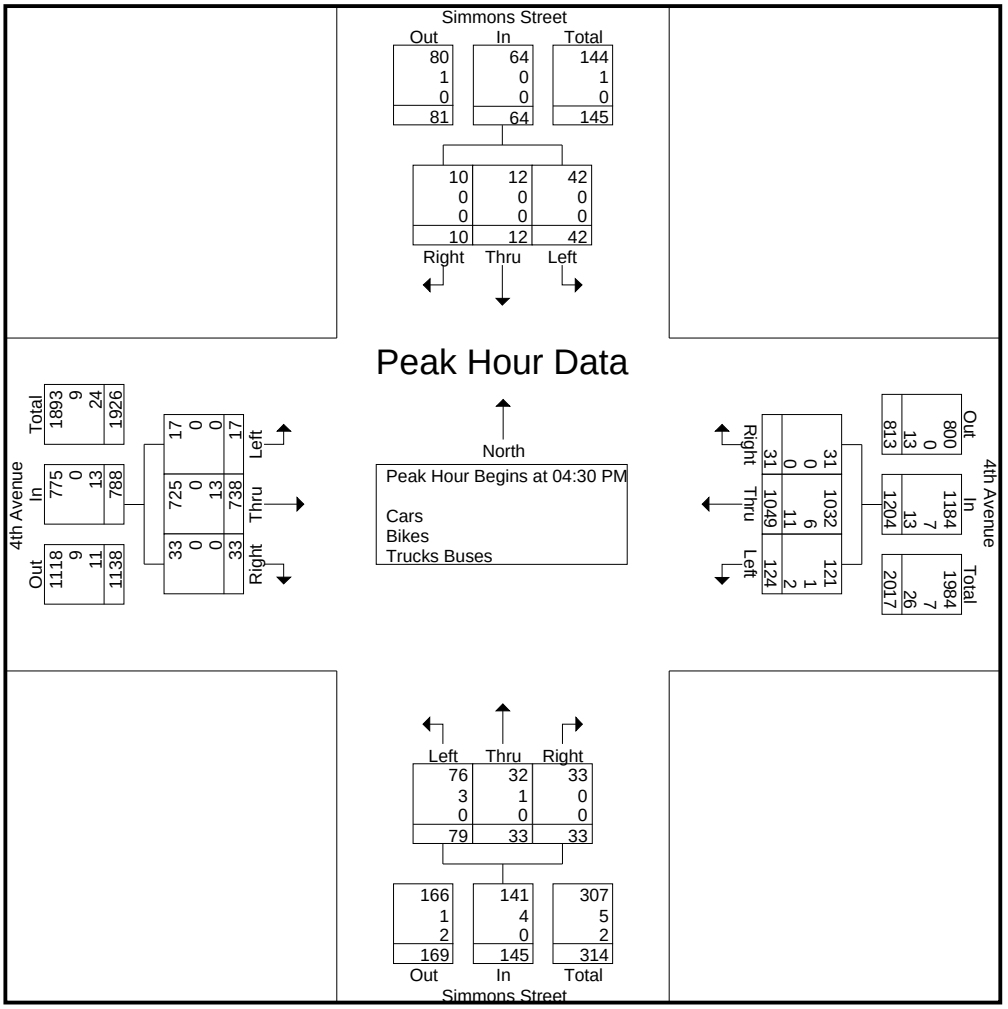
City of Olympia
Public Works Department
Transportation Planning & Engineering

Attachment 9.A

Simmons Street
4th Avenue
Weather Partly Cloudy, Showers
Counted by: John L

File Name : Simmons-4th
Site Code : 00000008
Start Date : 9/12/2019
Page No : 5

	Simmons Street From North				4th Avenue From East				Simmons Street From South				4th Avenue From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**4**	**5**	7	16	**11**	258	34	303	**9**	8	15	32	7	171	3	181	532
04:45 PM	2	3	10	15	7	259	23	289	9	8	21	38	**9**	186	4	199	541
05:00 PM	2	3	12	**17**	8	**271**	**38**	**317**	8	8	**24**	**40**	9	185	**6**	200	**574**
05:15 PM	2	1	**13**	16	5	261	29	295	7	**9**	19	35	8	**196**	4	**208**	554
Total Volume	10	12	42	64	31	1049	124	1204	33	33	79	145	33	738	17	788	2201
% App. Total	15.6	18.8	65.6		2.6	87.1	10.3		22.8	22.8	54.5		4.2	93.7	2.2		
PHF	.625	.600	.808	.941	.705	.968	.816	.950	.917	.917	.823	.906	.917	.941	.708	.947	.959
Cars	10	12	42	64	31	1032	121	1184	33	32	76	141	33	725	17	775	2164
% Cars	100	100	100	100	100	98.4	97.6	98.3	100	97.0	96.2	97.2	100	98.2	100	98.4	98.3
Bikes	0	0	0	0	0	6	1	7	0	1	3	4	0	0	0	0	11
% Bikes	0	0	0	0	0	0.6	0.8	0.6	0	3.0	3.8	2.8	0	0	0	0	0.5
Trucks Buses	0	0	0	0	0	11	2	13	0	0	0	0	0	13	0	13	26
% Trucks Buses	0	0	0	0	0	1.0	1.6	1.1	0	0	0	0	0	1.8	0	1.6	1.2



City of Olympia

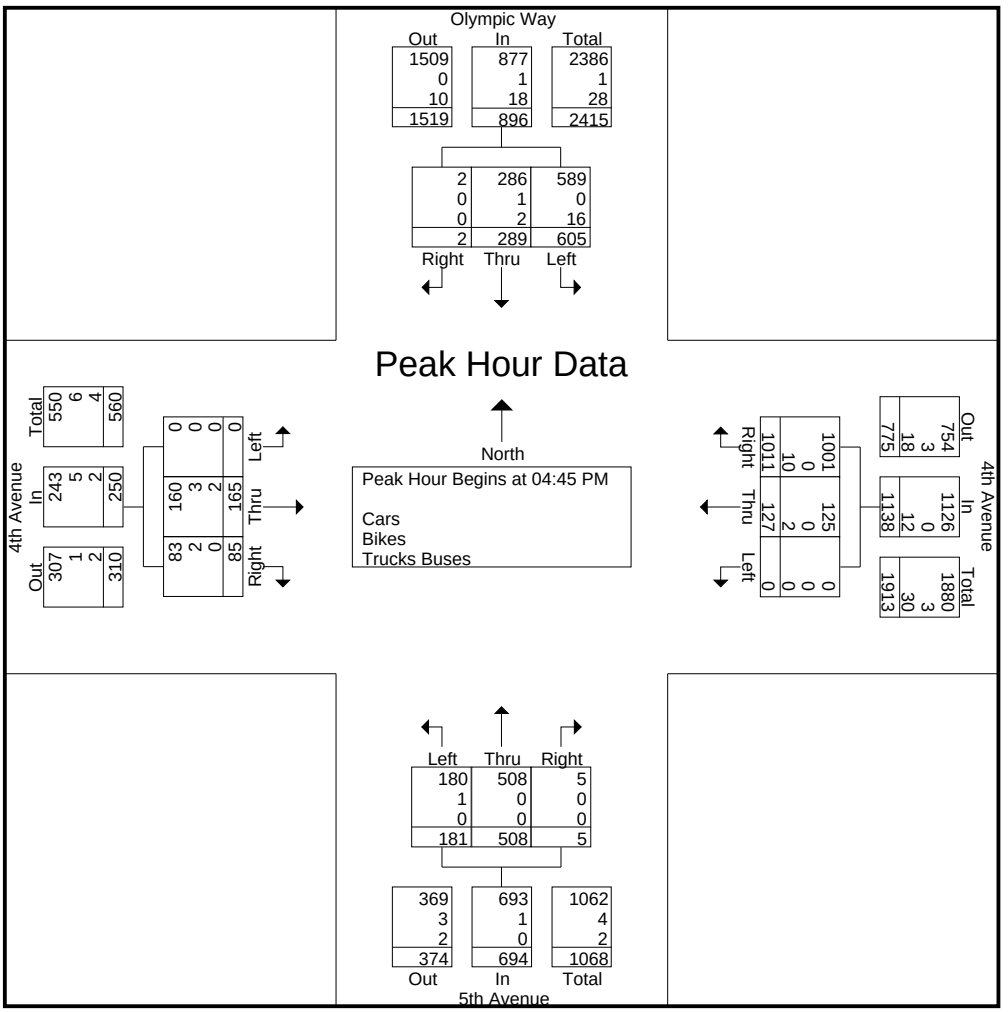
Public Works Department
Transportation Engineering

Attachment 9.A

Olympic Way/5th Avenue
4th Avenue
Weather: Sunny, Cool
Counted by: John L

File Name : Olympic5th-4th
Site Code : 00000582
Start Date : 9/25/2019
Page No : 5

	Olympic Way From North				4th Avenue From East				5th Avenue From South				4th Avenue From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	56	141	198	220	26	0	246	2	132	32	166	21	34	0	55	665
05:00 PM	0	75	156	231	242	48	0	290	2	128	52	182	29	43	0	72	775
05:15 PM	0	73	150	223	291	28	0	319	1	129	53	183	15	33	0	48	773
05:30 PM	1	85	158	244	258	25	0	283	0	119	44	163	20	55	0	75	765
Total Volume	2	289	605	896	1011	127	0	1138	5	508	181	694	85	165	0	250	2978
% App. Total	0.2	32.3	67.5		88.8	11.2	0		0.7	73.2	26.1		34	66	0		
PHF	.500	.850	.957	.918	.869	.661	.000	.892	.625	.962	.854	.948	.733	.750	.000	.833	.961
Cars	2	286	589	877	1001	125	0	1126	5	508	180	693	83	160	0	243	2939
% Cars	100	99.0	97.4	97.9	99.0	98.4	0	98.9	100	100	99.4	99.9	97.6	97.0	0	97.2	98.7
Bikes	0	1	0	1	0	0	0	0	0	0	1	1	2	3	0	5	7
% Bikes	0	0.3	0	0.1	0	0	0	0	0	0	0.6	0.1	2.4	1.8	0	2.0	0.2
Trucks Buses	0	2	16	18	10	2	0	12	0	0	0	0	0	2	0	2	32
% Trucks Buses	0	0.7	2.6	2.0	1.0	1.6	0	1.1	0	0	0	0	0	1.2	0	0.8	1.1



City of Olympia

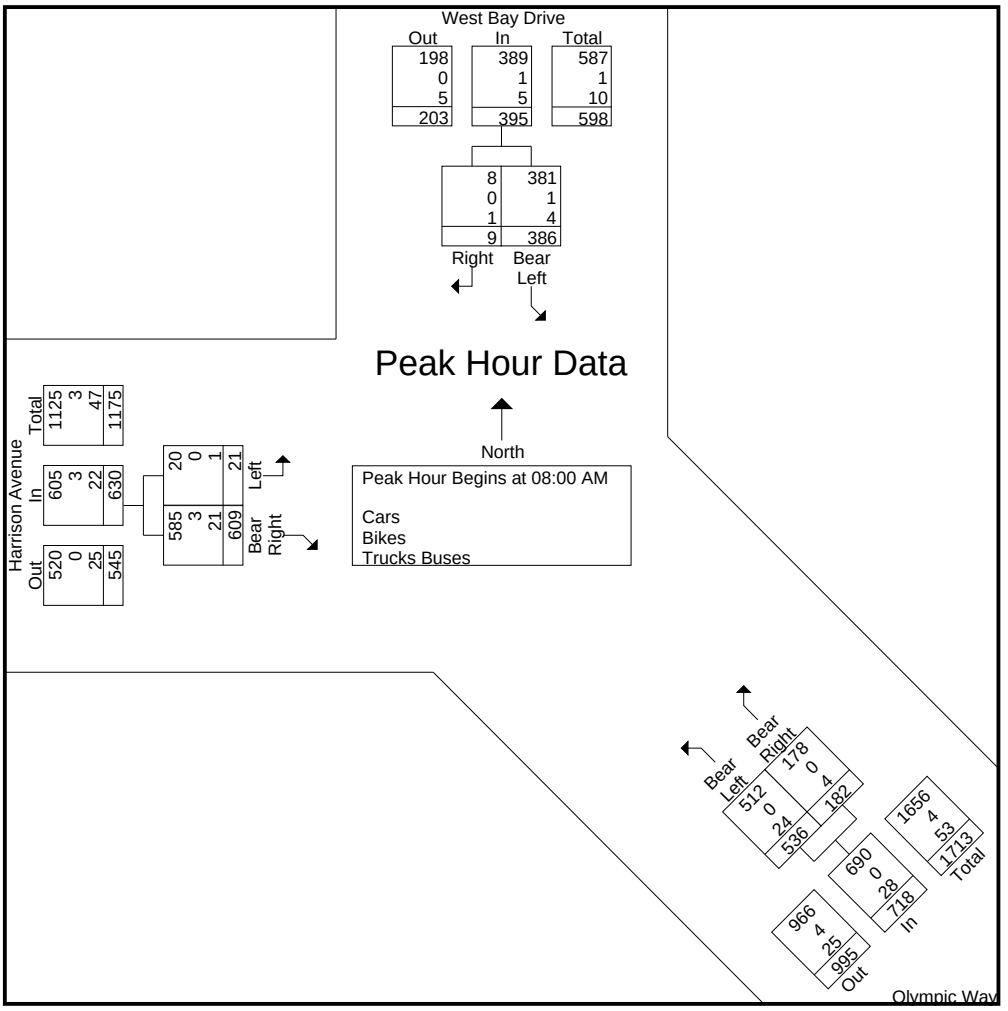
Public Works Department
Transportation Engineering

Attachment 9.A

West Bay Drive - Olympic Way
Harrison Avenue
Weather: Cloudy, Showers/Cool
Counted by: John L

File Name : Harrison-WestBay
Site Code : 00000541
Start Date : 4/11/2018
Page No : 3

	West Bay Drive From North			Olympic Way From Southeast			Harrison Avenue From West			
Start Time	Right	Bear Left	App. Total	Bear Right	Bear Left	App. Total	Bear Right	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	1	87	88	39	129	168	174	5	179	435
08:15 AM	2	111	113	51	143	194	149	8	157	464
08:30 AM	3	95	98	51	129	180	142	6	148	426
08:45 AM	3	93	96	41	135	176	144	2	146	418
Total Volume	9	386	395	182	536	718	609	21	630	1743
% App. Total	2.3	97.7		25.3	74.7		96.7	3.3		
PHF	.750	.869	.874	.892	.937	.925	.875	.656	.880	.939
Cars	8	381	389	178	512	690	585	20	605	1684
% Cars	88.9	98.7	98.5	97.8	95.5	96.1	96.1	95.2	96.0	96.6
Bikes	0	1	1	0	0	0	3	0	3	4
% Bikes	0	0.3	0.3	0	0	0	0.5	0	0.5	0.2
Trucks Buses	1	4	5	4	24	28	21	1	22	55
% Trucks Buses	11.1	1.0	1.3	2.2	4.5	3.9	3.4	4.8	3.5	3.2



City of Olympia

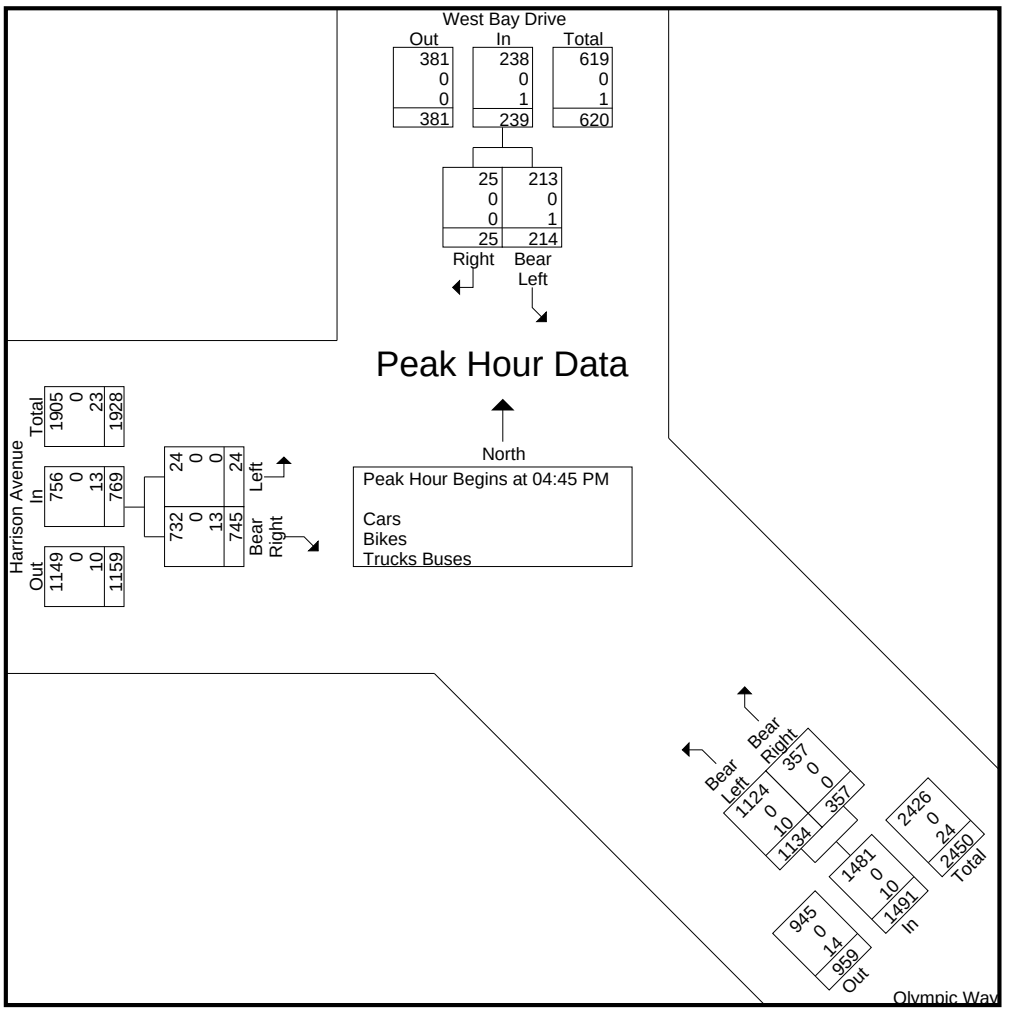
Public Works Department
Transportation Engineering

Attachment 9.A

West Bay Drive - Olympic Way
Harrison Avenue
Weather: Cloudy, Showers/Cool
Counted by: John L

File Name : Harrison-WestBay
Site Code : 00000541
Start Date : 4/11/2018
Page No : 5

	West Bay Drive From North			Olympic Way From Southeast			Harrison Avenue From West			
Start Time	Right	Bear Left	App. Total	Bear Right	Bear Left	App. Total	Bear Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	7	49	56	81	299	380	171	10	181	617
05:00 PM	8	58	66	88	245	333	213	5	218	617
05:15 PM	7	47	54	105	324	429	184	5	189	672
05:30 PM	3	60	63	83	266	349	177	4	181	593
Total Volume	25	214	239	357	1134	1491	745	24	769	2499
% App. Total	10.5	89.5		23.9	76.1		96.9	3.1		
PHF	.781	.892	.905	.850	.875	.869	.874	.600	.882	.930
Cars	25	213	238	357	1124	1481	732	24	756	2475
% Cars	100	99.5	99.6	100	99.1	99.3	98.3	100	98.3	99.0
Bikes	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0
Trucks Buses	0	1	1	0	10	10	13	0	13	24
% Trucks Buses	0	0.5	0.4	0	0.9	0.7	1.7	0	1.7	1.0



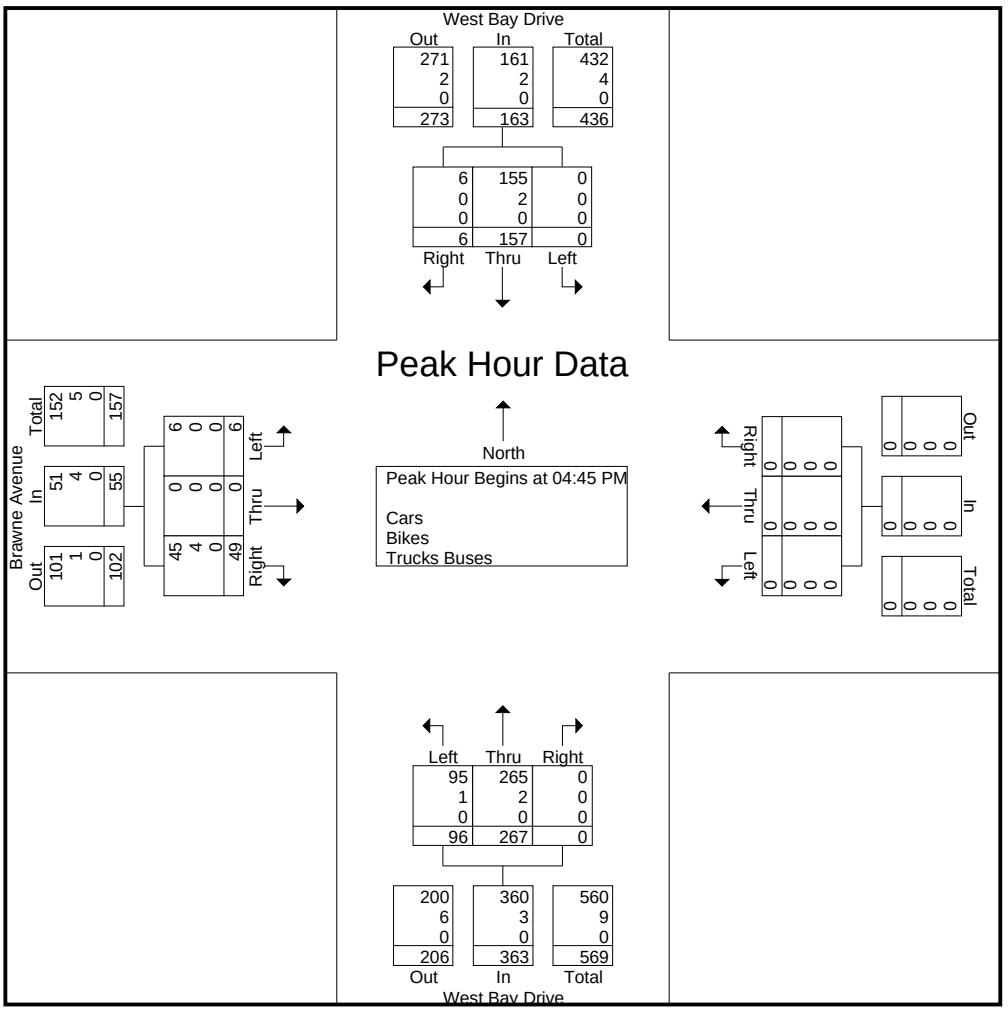
City of Olympia
Public Works Department
Transportation Planning & Engineering

Attachment 9.A

West Bay Drive
Brawne Avenue
Weather: Sunny, Warm
Counted by: John L

File Name : Brawne-WestBay
Site Code : 00000676
Start Date : 4/21/2017
Page No : 3

	West Bay Drive From North				From East				West Bay Drive From South				Brawne Avenue From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	33	0	34	0	0	0	0	0	**69**	25	**94**	12	0	1	13	141
05:00 PM	1	**47**	0	**48**	0	0	0	0	0	68	24	92	7	0	2	9	149
05:15 PM	1	36	0	37	0	0	0	0	0	69	19	88	11	0	**3**	14	139
05:30 PM	**3**	41	0	44	0	0	0	0	0	61	**28**	89	**19**	0	0	**19**	**152**
Total Volume	6	157	0	163	0	0	0	0	0	267	96	363	49	0	6	55	581
% App. Total	3.7	96.3	0		0	0	0		0	73.6	26.4		89.1	0	10.9		
PHF	.500	.835	.000	.849	.000	.000	.000	.000	.000	.967	.857	.965	.645	.000	.500	.724	.956
Cars	6	155	0	161	0	0	0	0	0	265	95	360	45	0	6	51	572
% Cars	100	98.7	0	98.8	0	0	0	0	0	99.3	99.0	99.2	91.8	0	100	92.7	98.5
Bikes	0	2	0	2	0	0	0	0	0	2	1	3	4	0	0	4	9
% Bikes	0	1.3	0	1.2	0	0	0	0	0	0.7	1.0	0.8	8.2	0	0	7.3	1.5
Trucks Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Attachment 9.A

ADT Volumes

IDN	Location	Year	Mo	NB	SB	Total	EB	WB	Total	85th% Spd	Avg Spd	% PassVeh	%Lt Trk	% Med Trk	% Hvy Trk
215	4th Avenue Bridge	2019	5	-	-	0	10875	10776	21651						
214	5th Avenue Bridge	2019	5	-	-	0	9604	9111	18715						
2909	Brawne Ave w/o West Bay Dr	2018	5	-	-	0	769	773	1542	26.6	22.8	98.9%	0.7%	0.3%	0.1%
182	Harrison Ave w/o West Bay Dr	2018	5	-	-	0	10321	11489	21810						
181	Olympic Way between Roundabouts	2019	10	13422	12627	26049	-	-	0						
3213	Schneider Hill Rd w/o West Bay Dr	2017	3	1655	1615	3270	-	-	0	37.3	32.2	98.7%	1.1%	0.1%	0.1%
221	Simmons St n/o 5th Ave	2018	5	1796	2315	4111	-	-	0						
179	West Bay Dr n/o Harrison Ave	2018	5	3764	4110	7874	-	-	0						
3844	West Bay Dr n/o Schneider Hill Rd	2017	3	374	375	749	-	-	0	36.0	30.5	88.8%	2.8%	0.5%	7.9%
1152	West Bay Dr s/o Giles Ave	2019	4	3106	3124	6230	-	-	0	39.0	35.1	97.5%	1.6%	0.4%	0.5%
3219	West Bay Dr s/o Schneider Hill Rd	2017	3	2054	2054	4108	-	-	0	37.2	32.5	96.5%	1.5%	0.4%	1.6%

Attachment 9.A

Appendix B

Traffic Volume Calculations Worksheets

Attachment 9.A

SCJ ALLIANCE
CONSULTING SERVICES

West Bay Yards

PM Peak Hour Volumes

Growth Rate:	2%

Pipeline Development Projects

Intersection	Movement		Existing 2020 Volumes	Two Hour Average Volumes	Background 2027 Growth	State and Water Volumes	The Laurana Volumes	Views on 5th Volumes	Total Pipeline Volumes	Baseline 2027 Volumes	Site Generated Primary	Site Generated Pass-By	Site Generated Volumes	Projected 2027 Volumes
		L	6	**6**	1	0	0	0	0	**7**	5	0	**5**	**12**
1	EB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
West Bay Dr		R	49	**48**	7	0	0	0	0	**55**	0	0	**0**	**55**
Brawne Avenue		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	WB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
TMC Date: 04/21/2017		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		L	96	**93**	13	0	0	0	0	**106**	0	0	**0**	**106**
4:45 - 5:45	NB	T	267	**259**	37	1	1	0	2	**298**	136	0	**136**	**434**
PHF: 0.96		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
Two hour Average Factor:		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
0.96	SB	T	157	**152**	22	1	1	0	2	**176**	89	0	**89**	**265**
		R	6	**6**	1	0	0	0	0	**7**	3	0	**3**	**10**
			581	**564**						**649**				882
		L	99	**96**	14	0	0	0	0	**110**	0	0	**0**	**110**
2	EB	T	395	**383**	55	0	0	0	0	**438**	23	0	**23**	**461**
Harrison Ave		R	89	**86**	12	0	0	0	0	**98**	0	0	**0**	**98**
Division St		L	216	**210**	30	0	0	0	0	**240**	10	0	**10**	**250**
	WB	T	642	**623**	90	0	0	0	0	**713**	15	0	**15**	**728**
TMC Date: 09/11/2019		R	124	**120**	17	0	0	0	0	**137**	0	0	**0**	**137**
		L	153	**148**	21	0	0	0	0	**169**	0	0	**0**	**169**
4:45 - 5:45	NB	T	229	**222**	32	0	0	0	0	**254**	0	0	**0**	**254**
PHF: 0.96		R	158	**153**	22	0	0	0	0	**175**	15	0	**15**	**190**
Two hour Average Factor:		L	204	**198**	29	0	0	0	0	**227**	0	0	**0**	**227**
0.97	SB	T	209	**203**	29	0	0	0	0	**232**	0	0	**0**	**232**
		R	67	**65**	9	0	0	0	0	**74**	0	0	**0**	**74**
			2,585	**2,507**						**2,867**				2,930
		L	24	**23**	3	0	0	0	0	**26**	38	0	**38**	**64**
3	EB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
Harrison Ave		R	745	**723**	104	3	3	0	6	**833**	0	0	**0**	**833**
West Bay Dr/ Olympic Way		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	WB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
TMC Date: 04/11/2018		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		L	1,134	**1,100**	159	2	3	0	5	**1,264**	0	0	**0**	**1,264**
4:45 - 5:45	NB	T	357	**346**	50	1	1	0	2	**398**	98	0	**98**	**496**
PHF: 0.93		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
Two hour Average Factor:		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
0.95	SB	T	214	**208**	30	1	1	0	2	**240**	64	0	**64**	**304**
		R	25	**24**	4	0	0	0	0	**28**	25	0	**25**	**53**
			2,499	**2,424**						**2,789**				3,014

Attachment 9.A

SCJ ALLIANCE
CONSULTING SERVICES

West Bay Yards

PM Peak Hour Volumes

Growth Rate:	2%

Pipeline Development Projects

Intersection	Movement		Existing 2020 Volumes	Two Hour Average Volumes	Background 2027 Growth	State and Water Volumes	The Laurana Volumes	Views on 5th Volumes	Total Pipeline Volumes	Baseline 2027 Volumes	Site Generated Primary	Site Generated Pass-By	Site Generated Volumes	Projected 2027 Volumes
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
4	EB	T	165	**160**	23	0	0	0	0	**183**	0	0	**0**	**183**
4th Ave		R	85	**82**	12	0	0	0	0	**94**	0	0	**0**	**94**
Olympic Way		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	WB	T	127	**123**	18	0	0	0	0	**141**	0	0	**0**	**141**
TMC Date: 09/25/2019		R	1,011	**981**	142	3	4	0	7	**1,130**	45	0	**45**	**1,175**
		L	181	**176**	25	0	0	0	0	**201**	0	0	**0**	**201**
4:45 - 5:45	NB	T	508	**493**	71	0	0	0	0	**564**	53	0	**53**	**617**
PHF: 0.96		R	5	**5**	1	0	0	0	0	**6**	0	0	**0**	**6**
Two hour Average Factor:		L	605	**587**	85	4	4	0	8	**680**	29	0	**29**	**709**
0.94	SB	T	289	**280**	40	0	0	0	0	**320**	35	0	**35**	**355**
		R	2	**2**	0	0	0	0	0	**2**	0	0	**0**	**2**
			2,978	**2,889**						**3,321**				3,483
		L	17	**16**	2	0	0	0	0	**18**	0	0	**0**	**18**
5	EB	T	738	**716**	103	4	4	13	21	**840**	15	0	**15**	**855**
4th Ave		R	33	**32**	5	0	0	0	0	**37**	14	0	**14**	**51**
Simmons St		L	124	**120**	17	0	0	0	0	**137**	0	0	**0**	**137**
	WB	T	1,049	**1,018**	147	3	4	-1	6	**1171**	23	0	**23**	**1,194**
TMC Date: 09/12/2019		R	31	**30**	4	0	0	0	0	**34**	0	0	**0**	**34**
		L	79	**77**	11	0	0	8	8	**96**	22	0	**22**	**118**
4:30 - 5:30	NB	T	33	**32**	5	0	0	0	0	**37**	0	0	**0**	**37**
PHF: 0.96		R	33	**32**	5	0	0	5	5	**42**	0	0	**0**	**42**
Two hour Average Factor:		L	42	**41**	6	0	0	0	0	**47**	0	0	**0**	**47**
0.99	SB	T	12	**12**	2	0	0	0	0	**14**	0	0	**0**	**14**
		R	10	**10**	1	0	0	0	0	**11**	0	0	**0**	**11**
			2,201	**2,136**						**2,484**				2,558
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
6	EB	T	380	**369**	53	1	1	0	2	**424**	35	0	**35**	**459**
Deschutes Parkway		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
Olympic Way/5th Ave		L	426	**413**	60	0	0	0	0	**473**	14	0	**14**	**487**
	WB	T	682	**662**	95	0	0	0	0	**757**	53	0	**53**	**810**
TMC Date: 04/22/2015		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
4:45 - 5:45	NB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
PHF: 0.88		R	377	**366**	53	0	0	0	0	**419**	22	0	**22**	**441**
Two hour Average Factor:		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
0.97	SB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
			1,865	**1,810**						**2,073**				2,197

Attachment 9.A

SCJ ALLIANCE
CONSULTING SERVICES

West Bay Yards

PM Peak Hour Volumes

Growth Rate:	2%

Pipeline Development Projects

Intersection	Movement		Existing 2020 Volumes	Two Hour Average Volumes	Background 2027 Growth	State and Water Volumes	The Laurana Volumes	Views on 5th Volumes	Total Pipeline Volumes	Baseline 2027 Volumes	Site Generated Primary	Site Generated Pass-By	Site Generated Volumes	Projected 2027 Volumes
		L	88	**85**	12	0	0	0	0	**97**	22	0	**22**	**119**
7	EB	T	642	**623**	90	1	1	8	10	**723**	35	0	**35**	**758**
5th Ave		R	6	**6**	1	0	0	0	0	**7**	0	0	**0**	**7**
Simmons St		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	WB	T	960	**931**	134	0	0	-1	-1	**1064**	53	0	**53**	**1,117**
TMC Date: 03/12/2019		R	22	**21**	3	0	0	0	0	**24**	0	0	**0**	**24**
		L	1	**1**	0	0	0	0	0	**1**	0	0	**0**	**1**
4:30 - 5:30	NB	T	6	**6**	1	0	0	0	0	**7**	0	0	**0**	**7**
PHF: 0.90		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
Two hour Average Factor:		L	13	**13**	2	0	0	6	6	**21**	0	0	**0**	**21**
0.89	SB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		R	131	**127**	18	0	0	7	7	**152**	14	0	**14**	**166**
			1,869	**1,813**						**2,096**				2,220
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
8	EB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
North Driveway		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
West Bay Dr		L	0	**0**	0	0	0	0	0	**0**	31	0	**31**	**31**
	WB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		R	0	**0**	0	0	0	0	0	**0**	4	0	**4**	**4**
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	NB	T	273	**265**	38	1	1	0	2	**305**	3	0	**3**	**308**
		R	0	**0**	0	0	0	0	0	**0**	48	0	**48**	**48**
		L	0	**0**	0	0	0	0	0	**0**	6	0	**6**	**6**
	SB	T	163	**158**	23	1	1	0	2	**183**	4	0	**4**	**187**
		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
			436	**423**						**488**				584

Attachment 9.A

SCJ ALLIANCE
CONSULTING SERVICES

West Bay Yards

PM Peak Hour Volumes

Growth Rate:	2%

Pipeline Development Projects

Intersection	Movement		Existing 2020 Volumes	Two Hour Average Volumes	Background 2027 Growth	State and Water Volumes	The Laurana Volumes	Views on 5th Volumes	Total Pipeline Volumes	Baseline 2027 Volumes	Site Generated Primary	Site Generated Pass-By	Site Generated Volumes	Projected 2027 Volumes
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
9	EB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
Center Driveway		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
West Bay Dr		L	0	**0**	0	0	0	0	0	**0**	12	5	**17**	**17**
	WB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		R	0	**0**	0	0	0	0	0	**0**	2	10	**12**	**12**
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	NB	T	273	**265**	38	1	1	0	2	**305**	49	-15	**34**	**339**
		R	0	**0**	0	0	0	0	0	**0**	19	15	**34**	**34**
		L	0	**0**	0	0	0	0	0	**0**	2	8	**10**	**10**
	SB	T	163	**158**	23	1	1	0	2	**183**	33	-8	**25**	**208**
		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
			436	**423**						**488**				620
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
10	EB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
South Driveway		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
West Bay Dr		L	0	**0**	0	0	0	0	0	**0**	49	0	**49**	**49**
	WB	T	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
		R	0	**0**	0	0	0	0	0	**0**	1	0	**1**	**1**
		L	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
	NB	T	273	**265**	38	1	1	0	2	**305**	67	0	**67**	**372**
		R	0	**0**	0	0	0	0	0	**0**	74	0	**74**	**74**
		L	0	**0**	0	0	0	0	0	**0**	2	0	**2**	**2**
	SB	T	163	**158**	23	1	1	0	2	**183**	43	0	**43**	**226**
		R	0	**0**	0	0	0	0	0	**0**	0	0	**0**	**0**
			436	**423**						**488**				724

Attachment 9.A

SCJ ALLIANCE
CONSULTING SERVICES

West Bay Yards

AM Peak Hour Volumes

Growth Rate:	2%

Pipeline Development Projects

Intersection	Movement		Existing 2020 Volumes	Background 2027 Growth	State and Water Volumes	The Laurana Volumes	Views on 5th Volumes	Total Pipeline Volumes	**Baseline 2027 Volumes**	Site Generated Primary	Site Generated Pass-By	**Site Generated Volumes**	**Projected 2027 Volumes**
		L	21	3	0	0	0	0	**24**	18	0	**18**	**42**
3	EB	T	0	0	0	0	0	0	**0**	0	0	**0**	**0**
Harrison Ave		R	609	85	1	2	0	3	**697**	0	0	**0**	**697**
West Bay Dr/ Olympic Way		L	0	0	0	0	0	0	**0**	0	0	**0**	**0**
	WB	T	0	0	0	0	0	0	**0**	0	0	**0**	**0**
TMC Date: 04/11/2018		R	0	0	0	0	0	0	**0**	0	0	**0**	**0**
		L	536	75	2	2	0	4	**615**	0	0	**0**	**615**
8:00 - 9:00	NB	T	182	25	1	1	0	2	**209**	48	0	**48**	**257**
PHF: 0.94		R	0	0	0	0	0	0	**0**	0	0	**0**	**0**
		L	0	0	0	0	0	0	**0**	0	0	**0**	**0**
	SB	T	386	54	0	0	0	0	**440**	111	0	**111**	**551**
		R	9	1	0	0	0	0	**10**	42	0	**42**	**52**
			1,743						**1,995**				2,214

Attachment 9.A

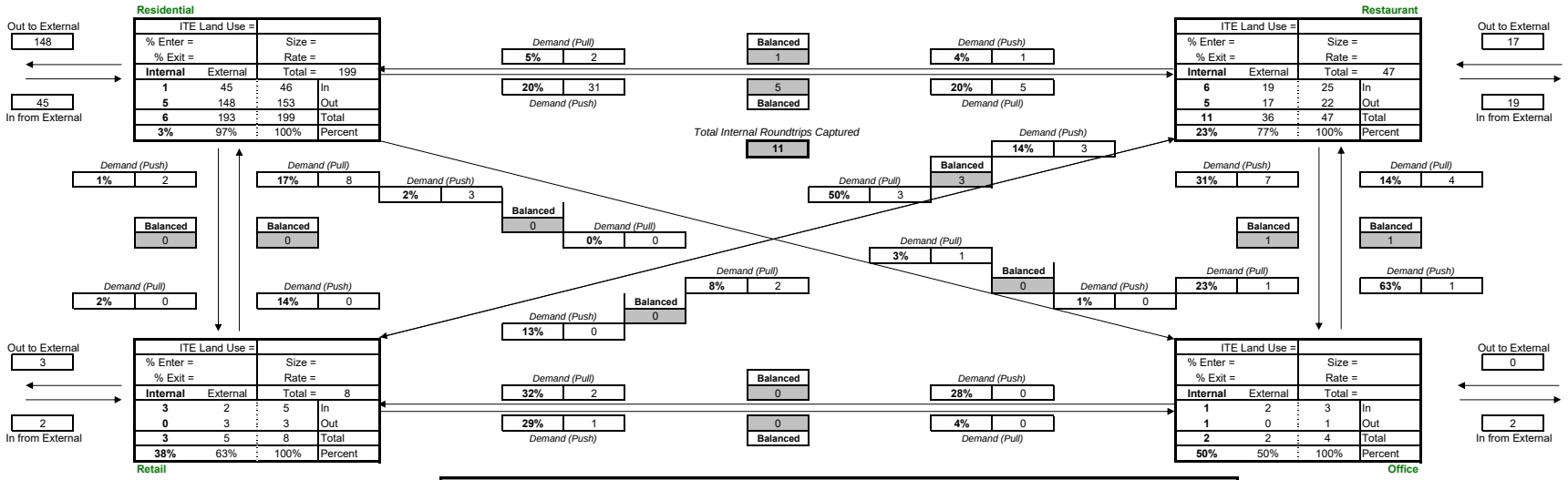
SCJ ALLIANCE

West Bay Yards

Weekday AM Peak Hour

Multi-Use Development Trip Generation and Internal Capture Summary

Trip Generation Handbook , 3rd Edition



Multi-Use Development Trip Generation Summary - Weekday AM Peak Hour					
	Residential	Restaurant	Retail	Office	Total Devel.
Total Gross Trips	199	47	8	0	254
Less Internal Trips	6 3%	11 23%	3 38%	2 50.0%	22 9.0%
Total External Trips	193	36	5	2	236
External In	45	19	2	2	68
External Out	148	17	3	0	168

Attachment 9.A

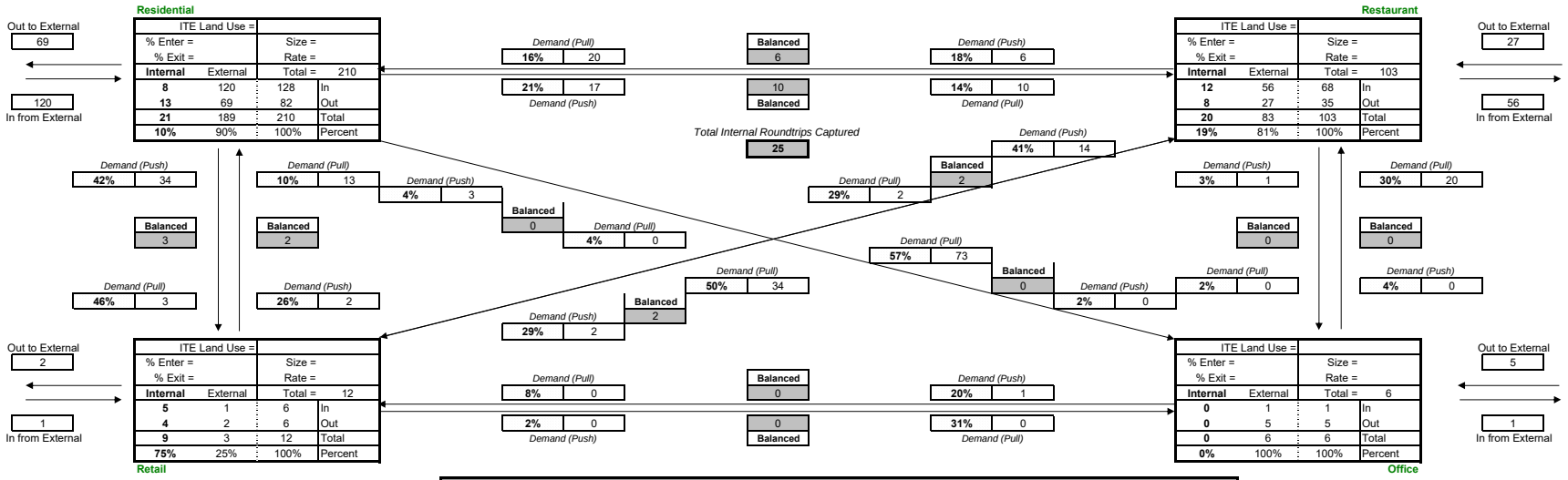
SCJ ALLIANCE

West Bay Yards

Weekday PM Peak Hour

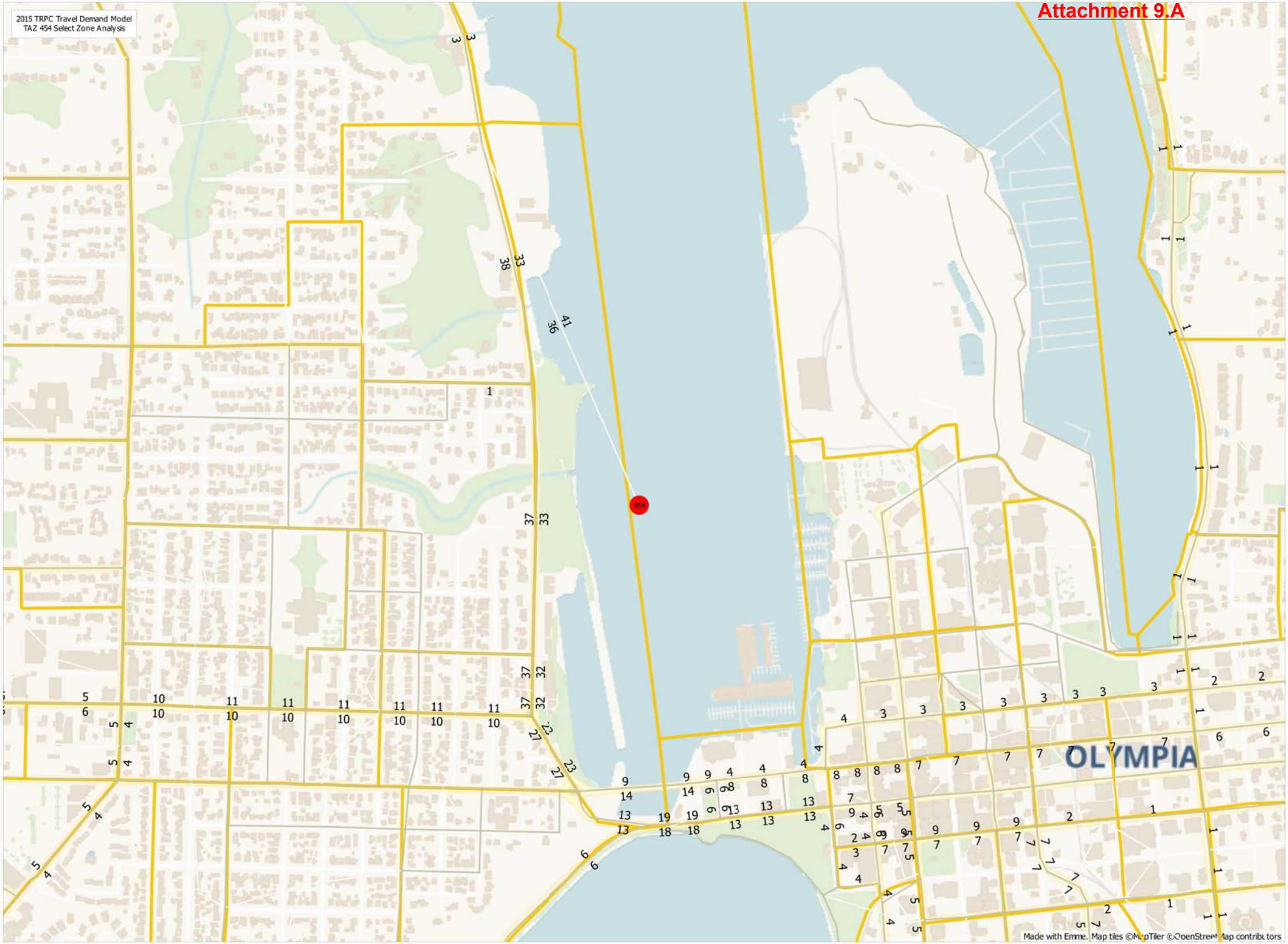
Multi-Use Development Trip Generation and Internal Capture Summary

Trip Generation Handbook , 3rd Edition



Multi-Use Development Trip Generation Summary - Weekday PM Peak Hour					
	Residential	Restaurant	Retail	Office	Total Devel.
Total Gross Trips	210	103	12	6	331
Less Internal Trips	21 10%	20 19%	9 75%	0 0.0%	50 15.0%
Total External Trips	189	83	3	6	281
External In	120	56	1	1	178
External Out	69	27	2	5	103

Attachment 9.A



Appendix C

Capacity Analysis Worksheets

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	50	95	260	150	5
Future Vol, veh/h	5	50	95	260	150	5
Conflicting Peds, #/hr	6	9	9	0	0	5
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	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	52	99	271	156	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	643	177	170	0	-	0
Stage 1	168	-	-	-	-	-
Stage 2	475	-	-	-	-	-
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	438	866	1407	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	394	851	1395	-	-	-
Mov Cap-2 Maneuver	394	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	620	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	2.1	0
HCM LOS	B		

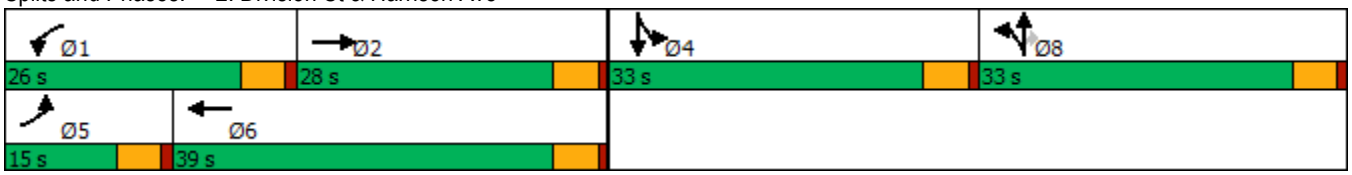
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1395	-	770	-	-
HCM Lane V/C Ratio	0.071	-	0.074	-	-
HCM Control Delay (s)	7.8	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	385	85	210	625	120	150	220	155	200	205	65
Future Volume (vph)	95	385	85	210	625	120	150	220	155	200	205	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	200		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		1239			1419			1000			1063	
Travel Time (s)		33.8			38.7			22.7			24.2	
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	12.0	28.0		12.0	28.0		31.0	31.0	31.0	33.0	33.0	
Total Split (s)	15.0	28.0		26.0	39.0		33.0	33.0	33.0	33.0	33.0	
Total Split (%)	12.5%	23.3%		21.7%	32.5%		27.5%	27.5%	27.5%	27.5%	27.5%	
Maximum Green (s)	10.0	23.0		21.0	34.0		28.0	28.0	28.0	28.0	28.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		16.0			16.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		4			7		7	7	7	6	6	

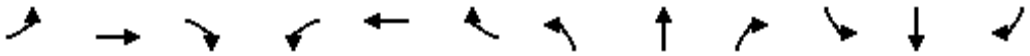
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 104.2
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Division St & Harrison Ave



HCM 6th Signalized Intersection Summary
2: Division St & Harrison Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	385	85	210	625	120	150	220	155	200	205	65
Future Volume (veh/h)	95	385	85	210	625	120	150	220	155	200	205	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.96
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	98	397	88	216	644	124	155	227	160	206	211	71
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	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	636	139	287	857	165	195	286	405	325	356	122
Arrive On Green	0.09	0.22	0.20	0.16	0.29	0.27	0.24	0.26	0.26	0.21	0.23	0.21
Sat Flow, veh/h	1781	2880	631	1781	2941	565	744	1089	1545	1435	1571	540
Grp Volume(v), veh/h	98	243	242	216	389	379	382	0	160	258	0	230
Grp Sat Flow(s),veh/h/ln	1781	1777	1735	1781	1777	1729	1833	0	1545	1799	0	1747
Q Serve(g_s), s	4.9	11.5	11.8	10.7	18.4	18.5	18.1	0.0	7.9	12.1	0.0	10.9
Cycle Q Clear(g_c), s	4.9	11.5	11.8	10.7	18.4	18.5	18.1	0.0	7.9	12.1	0.0	10.9
Prop In Lane	1.00		0.36	1.00		0.33	0.41		1.00	0.80		0.31
Lane Grp Cap(c), veh/h	161	393	383	287	518	504	480	0	405	408	0	396
V/C Ratio(X)	0.61	0.62	0.63	0.75	0.75	0.75	0.80	0.00	0.40	0.63	0.00	0.58
Avail Cap(c_a), veh/h	230	479	467	442	689	671	593	0	500	581	0	565
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.6	32.6	33.1	37.2	29.8	30.2	32.3	0.0	28.2	33.2	0.0	32.2
Incr Delay (d2), s/veh	1.4	0.7	0.9	1.5	2.0	2.1	5.5	0.0	0.5	1.2	0.0	1.0
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	2.2	5.0	5.0	4.8	8.1	8.0	8.6	0.0	2.9	5.4	0.0	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	33.3	34.0	38.7	31.8	32.3	37.8	0.0	28.6	34.4	0.0	33.2
LnGrp LOS	D	C	C	D	C	C	D	A	C	C	A	C
Approach Vol, veh/h		583			984			542			488	
Approach Delay, s/veh		35.1			33.5			35.1			33.8	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.9	23.5		24.0	11.4	30.0		27.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	23.0		28.0	10.0	34.0		28.0				
Max Q Clear Time (g_c+I1), s	12.7	13.8		14.1	6.9	20.5		20.1				
Green Ext Time (p_c), s	0.2	0.7		1.1	0.0	1.3		1.0				

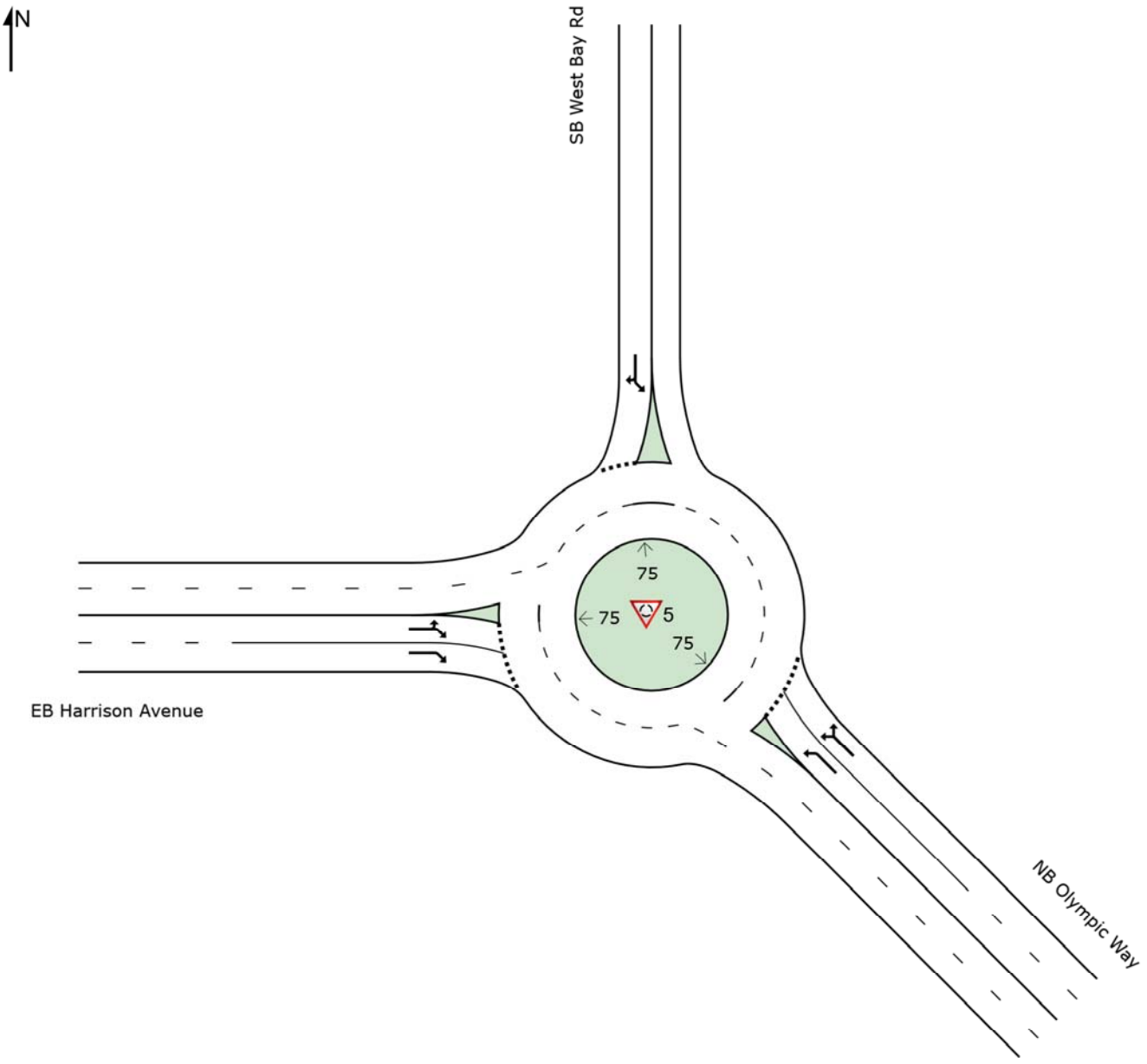
Intersection Summary												
HCM 6th Ctrl Delay			34.3									
HCM 6th LOS			C									

SITE LAYOUT

Site: 5 [Existing 2020 PM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 5 [Existing 2020 PM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
SouthEast: NB Olympic Way														
3ax	L1	1100	1.0	1183	1.0	0.561	0.2	LOS A	4.4	112.1	0.19	0.06	0.19	34.8
18ax	R1	345	1.0	371	1.0	0.561	0.2	LOS A	4.4	112.1	0.18	0.06	0.18	35.6
Approach		1445	1.0	1554	1.0	0.561	0.2	LOS A	4.4	112.1	0.19	0.06	0.19	35.0
North: SB West Bay Rd														
7a	L1	210	1.0	226	1.0	0.446	6.1	LOS A	2.0	49.6	0.67	0.72	0.83	32.1
14	R2	25	1.0	27	1.0	0.446	6.1	LOS A	2.0	49.6	0.67	0.72	0.83	31.7
Approach		235	1.0	253	1.0	0.446	6.1	LOS A	2.0	49.6	0.67	0.72	0.83	32.1
West: EB Harrison Avenue														
5	L2	25	2.0	27	2.0	0.346	1.0	LOS A	2.0	50.2	0.44	0.29	0.44	36.0
12a	R1	725	2.0	780	2.0	0.346	1.0	LOS A	2.0	51.0	0.44	0.29	0.44	35.9
Approach		750	2.0	806	2.0	0.346	1.0	LOS A	2.0	51.0	0.44	0.29	0.44	35.9
All Vehicles		2430	1.3	2613	1.3	0.561	1.0	LOS A	4.4	112.1	0.31	0.20	0.33	35.0

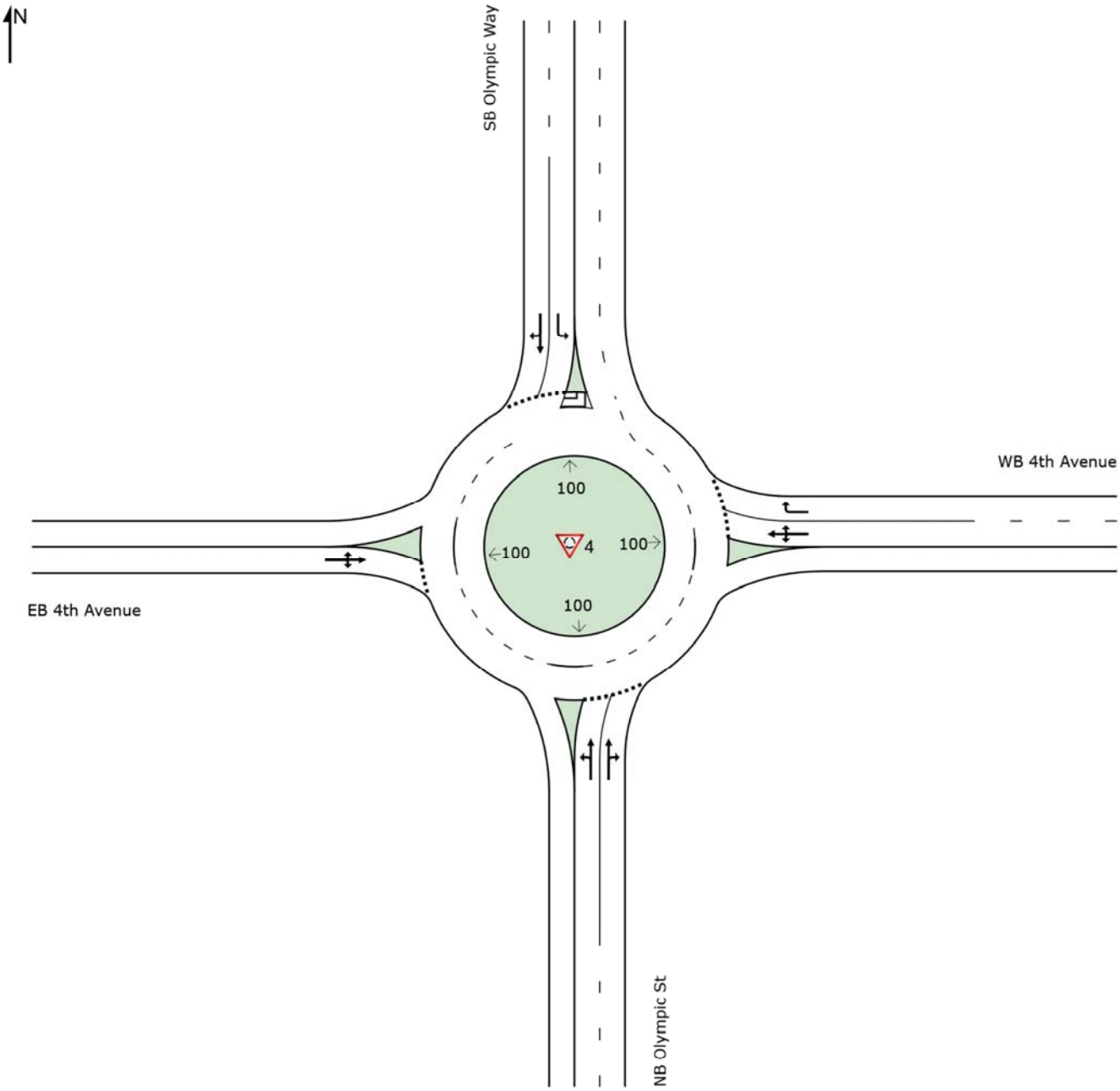
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if 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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 4 [Existing 2020 (Site Folder: General)]

4th Ave/Olympic Way
PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 4 [Existing 2020 (Site Folder: General)]

4th Ave/Olympic Way
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Olympic St														
3	L2	175	0.0	182	0.0	0.442	5.6	LOS A	3.1	77.6	0.81	0.82	0.89	33.6
8	T1	495	0.0	516	0.0	0.442	4.9	LOS A	3.3	82.0	0.82	0.78	0.87	34.6
18	R2	5	0.0	5	0.0	0.442	4.7	LOS A	3.3	82.0	0.82	0.77	0.87	34.0
Approach		675	0.0	703	0.0	0.442	5.1	LOS A	3.3	82.0	0.81	0.79	0.88	34.4
East: WB 4th Avenue														
1	L2	1	0.0	1	0.0	0.620	3.8	LOS A	4.3	109.4	0.76	0.79	0.92	35.9
6	T1	125	2.0	130	2.0	0.620	3.9	LOS A	4.3	109.4	0.76	0.79	0.92	35.6
16	R2	980	1.0	1021	1.0	0.620	3.4	LOS A	4.5	114.2	0.76	0.78	0.90	34.7
Approach		1106	1.1	1152	1.1	0.620	3.5	LOS A	4.5	114.2	0.76	0.78	0.91	34.8
North: SB Olympic Way														
7	L2	585	3.0	609	3.0	0.439	1.4	LOS A	3.2	82.6	0.57	0.40	0.57	33.7
4	T1	280	1.0	292	1.0	0.271	1.6	LOS A	1.6	40.7	0.52	0.35	0.52	36.2
14	R2	5	0.0	5	0.0	0.271	1.6	LOS A	1.6	40.7	0.52	0.35	0.52	35.0
Approach		870	2.3	906	2.3	0.439	1.5	LOS A	3.2	82.6	0.55	0.38	0.55	34.4
West: EB 4th Avenue														
5	L2	1	0.0	1	0.0	0.319	2.7	LOS A	1.5	36.6	0.64	0.54	0.64	36.1
2	T1	160	1.0	167	1.0	0.319	2.8	LOS A	1.5	36.6	0.64	0.54	0.64	36.0
12	R2	80	0.0	83	0.0	0.319	2.7	LOS A	1.5	36.6	0.64	0.54	0.64	34.9
Approach		241	0.7	251	0.7	0.319	2.7	LOS A	1.5	36.6	0.64	0.54	0.64	35.6
All Vehicles		2892	1.2	3013	1.2	0.620	3.2	LOS A	4.5	114.2	0.70	0.64	0.77	34.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	715	30	120	1020	30	75	30	30	40	10	10
Future Volume (vph)	15	715	30	120	1020	30	75	30	30	40	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	145		0	0		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		212			635			318			127	
Travel Time (s)		5.8			17.3			8.7			3.5	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	29.0		8.0	25.0		32.0	32.0		32.0	32.0	
Total Split (s)	10.0	42.0		16.0	48.0		32.0	32.0		32.0	32.0	
Total Split (%)	11.1%	46.7%		17.8%	53.3%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	5.0	37.0		11.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-2.0		-1.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	3.0		4.0	3.0			3.0			3.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	0.5		2.0	0.5		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0			13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0			19		1	1		8	8	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 48 (53%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Simmons & 4th Ave

HCM 6th Signalized Intersection Summary
5: Simmons & 4th Ave

Existing 2020
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	715	30	120	1020	30	75	30	30	40	10	10
Future Volume (veh/h)	15	715	30	120	1020	30	75	30	30	40	10	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.93		0.98	0.98		0.93
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	15	722	30	121	1030	30	76	30	30	40	10	10
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	366	2064	86	519	2220	65	241	97	78	285	73	58
Arrive On Green	0.02	0.59	0.57	0.06	0.63	0.61	0.21	0.24	0.21	0.21	0.24	0.21
Sat Flow, veh/h	1781	3471	144	1781	3522	103	753	411	329	920	307	245
Grp Volume(v), veh/h	15	369	383	121	520	540	136	0	0	60	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1839	1781	1777	1848	1493	0	0	1472	0	0
Q Serve(g_s), s	0.3	9.6	9.6	2.3	13.8	13.8	4.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	9.6	9.6	2.3	13.8	13.8	6.6	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		0.08	1.00		0.06	0.56		0.22	0.67		0.17
Lane Grp Cap(c), veh/h	366	1056	1093	519	1120	1165	383	0	0	383	0	0
V/C Ratio(X)	0.04	0.35	0.35	0.23	0.46	0.46	0.35	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	446	1056	1093	655	1120	1165	507	0	0	503	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.7	9.3	9.4	6.6	8.7	8.7	29.2	0.0	0.0	27.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.9	0.1	1.4	1.3	0.2	0.0	0.0	0.1	0.0	0.0
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	0.1	3.7	3.9	0.8	5.3	5.5	2.6	0.0	0.0	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	10.3	10.3	6.6	10.1	10.1	29.4	0.0	0.0	27.9	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	C	A	A	C	A	A
Approach Vol, veh/h		767			1181			136			60	
Approach Delay, s/veh		10.2			9.7			29.4			27.9	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	59.7		24.3	9.1	56.5		24.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	43.0		27.0	11.0	37.0		27.0				
Max Q Clear Time (g_c+I1), s	2.3	15.8		8.6	4.3	11.6		4.7				
Green Ext Time (p_c), s	0.0	0.2		0.2	0.1	0.2		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B

6: Deschutes Pkwy & Olympic St/5th Ave Performance by movement

Movement	EBT	WBL	WBT	NER	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.3	0.1
Total Del/Veh (s)	1.1	11.5	2.0	1.5	3.9

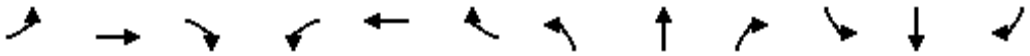
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	625	5	1	930	20	5	5	0	15	0	125
Future Volume (vph)	85	625	5	1	930	20	5	5	0	15	0	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		755			617			93			318	
Travel Time (s)		20.6			16.8			2.5			8.7	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0	
Total Split (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	61.1%	61.1%		61.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.5	0.5		0.5	0.5		2.5	2.5		2.5	2.5	
Recall Mode	C-Max	C-Max		C-Min	C-Min		None	None		None	None	
Walk Time (s)				7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				14.0	14.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)				1	1		0	0		6	6	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 7: 5th Ave & Simmons

HCM 6th Signalized Intersection Summary
7: 5th Ave & Simmons



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	625	5	1	930	20	5	5	0	15	0	125
Future Volume (veh/h)	85	625	5	1	930	20	5	5	0	15	0	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		0.98	0.99		1.00	0.95		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	96	702	6	1	1045	22	6	6	0	17	0	140
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	1804	16	40	2564	54	184	171	0	61	16	273
Arrive On Green	0.71	0.74	0.71	0.71	0.74	0.71	0.18	0.20	0.00	0.18	0.00	0.18
Sat Flow, veh/h	264	2451	21	0	3483	73	631	867	0	86	82	1382
Grp Volume(v), veh/h	327	0	477	561	0	507	12	0	0	157	0	0
Grp Sat Flow(s),veh/h/ln	1040	0	1697	1870	0	1687	1498	0	0	1550	0	0
Q Serve(g_s), s	3.2	0.0	9.3	0.0	0.0	10.2	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	13.5	0.0	9.3	10.3	0.0	10.2	0.5	0.0	0.0	8.2	0.0	0.0
Prop In Lane	0.29		0.01	0.00		0.04	0.50		0.00	0.11		0.89
Lane Grp Cap(c), veh/h	794	0	1249	1375	0	1242	322	0	0	316	0	0
V/C Ratio(X)	0.41	0.00	0.38	0.41	0.00	0.41	0.04	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	794	0	1249	1375	0	1242	557	0	0	557	0	0
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	1.00	0.00	1.00	1.00	0.00	0.00	0.98	0.00	0.00
Uniform Delay (d), s/veh	4.3	0.0	4.4	4.5	0.0	4.5	29.6	0.0	0.0	33.2	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.9	0.9	0.0	1.0	0.0	0.0	0.0	0.9	0.0	0.0
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	2.2	0.0	2.9	3.9	0.0	3.2	0.2	0.0	0.0	3.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	5.3	5.4	0.0	5.5	29.6	0.0	0.0	34.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		804			1068			12			157	
Approach Delay, s/veh		5.5			5.4			29.6			34.1	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		69.2		20.8		69.2		20.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		15.5		10.2		12.3		2.5				
Green Ext Time (p_c), s		0.4		0.4		0.2		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			7.8									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	55	105	300	175	5
Future Vol, veh/h	5	55	105	300	175	5
Conflicting Peds, #/hr	6	9	9	0	0	5
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	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	57	109	313	182	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	731	203	196	0	-	0
Stage 1	194	-	-	-	-	-
Stage 2	537	-	-	-	-	-
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	389	838	1377	-	-	-
Stage 1	839	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	345	824	1365	-	-	-
Mov Cap-2 Maneuver	345	-	-	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	581	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	2	0
HCM LOS	B		

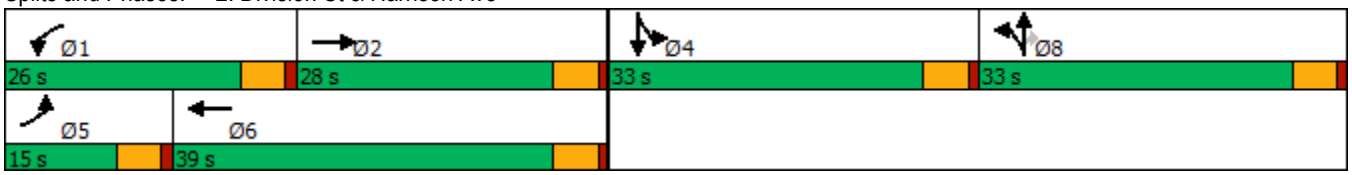
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1365	-	739	-	-
HCM Lane V/C Ratio	0.08	-	0.085	-	-
HCM Control Delay (s)	7.9	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	440	100	240	715	135	170	255	175	225	230	75
Future Volume (vph)	110	440	100	240	715	135	170	255	175	225	230	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	200		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		1239			1419			1000			1063	
Travel Time (s)		33.8			38.7			22.7			24.2	
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	12.0	28.0		12.0	28.0		31.0	31.0	31.0	33.0	33.0	
Total Split (s)	15.0	28.0		26.0	39.0		33.0	33.0	33.0	33.0	33.0	
Total Split (%)	12.5%	23.3%		21.7%	32.5%		27.5%	27.5%	27.5%	27.5%	27.5%	
Maximum Green (s)	10.0	23.0		21.0	34.0		28.0	28.0	28.0	28.0	28.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		16.0			16.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		4			7		7	7	7	6	6	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 113.3
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Division St & Harrison Ave



HCM 6th Signalized Intersection Summary
2: Division St & Harrison Ave

Projected 2027 without Project
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	440	100	240	715	135	170	255	175	225	230	75
Future Volume (veh/h)	110	440	100	240	715	135	170	255	175	225	230	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	1.00		0.98	1.00		0.96
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	113	454	103	247	737	139	175	263	180	232	237	82
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	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	618	139	308	862	163	198	298	419	325	355	125
Arrive On Green	0.10	0.22	0.20	0.17	0.29	0.27	0.25	0.27	0.27	0.21	0.23	0.21
Sat Flow, veh/h	1781	2864	644	1781	2952	557	733	1101	1546	1430	1562	552
Grp Volume(v), veh/h	113	280	277	247	443	433	438	0	180	292	0	259
Grp Sat Flow(s),veh/h/ln	1781	1777	1732	1781	1777	1732	1834	0	1546	1799	0	1745
Q Serve(g_s), s	6.5	15.5	15.8	14.1	24.9	25.0	24.2	0.0	10.2	15.9	0.0	14.3
Cycle Q Clear(g_c), s	6.5	15.5	15.8	14.1	24.9	25.0	24.2	0.0	10.2	15.9	0.0	14.3
Prop In Lane	1.00		0.37	1.00		0.32	0.40		1.00	0.79		0.32
Lane Grp Cap(c), veh/h	172	383	373	308	519	506	497	0	419	409	0	396
V/C Ratio(X)	0.66	0.73	0.74	0.80	0.85	0.85	0.88	0.00	0.43	0.71	0.00	0.65
Avail Cap(c_a), veh/h	202	420	409	388	605	590	520	0	439	510	0	495
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.1	38.6	39.1	42.0	35.3	35.6	37.3	0.0	31.8	38.5	0.0	37.4
Incr Delay (d2), s/veh	3.7	4.8	5.3	7.3	9.1	9.3	15.4	0.0	0.5	3.0	0.0	1.7
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	3.1	7.3	7.3	6.8	12.0	11.8	12.9	0.0	3.8	7.4	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.8	43.4	44.4	49.3	44.4	45.0	52.7	0.0	32.3	41.5	0.0	39.1
LnGrp LOS	D	D	D	D	D	D	D	A	C	D	A	D
Approach Vol, veh/h		670			1123			618			551	
Approach Delay, s/veh		44.9			45.7			46.8			40.3	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.3	25.8		27.0	13.2	33.9		31.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	23.0		28.0	10.0	34.0		28.0				
Max Q Clear Time (g_c+I1), s	16.1	17.8		17.9	8.5	27.0		26.2				
Green Ext Time (p_c), s	0.2	0.6		1.1	0.0	1.2		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			44.7									
HCM 6th LOS			D									

MOVEMENT SUMMARY

Site: 5 [Without Project 2027 PM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
SouthEast: NB Olympic Way														
3ax	L1	1240	1.0	1333	1.0	0.634	0.2	LOS A	5.9	149.8	0.22	0.07	0.22	34.7
18ax	R1	390	1.0	419	1.0	0.634	0.2	LOS A	5.9	149.8	0.22	0.07	0.22	35.5
Approach		1630	1.0	1753	1.0	0.634	0.2	LOS A	5.9	149.8	0.22	0.07	0.22	34.9
North: SB West Bay Rd														
7a	L1	235	1.0	253	1.0	0.545	8.4	LOS A	2.8	69.4	0.76	0.84	1.03	31.1
14	R2	25	1.0	27	1.0	0.545	8.4	LOS A	2.8	69.4	0.76	0.84	1.03	30.6
Approach		260	1.0	280	1.0	0.545	8.4	LOS A	2.8	69.4	0.76	0.84	1.03	31.0
West: EB Harrison Avenue														
5	L2	25	2.0	27	2.0	0.400	1.2	LOS A	2.5	62.3	0.50	0.34	0.50	35.9
12a	R1	820	2.0	882	2.0	0.400	1.2	LOS A	2.5	63.5	0.49	0.33	0.49	35.7
Approach		845	2.0	909	2.0	0.400	1.2	LOS A	2.5	63.5	0.49	0.33	0.49	35.7
All Vehicles		2735	1.3	2941	1.3	0.634	1.3	LOS A	5.9	149.8	0.36	0.23	0.38	34.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [Without Project 2027 (Site Folder: General)]

4th Ave/Olympic Way
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

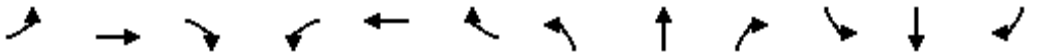
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Olympic St														
3	L2	200	0.0	208	0.0	0.595	10.7	LOS B	5.5	136.5	0.94	1.05	1.25	31.3
8	T1	565	0.0	589	0.0	0.595	9.7	LOS A	6.0	150.5	0.95	1.05	1.25	32.6
18	R2	5	0.0	5	0.0	0.595	9.3	LOS A	6.0	150.5	0.96	1.05	1.25	32.1
Approach		770	0.0	802	0.0	0.595	9.9	LOS A	6.0	150.5	0.95	1.05	1.25	32.2
East: WB 4th Avenue														
1	L2	1	0.0	1	0.0	0.776	6.5	LOS A	7.0	175.5	0.89	1.02	1.25	34.6
6	T1	140	2.0	146	2.0	0.776	6.6	LOS A	7.0	175.5	0.89	1.02	1.25	34.4
16	R2	1130	1.0	1177	1.0	0.776	5.8	LOS A	7.4	186.5	0.89	1.01	1.22	33.6
Approach		1271	1.1	1324	1.1	0.776	5.9	LOS A	7.4	186.5	0.89	1.01	1.22	33.7
North: SB Olympic Way														
7	L2	680	3.0	708	3.0	0.528	1.8	LOS A	4.3	110.0	0.66	0.49	0.66	33.5
4	T1	320	1.0	333	1.0	0.322	1.9	LOS A	2.0	51.3	0.58	0.40	0.58	36.0
14	R2	5	0.0	5	0.0	0.322	1.9	LOS A	2.0	51.3	0.58	0.40	0.58	34.8
Approach		1005	2.3	1047	2.3	0.528	1.8	LOS A	4.3	110.0	0.63	0.46	0.63	34.2
West: EB 4th Avenue														
5	L2	1	0.0	1	0.0	0.414	3.8	LOS A	2.2	55.3	0.73	0.70	0.81	35.8
2	T1	185	1.0	193	1.0	0.414	3.9	LOS A	2.2	55.3	0.73	0.70	0.81	35.6
12	R2	95	0.0	99	0.0	0.414	3.8	LOS A	2.2	55.3	0.73	0.70	0.81	34.5
Approach		281	0.7	293	0.7	0.414	3.9	LOS A	2.2	55.3	0.73	0.70	0.81	35.2
All Vehicles		3327	1.2	3466	1.2	0.776	5.4	LOS A	7.4	186.5	0.81	0.83	1.02	33.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	840	35	135	1170	35	95	35	40	45	15	10
Future Volume (vph)	20	840	35	135	1170	35	95	35	40	45	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	145		0	0		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		212			635			318			127	
Travel Time (s)		5.8			17.3			8.7			3.5	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	29.0		8.0	25.0		32.0	32.0		32.0	32.0	
Total Split (s)	10.0	42.0		16.0	48.0		32.0	32.0		32.0	32.0	
Total Split (%)	11.1%	46.7%		17.8%	53.3%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	5.0	37.0		11.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-2.0		-1.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	3.0		4.0	3.0			3.0			3.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	0.5		2.0	0.5		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0			13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0			19		1	1		8	8	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 48 (53%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Simmons & 4th Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	840	35	135	1170	35	95	35	40	45	15	10
Future Volume (veh/h)	20	840	35	135	1170	35	95	35	40	45	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.94		0.98	0.99		0.93
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	20	848	35	136	1182	35	96	35	40	45	15	10
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	313	2016	83	462	2176	64	250	95	86	279	92	51
Arrive On Green	0.02	0.58	0.56	0.06	0.62	0.60	0.22	0.25	0.22	0.22	0.25	0.22
Sat Flow, veh/h	1781	3472	143	1781	3520	104	763	384	350	866	374	207
Grp Volume(v), veh/h	20	434	449	136	596	621	171	0	0	70	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1839	1781	1777	1848	1497	0	0	1446	0	0
Q Serve(g_s), s	0.4	12.2	12.2	2.6	17.4	17.4	5.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	12.2	12.2	2.6	17.4	17.4	8.5	0.0	0.0	3.3	0.0	0.0
Prop In Lane	1.00		0.08	1.00		0.06	0.56		0.23	0.64		0.14
Lane Grp Cap(c), veh/h	313	1032	1067	462	1099	1142	398	0	0	390	0	0
V/C Ratio(X)	0.06	0.42	0.42	0.29	0.54	0.54	0.43	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	388	1032	1067	589	1099	1142	508	0	0	498	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.7	10.5	10.5	7.4	9.9	9.9	29.3	0.0	0.0	27.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	1.2	0.1	1.9	1.9	0.3	0.0	0.0	0.1	0.0	0.0
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	0.2	4.9	5.0	0.9	6.8	7.0	3.3	0.0	0.0	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.7	11.7	11.7	7.5	11.8	11.8	29.5	0.0	0.0	27.4	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	C	A	A	C	A	A
Approach Vol, veh/h		903			1353			171			70	
Approach Delay, s/veh		11.7			11.4			29.5			27.4	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	58.6		25.2	9.6	55.3		25.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	43.0		27.0	11.0	37.0		27.0				
Max Q Clear Time (g_c+I1), s	2.4	19.4		10.5	4.6	14.2		5.3				
Green Ext Time (p_c), s	0.0	0.3		0.3	0.1	0.2		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			13.2									
HCM 6th LOS			B									

SimTraffic Performance Report

6: Deschutes Pkwy & Olympic St/5th Ave Performance by movement

Movement	EBT	WBL	WBT	NER	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.4	0.1
Total Del/Veh (s)	1.6	22.3	2.6	1.6	6.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	725	5	1	1065	25	5	5	0	20	0	150
Future Volume (vph)	95	725	5	1	1065	25	5	5	0	20	0	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		755			617			93			318	
Travel Time (s)		20.6			16.8			2.5			8.7	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0	
Total Split (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	61.1%	61.1%		61.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.5	0.5		0.5	0.5		2.5	2.5		2.5	2.5	
Recall Mode	C-Max	C-Max		C-Min	C-Min		None	None		None	None	
Walk Time (s)				7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				14.0	14.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)				1	1		0	0		6	6	

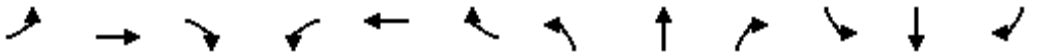
Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 7: 5th Ave & Simmons

HCM 6th Signalized Intersection Summary
7: 5th Ave & Simmons

Projected 2027 without Project
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	725	5	1	1065	25	5	5	0	20	0	150
Future Volume (veh/h)	95	725	5	1	1065	25	5	5	0	20	0	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		0.98	0.99		1.00	0.95		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	107	815	6	1	1197	28	6	6	0	22	0	169
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	1700	13	40	2511	59	183	169	0	65	17	289
Arrive On Green	0.70	0.72	0.70	0.70	0.72	0.70	0.19	0.21	0.00	0.19	0.00	0.19
Sat Flow, veh/h	230	2352	18	0	3474	81	582	802	0	99	80	1372
Grp Volume(v), veh/h	356	0	572	645	0	581	12	0	0	191	0	0
Grp Sat Flow(s),veh/h/ln	902	0	1698	1870	0	1685	1384	0	0	1550	0	0
Q Serve(g_s), s	8.6	0.0	12.7	0.0	0.0	13.2	0.0	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	21.8	0.0	12.7	13.3	0.0	13.2	0.5	0.0	0.0	10.1	0.0	0.0
Prop In Lane	0.30		0.01	0.00		0.05	0.50		0.00	0.12		0.88
Lane Grp Cap(c), veh/h	684	0	1227	1350	0	1218	321	0	0	337	0	0
V/C Ratio(X)	0.52	0.00	0.47	0.48	0.00	0.48	0.04	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	684	0	1227	1350	0	1218	533	0	0	558	0	0
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	1.00	0.00	1.00	1.00	0.00	0.00	0.97	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	5.2	5.3	0.0	5.3	28.6	0.0	0.0	32.9	0.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	1.3	1.2	0.0	1.3	0.0	0.0	0.0	1.1	0.0	0.0
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	2.7	0.0	4.1	5.2	0.0	4.3	0.2	0.0	0.0	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.8	0.0	6.5	6.5	0.0	6.6	28.7	0.0	0.0	34.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		928			1226			12			191	
Approach Delay, s/veh		7.4			6.6			28.7			34.0	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		68.0		22.0		68.0		22.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		23.8		12.1		15.3		2.5				
Green Ext Time (p_c), s		0.6		0.5		0.3		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	55	105	435	265	10
Future Vol, veh/h	10	55	105	435	265	10
Conflicting Peds, #/hr	6	9	9	0	0	5
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	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	57	109	453	276	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	967	299	295	0	-	0
Stage 1	290	-	-	-	-	-
Stage 2	677	-	-	-	-	-
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	282	741	1266	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	245	728	1255	-	-	-
Mov Cap-2 Maneuver	245	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	500	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1255	-	559	-	-
HCM Lane V/C Ratio	0.087	-	0.121	-	-
HCM Control Delay (s)	8.1	0	12.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.4	-	-

Lanes, Volumes, Timings
2: Division St & Harrison Ave

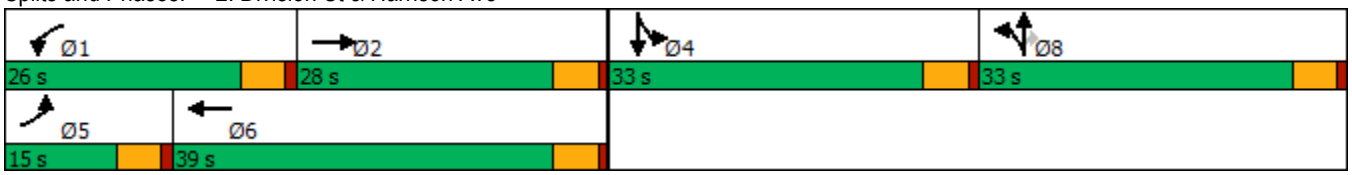
Projected 2027 with Project
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	460	100	250	730	135	170	255	190	225	230	75
Future Volume (vph)	110	460	100	250	730	135	170	255	190	225	230	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	200		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		1239			1419			1000			1063	
Travel Time (s)		33.8			38.7			22.7			24.2	
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	12.0	28.0		12.0	28.0		31.0	31.0	31.0	33.0	33.0	
Total Split (s)	15.0	28.0		26.0	39.0		33.0	33.0	33.0	33.0	33.0	
Total Split (%)	12.5%	23.3%		21.7%	32.5%		27.5%	27.5%	27.5%	27.5%	27.5%	
Maximum Green (s)	10.0	23.0		21.0	34.0		28.0	28.0	28.0	28.0	28.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		16.0			16.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		4			7		7	7	7	6	6	

Intersection Summary

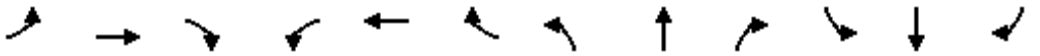
Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 113.7
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Division St & Harrison Ave



HCM 6th Signalized Intersection Summary
2: Division St & Harrison Ave

Projected 2027 with Project
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	460	100	250	730	135	170	255	190	225	230	75
Future Volume (veh/h)	110	460	100	250	730	135	170	255	190	225	230	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	1.00		0.98	1.00		0.96
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	113	474	103	258	753	139	175	263	196	232	237	82
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	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	624	135	317	883	163	197	297	417	322	352	124
Arrive On Green	0.10	0.22	0.20	0.18	0.30	0.28	0.25	0.27	0.27	0.21	0.23	0.21
Sat Flow, veh/h	1781	2890	623	1781	2965	547	733	1101	1546	1430	1562	552
Grp Volume(v), veh/h	113	290	287	258	451	441	438	0	196	292	0	259
Grp Sat Flow(s),veh/h/ln	1781	1777	1736	1781	1777	1735	1834	0	1546	1799	0	1744
Q Serve(g_s), s	6.6	16.5	16.8	15.0	25.7	25.8	24.7	0.0	11.4	16.3	0.0	14.6
Cycle Q Clear(g_c), s	6.6	16.5	16.8	15.0	25.7	25.8	24.7	0.0	11.4	16.3	0.0	14.6
Prop In Lane	1.00		0.36	1.00		0.32	0.40		1.00	0.79		0.32
Lane Grp Cap(c), veh/h	171	383	375	317	529	517	494	0	417	405	0	393
V/C Ratio(X)	0.66	0.76	0.77	0.81	0.85	0.85	0.89	0.00	0.47	0.72	0.00	0.66
Avail Cap(c_a), veh/h	198	412	403	380	594	580	510	0	430	501	0	486
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.0	39.6	40.1	42.6	35.6	35.9	38.2	0.0	32.9	39.4	0.0	38.3
Incr Delay (d2), s/veh	4.2	6.3	6.9	9.1	9.6	9.8	16.4	0.0	0.6	3.3	0.0	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	3.1	7.9	7.9	7.4	12.5	12.3	13.3	0.0	4.3	7.6	0.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.2	45.9	47.0	51.7	45.2	45.7	54.5	0.0	33.5	42.7	0.0	40.2
LnGrp LOS	D	D	D	D	D	D	D	A	C	D	A	D
Approach Vol, veh/h		690			1150			634			551	
Approach Delay, s/veh		47.2			46.9			48.1			41.5	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.2	26.3		27.3	13.3	35.1		32.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	23.0		28.0	10.0	34.0		28.0				
Max Q Clear Time (g_c+I1), s	17.0	18.8		18.3	8.6	27.8		26.7				
Green Ext Time (p_c), s	0.2	0.5		1.1	0.0	1.2		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		46.2	
HCM 6th LOS		D	

MOVEMENT SUMMARY

Site: 5 [With Project 2027 PM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
SouthEast: NB Olympic Way														
3ax	L1	1240	1.0	1333	1.0	0.699	0.7	LOS A	7.3	184.7	0.44	0.22	0.44	34.2
18ax	R1	485	1.0	522	1.0	0.699	0.6	LOS A	7.3	184.7	0.43	0.22	0.43	35.2
Approach		1725	1.0	1855	1.0	0.699	0.6	LOS A	7.3	184.7	0.44	0.22	0.44	34.5
North: SB West Bay Rd														
7a	L1	295	1.0	317	1.0	0.824	16.4	LOS B	6.5	163.6	0.91	1.14	1.69	28.1
14	R2	55	1.0	59	1.0	0.824	16.4	LOS B	6.5	163.6	0.91	1.14	1.69	27.7
Approach		350	1.0	376	1.0	0.824	16.4	LOS B	6.5	163.6	0.91	1.14	1.69	28.0
West: EB Harrison Avenue														
5	L2	70	2.0	75	2.0	0.449	1.6	LOS A	3.0	75.5	0.60	0.43	0.60	35.4
12a	R1	820	2.0	882	2.0	0.449	1.5	LOS A	3.1	77.5	0.59	0.42	0.59	35.3
Approach		890	2.0	957	2.0	0.449	1.6	LOS A	3.1	77.5	0.59	0.42	0.59	35.3
All Vehicles		2965	1.3	3188	1.3	0.824	2.8	LOS A	7.3	184.7	0.54	0.39	0.63	33.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [With Project 2027 (Site Folder: General)]

4th Ave/Olympic Way
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Olympic St														
3	L2	200	0.0	208	0.0	0.667	13.7	LOS B	6.8	170.8	0.98	1.14	1.43	30.1
8	T1	615	0.0	641	0.0	0.667	12.6	LOS B	7.6	191.1	0.99	1.16	1.44	31.3
18	R2	5	0.0	5	0.0	0.667	12.2	LOS B	7.6	191.1	1.00	1.17	1.44	30.9
Approach		820	0.0	854	0.0	0.667	12.9	LOS B	7.6	191.1	0.99	1.16	1.44	31.0
East: WB 4th Avenue														
1	L2	1	0.0	1	0.0	0.843	8.7	LOS A	8.6	216.6	0.94	1.13	1.47	33.4
6	T1	140	2.0	146	2.0	0.843	8.8	LOS A	8.6	216.6	0.94	1.13	1.47	33.2
16	R2	1175	1.0	1224	1.0	0.843	7.8	LOS A	9.2	232.5	0.94	1.12	1.44	32.6
Approach		1316	1.1	1371	1.1	0.843	7.9	LOS A	9.2	232.5	0.94	1.12	1.44	32.7
North: SB Olympic Way														
7	L2	710	3.0	740	3.0	0.553	1.8	LOS A	4.6	118.5	0.68	0.51	0.68	33.4
4	T1	355	1.0	370	1.0	0.355	1.9	LOS A	2.3	58.5	0.60	0.41	0.60	35.9
14	R2	5	0.0	5	0.0	0.355	1.9	LOS A	2.3	58.5	0.60	0.41	0.60	34.8
Approach		1070	2.3	1115	2.3	0.553	1.9	LOS A	4.6	118.5	0.65	0.48	0.65	34.2
West: EB 4th Avenue														
5	L2	1	0.0	1	0.0	0.434	4.2	LOS A	2.4	59.3	0.75	0.74	0.85	35.6
2	T1	185	1.0	193	1.0	0.434	4.3	LOS A	2.4	59.3	0.75	0.74	0.85	35.4
12	R2	95	0.0	99	0.0	0.434	4.2	LOS A	2.4	59.3	0.75	0.74	0.85	34.4
Approach		281	0.7	293	0.7	0.434	4.2	LOS A	2.4	59.3	0.75	0.74	0.85	35.1
All Vehicles		3487	1.2	3632	1.2	0.843	6.9	LOS A	9.2	232.5	0.85	0.90	1.15	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	855	50	135	1195	35	120	35	40	45	15	10
Future Volume (vph)	20	855	50	135	1195	35	120	35	40	45	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	145		0	0		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		212			635			318			127	
Travel Time (s)		5.8			17.3			8.7			3.5	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	29.0		8.0	25.0		32.0	32.0		32.0	32.0	
Total Split (s)	10.0	42.0		16.0	48.0		32.0	32.0		32.0	32.0	
Total Split (%)	11.1%	46.7%		17.8%	53.3%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	5.0	37.0		11.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-2.0		-1.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	3.0		4.0	3.0			3.0			3.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	0.5		2.0	0.5		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0			13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0			19		1	1		8	8	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 48 (53%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Simmons & 4th Ave

HCM 6th Signalized Intersection Summary
5: Simmons & 4th Ave

Projected 2027 with Project
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	855	50	135	1195	35	120	35	40	45	15	10
Future Volume (veh/h)	20	855	50	135	1195	35	120	35	40	45	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.94		0.98	0.99		0.93
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	20	864	51	136	1207	35	121	35	40	45	15	10
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	1947	115	444	2151	62	280	84	77	285	94	52
Arrive On Green	0.02	0.57	0.55	0.06	0.61	0.59	0.23	0.25	0.23	0.23	0.25	0.23
Sat Flow, veh/h	1781	3402	201	1781	3523	102	847	330	302	865	371	206
Grp Volume(v), veh/h	20	451	464	136	609	633	196	0	0	70	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1826	1781	1777	1848	1479	0	0	1442	0	0
Q Serve(g_s), s	0.4	13.1	13.2	2.7	18.3	18.3	6.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	13.1	13.2	2.7	18.3	18.3	10.1	0.0	0.0	3.3	0.0	0.0
Prop In Lane	1.00		0.11	1.00		0.06	0.62		0.20	0.64		0.14
Lane Grp Cap(c), veh/h	300	1017	1045	444	1085	1128	407	0	0	400	0	0
V/C Ratio(X)	0.07	0.44	0.44	0.31	0.56	0.56	0.48	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	376	1017	1045	570	1085	1128	505	0	0	497	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.1	11.0	11.1	7.8	10.4	10.4	29.3	0.0	0.0	26.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.4	1.4	0.1	2.1	2.0	0.3	0.0	0.0	0.1	0.0	0.0
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	0.2	5.2	5.4	0.9	7.2	7.5	3.9	0.0	0.0	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.1	12.4	12.5	8.0	12.5	12.4	29.6	0.0	0.0	26.9	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	C	A	A	C	A	A
Approach Vol, veh/h		935			1378			196			70	
Approach Delay, s/veh		12.4			12.0			29.6			26.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	58.0		25.9	9.6	54.5		25.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	43.0		27.0	11.0	37.0		27.0				
Max Q Clear Time (g_c+I1), s	2.4	20.3		12.1	4.7	15.2		5.3				
Green Ext Time (p_c), s	0.0	0.3		0.3	0.1	0.2		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		13.9	
HCM 6th LOS		B	

6: Deschutes Pkwy & Olympic St/5th Ave Performance by movement

Movement	EBT	WBL	WBT	NER	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.4	0.2
Total Del/Veh (s)	2.1	33.6	2.6	2.0	9.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	760	5	1	1115	25	5	5	0	20	0	165
Future Volume (vph)	120	760	5	1	1115	25	5	5	0	20	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		755			617			93			318	
Travel Time (s)		20.6			16.8			2.5			8.7	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0	
Total Split (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	61.1%	61.1%		61.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.5	0.5		0.5	0.5		2.5	2.5		2.5	2.5	
Recall Mode	C-Max	C-Max		C-Min	C-Min		None	None		None	None	
Walk Time (s)				7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				14.0	14.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)				1	1		0	0		6	6	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: 5th Ave & Simmons

HCM 6th Signalized Intersection Summary
7: 5th Ave & Simmons

Projected 2027 with Project
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	760	5	1	1115	25	5	5	0	20	0	165
Future Volume (veh/h)	120	760	5	1	1115	25	5	5	0	20	0	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		0.98	0.99		1.00	0.95		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	135	854	6	1	1253	28	6	6	0	22	0	185
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	1542	11	40	2492	56	181	167	0	64	16	301
Arrive On Green	0.69	0.72	0.69	0.69	0.72	0.69	0.19	0.22	0.00	0.19	0.00	0.19
Sat Flow, veh/h	245	2151	16	0	3478	78	557	771	0	91	74	1387
Grp Volume(v), veh/h	343	0	652	674	0	608	12	0	0	207	0	0
Grp Sat Flow(s),veh/h/ln	713	0	1699	1870	0	1686	1328	0	0	1552	0	0
Q Serve(g_s), s	18.1	0.0	15.9	0.0	0.0	14.4	0.0	0.0	0.0	3.3	0.0	0.0
Cycle Q Clear(g_c), s	32.5	0.0	15.9	14.6	0.0	14.4	0.5	0.0	0.0	11.0	0.0	0.0
Prop In Lane	0.39		0.01	0.00		0.05	0.50		0.00	0.11		0.89
Lane Grp Cap(c), veh/h	551	0	1217	1338	0	1208	318	0	0	346	0	0
V/C Ratio(X)	0.62	0.00	0.54	0.50	0.00	0.50	0.04	0.00	0.00	0.60	0.00	0.00
Avail Cap(c_a), veh/h	551	0	1217	1338	0	1208	520	0	0	558	0	0
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	1.00	0.00	1.00	1.00	0.00	0.00	0.97	0.00	0.00
Uniform Delay (d), s/veh	9.2	0.0	5.9	5.7	0.0	5.7	28.2	0.0	0.0	32.8	0.0	0.0
Incr Delay (d2), s/veh	5.2	0.0	1.7	1.4	0.0	1.5	0.0	0.0	0.0	1.2	0.0	0.0
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	5.2	0.0	5.3	5.8	0.0	4.7	0.2	0.0	0.0	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	0.0	7.6	7.0	0.0	7.2	28.2	0.0	0.0	34.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		995			1282			12			207	
Approach Delay, s/veh		9.9			7.1			28.2			34.0	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		67.5		22.5		67.5		22.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		34.5		13.0		16.6		2.5				
Green Ext Time (p_c), s		0.8		0.5		0.3		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			10.6									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	5	310	50	5	185
Future Vol, veh/h	30	5	310	50	5	185
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	33	5	337	54	5	201

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	575	364	0	0	391	0
Stage 1	364	-	-	-	-	-
Stage 2	211	-	-	-	-	-
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	480	681	-	-	1168	-
Stage 1	703	-	-	-	-	-
Stage 2	824	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	478	681	-	-	1168	-
Mov Cap-2 Maneuver	478	-	-	-	-	-
Stage 1	703	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	499	1168	-
HCM Lane V/C Ratio	-	-	0.076	0.005	-
HCM Control Delay (s)	-	-	12.8	8.1	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	10	340	35	10	210
Future Vol, veh/h	15	10	340	35	10	210
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	16	11	370	38	11	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	639	389	0	0	408	0
Stage 1	389	-	-	-	-	-
Stage 2	250	-	-	-	-	-
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	440	659	-	-	1151	-
Stage 1	685	-	-	-	-	-
Stage 2	792	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	435	659	-	-	1151	-
Mov Cap-2 Maneuver	435	-	-	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	783	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	503	1151	-
HCM Lane V/C Ratio	-	-	0.054	0.009	-
HCM Control Delay (s)	-	-	12.6	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	4	370	75	5	225
Future Vol, veh/h	50	4	370	75	5	225
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	54	4	402	82	5	245

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	698	443	0	0	484	0
Stage 1	443	-	-	-	-	-
Stage 2	255	-	-	-	-	-
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	407	615	-	-	1079	-
Stage 1	647	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	405	615	-	-	1079	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	784	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	416	1079	-
HCM Lane V/C Ratio	-	-	0.141	0.005	-
HCM Control Delay (s)	-	-	15.1	8.4	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0	-

MOVEMENT SUMMARY

Site: 5 [Existing 2020 AM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
SouthEast: NB Olympic Way														
3ax	L1	535	2.0	569	2.0	0.278	0.1	LOS A	1.5	39.2	0.12	0.03	0.12	35.0
18ax	R1	180	5.0	191	5.0	0.278	0.1	LOS A	1.5	39.2	0.12	0.03	0.12	35.7
Approach		715	2.8	761	2.8	0.278	0.1	LOS A	1.5	39.2	0.12	0.03	0.12	35.1
North: SB West Bay Rd														
7a	L1	385	1.0	410	1.0	0.559	4.0	LOS A	2.8	71.5	0.59	0.63	0.71	33.0
14	R2	10	11.0	11	11.0	0.559	4.6	LOS A	2.8	71.5	0.59	0.63	0.71	32.2
Approach		395	1.3	420	1.3	0.559	4.0	LOS A	2.8	71.5	0.59	0.63	0.71	32.9
West: EB Harrison Avenue														
5	L2	20	3.0	21	3.0	0.340	2.0	LOS A	1.9	49.4	0.57	0.46	0.57	35.6
12a	R1	610	5.0	649	5.0	0.340	1.9	LOS A	2.0	50.9	0.57	0.44	0.57	35.4
Approach		630	4.9	670	4.9	0.340	1.9	LOS A	2.0	50.9	0.57	0.44	0.57	35.4
All Vehicles		1740	3.2	1851	3.2	0.559	1.6	LOS A	2.8	71.5	0.39	0.32	0.42	34.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 5 [Without Project 2027 AM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
SouthEast: NB Olympic Way														
3ax	L1	615	2.0	654	2.0	0.324	0.1	LOS A	2.1	53.9	0.16	0.05	0.16	34.9
18ax	R1	210	5.0	223	5.0	0.324	0.1	LOS A	2.1	53.9	0.15	0.05	0.15	35.7
Approach		825	2.8	878	2.8	0.324	0.1	LOS A	2.1	53.9	0.16	0.05	0.16	35.1
North: SB West Bay Rd														
7a	L1	440	1.0	468	1.0	0.767	10.8	LOS B	6.7	170.0	0.84	1.01	1.33	30.0
14	R2	10	11.0	11	11.0	0.767	12.1	LOS B	6.7	170.0	0.84	1.01	1.33	29.4
Approach		450	1.2	479	1.2	0.767	10.8	LOS B	6.7	170.0	0.84	1.01	1.33	30.0
West: EB Harrison Avenue														
5	L2	25	3.0	27	3.0	0.433	2.7	LOS A	2.9	74.5	0.71	0.60	0.71	35.1
12a	R1	695	5.0	739	5.0	0.433	2.7	LOS A	3.0	77.3	0.71	0.58	0.71	35.0
Approach		720	4.9	766	4.9	0.433	2.7	LOS A	3.0	77.3	0.71	0.58	0.71	35.0
All Vehicles		1995	3.2	2122	3.2	0.767	3.5	LOS A	6.7	170.0	0.51	0.46	0.62	33.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 5 [With Project 2027 AM (Site Folder: General)]

Harrison Ave/West Bay Rd
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
SouthEast: NB Olympic Way														
3ax	L1	615	2.0	654	2.0	0.346	0.2	LOS A	2.2	56.4	0.20	0.08	0.20	34.8
18ax	R1	255	5.0	271	5.0	0.346	0.2	LOS A	2.2	56.4	0.20	0.08	0.20	35.7
Approach		870	2.9	926	2.9	0.346	0.2	LOS A	2.2	56.4	0.20	0.08	0.20	35.0
North: SB West Bay Rd														
7a	L1	550	1.0	585	1.0	0.899	12.6	LOS B	10.5	265.6	0.90	1.17	1.70	29.3
14	R2	50	11.0	53	11.0	0.899	13.6	LOS B	10.5	265.6	0.90	1.17	1.70	28.8
Approach		600	1.8	638	1.8	0.899	12.7	LOS B	10.5	265.6	0.90	1.17	1.70	29.3
West: EB Harrison Avenue														
5	L2	40	3.0	43	3.0	0.489	4.1	LOS A	3.6	93.8	0.79	0.78	0.87	34.8
12a	R1	695	5.0	739	5.0	0.489	3.9	LOS A	3.7	97.4	0.80	0.76	0.86	34.6
Approach		735	4.9	782	4.9	0.489	3.9	LOS A	3.7	97.4	0.80	0.76	0.86	34.7
All Vehicles		2205	3.3	2346	3.3	0.899	4.8	LOS A	10.5	265.6	0.59	0.60	0.83	33.1

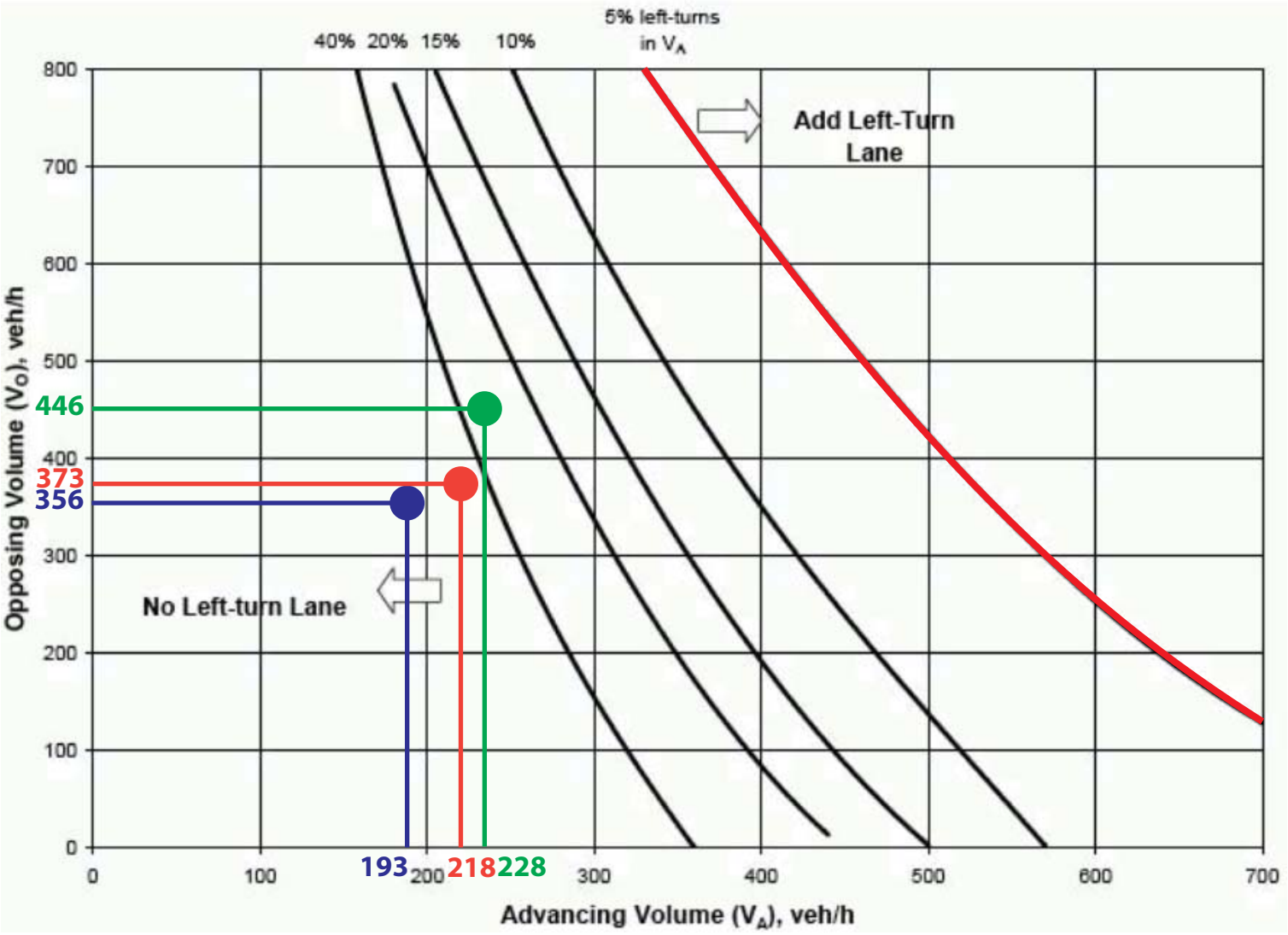
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if 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: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix D

Turn Lane Warrant and Sensitivity Analysis Worksheets

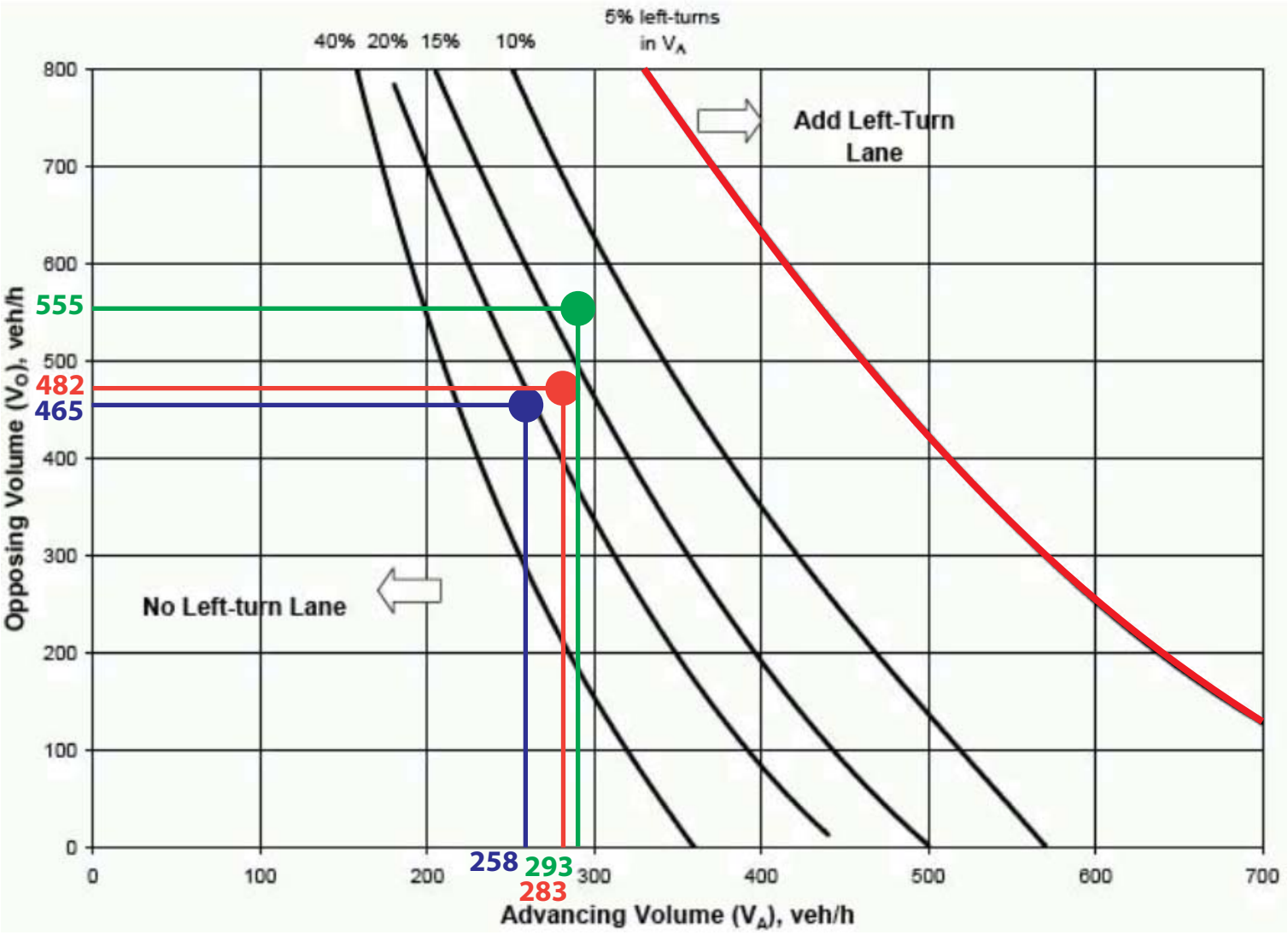
Attachment 9.A

Legend
North Site Driveway
Center Site Driveway
South Site Driveway



Attachment 9.A

Legend
North Site Driveway
Center Site Driveway
South Site Driveway



Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	5	415	50	5	250
Future Vol, veh/h	30	5	415	50	5	250
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	33	5	451	54	5	272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	760	478	0	0	505	0
Stage 1	478	-	-	-	-	-
Stage 2	282	-	-	-	-	-
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	374	587	-	-	1060	-
Stage 1	624	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	372	587	-	-	1060	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	761	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	393	1060	-
HCM Lane V/C Ratio	-	-	0.097	0.005	-
HCM Control Delay (s)	-	-	15.1	8.4	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	10	450	35	10	275
Future Vol, veh/h	15	10	450	35	10	275
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	16	11	489	38	11	299

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	829	508	0	0	527	0
Stage 1	508	-	-	-	-	-
Stage 2	321	-	-	-	-	-
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	340	565	-	-	1040	-
Stage 1	604	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	336	565	-	-	1040	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	725	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	401	1040	-
HCM Lane V/C Ratio	-	-	0.068	0.01	-
HCM Control Delay (s)	-	-	14.6	8.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	4	480	75	5	290
Future Vol, veh/h	50	4	480	75	5	290
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	54	4	522	82	5	315

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	888	563	0	0	604	0
Stage 1	563	-	-	-	-	-
Stage 2	325	-	-	-	-	-
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	314	526	-	-	974	-
Stage 1	570	-	-	-	-	-
Stage 2	732	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	312	526	-	-	974	-
Mov Cap-2 Maneuver	312	-	-	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.7	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	322	974	-
HCM Lane V/C Ratio	-	-	0.182	0.006	-
HCM Control Delay (s)	-	-	18.7	8.7	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0	-