

PORT OF CHEHALIS
TRAFFIC IMPACT ANALYSIS

Chehalis UGA / Lewis County, WA



07/05/2022

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PORT OF CHEHALIS
TRAFFIC IMPACT ANALYSIS

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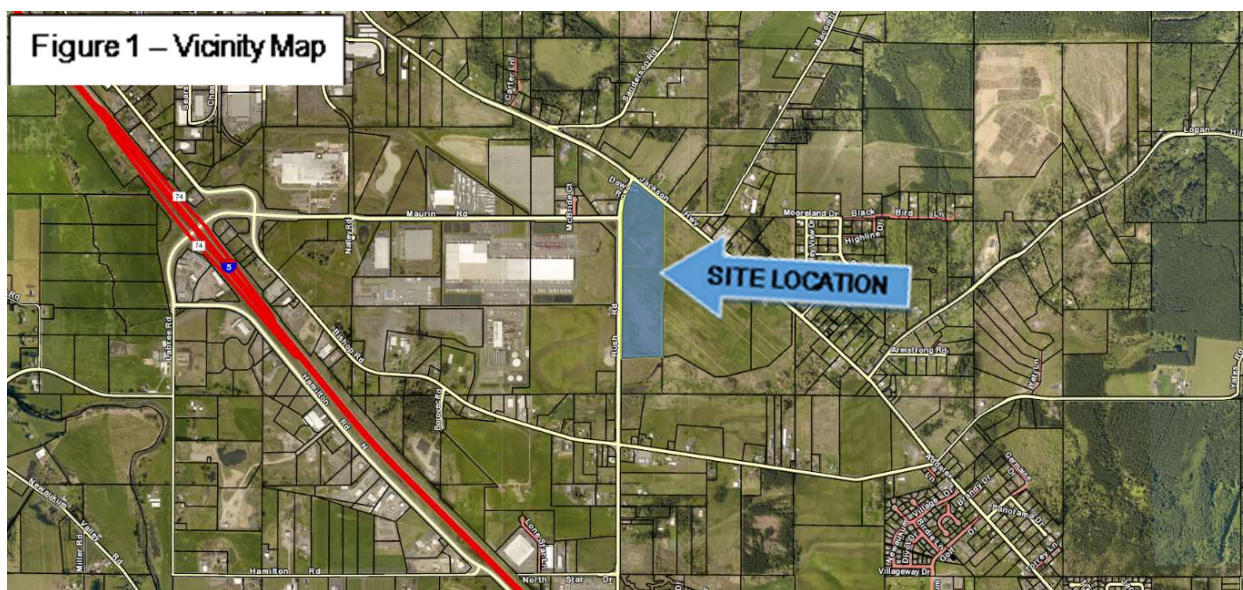
PORT OF CHEHALIS TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

The main goals of this study focus on the analysis of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent street system, baseline vehicular volumes, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined.

2. PROJECT DESCRIPTION

The Port of Chehalis project is a proposed industrial site comprised of a single, 525,000 square foot building located within the Chehalis Urban Growth Area of Lewis County. The subject site is bordered by Rush Road to the west and located south of Jackson Highway on an undeveloped, 34.07-acre tax parcel (#: 017800014003). Access to the subject site is proposed via six new driveways. The northernmost driveway is proposed to extend east from Rush Road and aligned opposite Maurin Road. The five remaining driveways would similarly take access from Rush Road and are located to the south. Internal connectivity for an adjacent easterly site may also be included. Figure 1 below illustrates the adjacent street system and the subject site's lot boundaries which are highlighted in blue. A conceptual site plan of the project is presented in Figure 2 which shows the proposed access points.





3. EXISTING CONDITIONS

3.1 Existing Roadway Characteristics

The street network serving the proposed project consists of a variety of roadways. The roadways defined in the study area are listed and described below.

Table 1: Roadway Network

Functional Classification	Roadway	Speed Limit	Lanes	Street Parking	Sidewalk	Bike Facilities
Principal Arterial	Jackson Highway	30-40 mph	2	No	No	No
Minor Arterial	Bishop Road	35 mph	2	No	No	No
Collectors	Maurin Road	35 mph	2	No	No	No
	Rush Road	35 mph	2	No	Westside	No

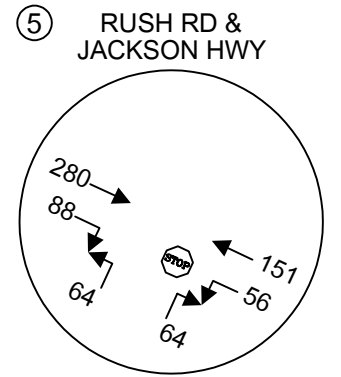
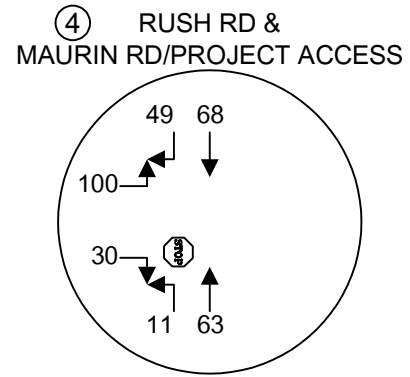
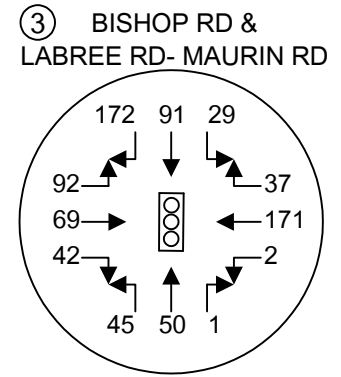
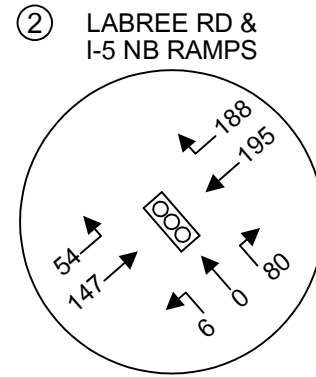
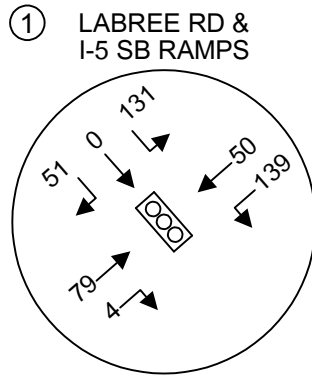
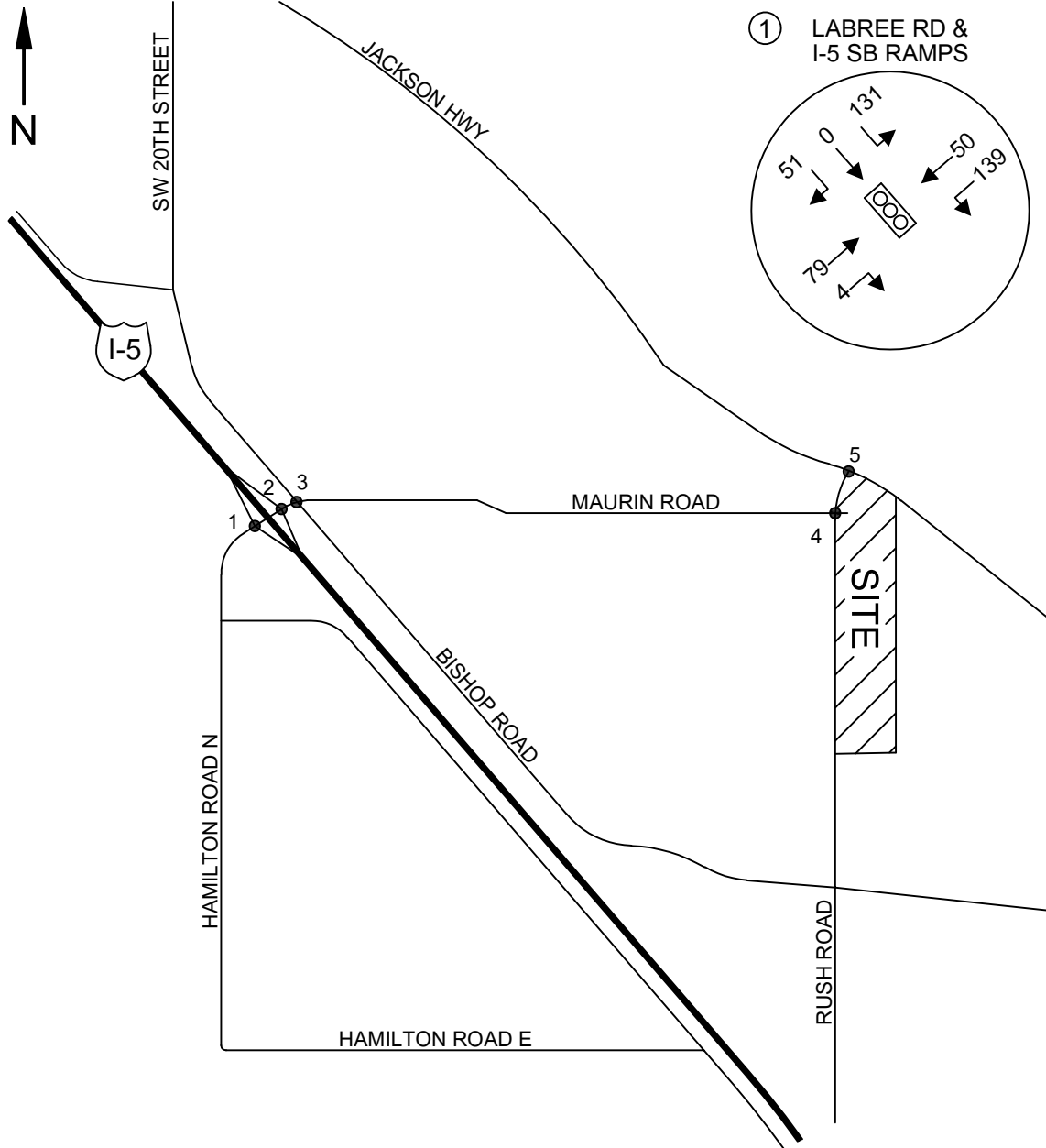
3.2 Existing Peak Hour Volumes and Patterns

Field data for this study was collected in March of 2022 between the evening peak period from 3:00-6:00 PM. Study locations were determined based on the subject site’s location and expected travel routes. See list of study intersection below.

- Labree Road & I-5 South Ramps (Signal)
- Labree Road & 1-5 North Ramps (Signal)
- Bishop Road & Maurin Road/Labree Road (Signal)
- Maurin Road & Rush Road (Stop)
- Jackson Highway & Rush Road (Stop)

The one hour reflecting highest overall roadway volumes (peak hour) was then derived from these counts and used for capacity evaluation.

Additionally, the WSDOT COVID-19 Transportation System Performance Multimodal Executive Summary showed that traffic volumes in the area along state facilities in Lewis County were on average 2% lower than typical baseline conditions on the date the count was taken (3/10/2022). This indicates that traffic levels are coming back to pre-pandemic levels and therefore traffic counts could be considered normal conditions. However, to present a conservative analysis, all traffic volumes herein have been adjusted up five percent to establish baseline peak hour conditions. Adjusted baseline 2022 PM peak hour volumes at the study intersections are illustrated in Figure 3. Full-count sheets have been included in the appendix.



3.3 Roadway Improvements

A review of the City of Chehalis Six-Year (2022-2027) Transportation Improvement Program indicates no planned projects in the general vicinity of the Port of Chehalis project. A review of the Lewis County Six-Year (2022-2027) Transportation Improvement Program indicates the following planned project in the general area.

Rush Road Improvements (MP 2.600 to MP 3.164; Priority #16): This project entails a major widening of the roadway and potentially including curb, gutter sidewalk and more. Total funds allocated to the project total \$2,680,000 and construction is to begin in 2024.

3.4 Pedestrian and Bicycle Activity

During field observations, non-motorist transport was observed at two of the six study intersections. One pedestrian was noted crossing the northwest leg of the intersection of Jackson Highway & Rush Road. One pedestrian was noted crossing the west leg of the intersection of Maurin Road & Rush Road. Given the industrial area in which the subject site is located, little to no non-motorist transport is expected to be generated from the development. It is important to note that there is a pedestrian improvement project planned along Rush Road, which would include curb, gutter and sidewalk.

3.5 Public Transit

A review of the Twin Transit regional bus schedule indicates that transit service is provided within walking distance of the subject site. The nearest bus stop is located on the south side of Maurin Road (approximately 550 feet from subject site), servicing the Red Line. The Red Line provides service north of I-5 throughout the city and the port of Chehalis. Weekday service is provided from 6:00 AM – 7:00 PM and weekend service is provided from 7:00 AM – 4:00 PM. Refer to Twin Transit's Routes & Schedules for more detailed information.

3.6 Site Access & Driveway Design

As shown in the provided site plan, six driveways extending east from Rush Road are proposed with the primary access aligned with the opposite Maurin Road. All proposed driveways shall maintain and allow for clear sight lines as prescribed in the County engineering and AASHTO¹ standards. Sight lines along the 35-mph Rush Road need to

¹ A Policy on Geometric Design of Highways and Streets, *AASHTO*, 7th Edition, 2018.

measure 390 feet of unobstructed view for passenger vehicles and approximately 595-feet for heavy vehicles. Based on preliminary measurements and review of each access point, sight lines appear to be met at all locations. Verification may be needed upon final site plan and drive locations to ensure minimum distances can be attained.

3.7 Level of Service

Baseline intersection delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range² for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 11* analysis program. For side-street, stop-controlled intersections, LOS is determined by the approach with the highest delay. Delays presented represent overall weighted average delays for signalized intersections. Table 2 below presents baseline 2022 PM peak hour LOS delays for the key intersection of study.

Table 2: Baseline 2022 PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	Movement	LOS	Delay
Labree Rd & I-5 SB Ramps	Signalized	Overall	B	18.8
Labree Rd & I-5 NB Ramps	Signalized	Overall	B	12.2
Labree/Maurin Rd & Bishop Rd	Signalized	Overall	B	14.4
Maurin Rd & Consolidated Access	Stop	EB	B	11.8
Jackson Hwy & Rush Rd	Stop	NEB	B	12.8

EB: Eastbound; NEB: Northeast bound

Existing PM peak hour conditions are shown to operate with LOS B or better conditions indicating stable operations during the critical PM peak hour of travel.

² *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Stop Controlled Intersections – Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Highway Capacity Manual, 6th Edition

4. FUTURE TRAFFIC CONDITIONS

4.1 Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour (AM or PM) or an entire day. Data presented in this report was taken from the Institute of Transportation Engineer's publication *Trip Generation*, 11th Edition. The designated land use for this project is defined as High-Cube Transload and Short-Term Storage Warehouse (LUC-154). Table 3 below summarizes the estimated project trip generation using square footage as the input variable and ITE average rates to determine trip ends. Included are the average weekday daily traffic (AWDT) and the AM and PM peak hours. Refer to the appendix for trip generation output.

Table 3: Project Trip Generation

Land Use	Sq. Ft.	Trip Type	AWDT	AM Peak-Hour			PM Peak-Hour		
				In	Out	Total	In	Out	Total
LUC 154- H.C. Warehouse	525,000	Truck	116	5	6	11	2	3	5
		Pass. Vehicle	619	27	4	31	13	35	48
		Total	735	32	10	42	15	38	53

Based on ITE data, the project is anticipated to generate 735 new daily weekday trips with 42 trips occurring in the AM peak hour (32 inbound / 10 outbound) and 53 in the PM peak hour (15 inbound / 38 outbound). According to ITE data, heavy vehicle (truck) composition could account for around ~15% of the total daily volumes (~25% in the AM peak hour / ~10% in the PM peak hour).

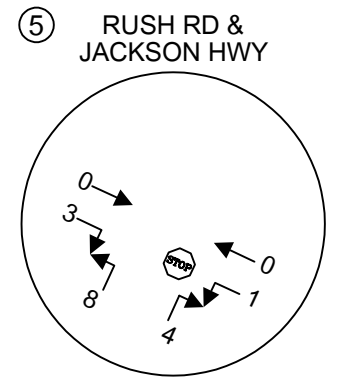
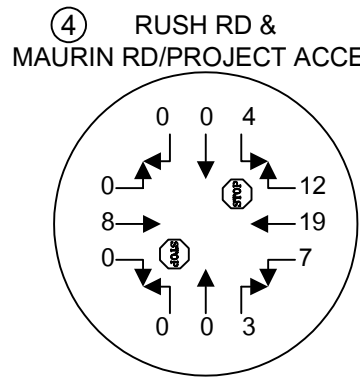
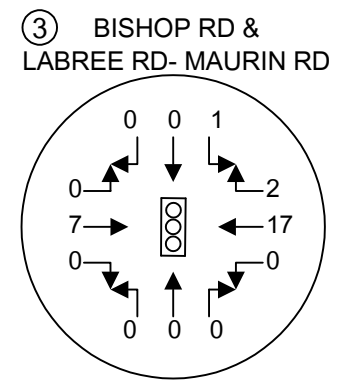
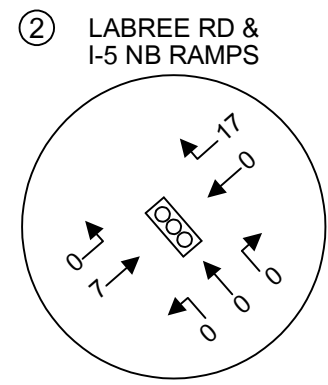
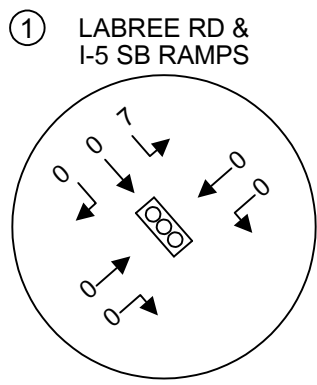
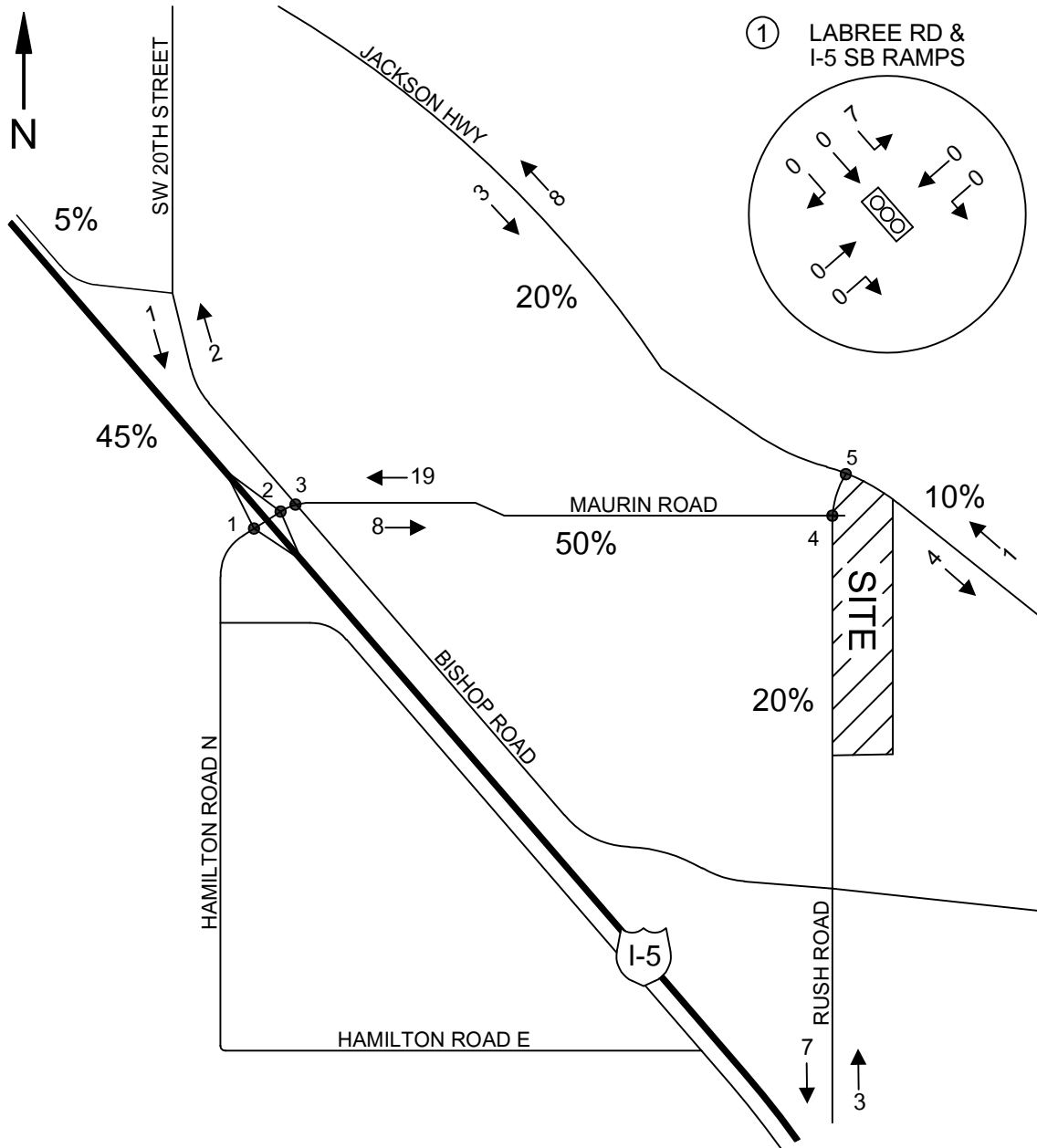
4.2 Trip Distribution and Assignment

An industrial site would primarily generate employee and delivery-based trip ends. The primary travel route is anticipated to be to/from Maurin Road with connection to I-5 both north and south. Other travel routes could be Jackson Highway and to/from the south by way of Rush Road. See Figure 4 for estimated trip assignment percentages. These values have similarly been applied to past industrial sites in the general vicinity. All project-generated traffic has been allocated via the northernmost Rush Road access opposite Maurin Road to remain conservative.

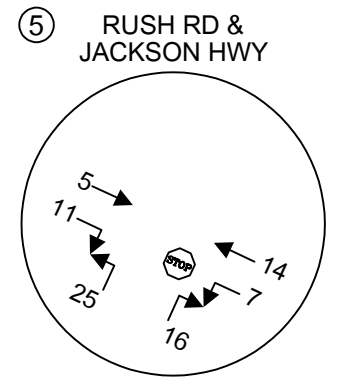
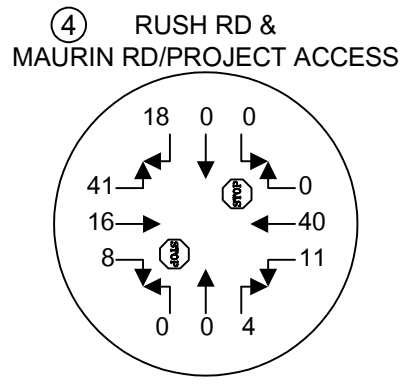
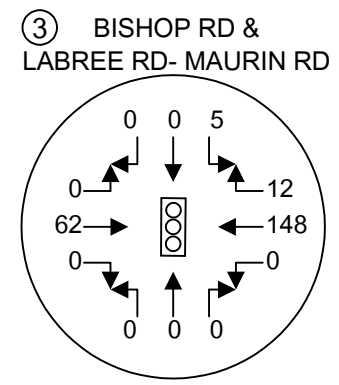
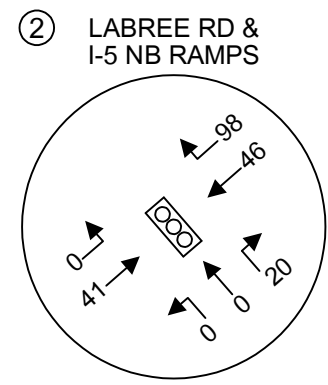
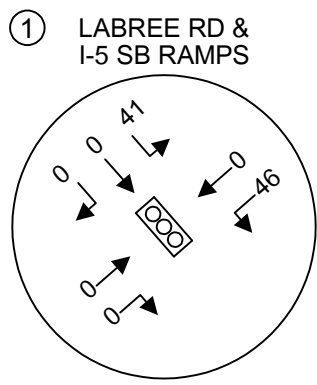
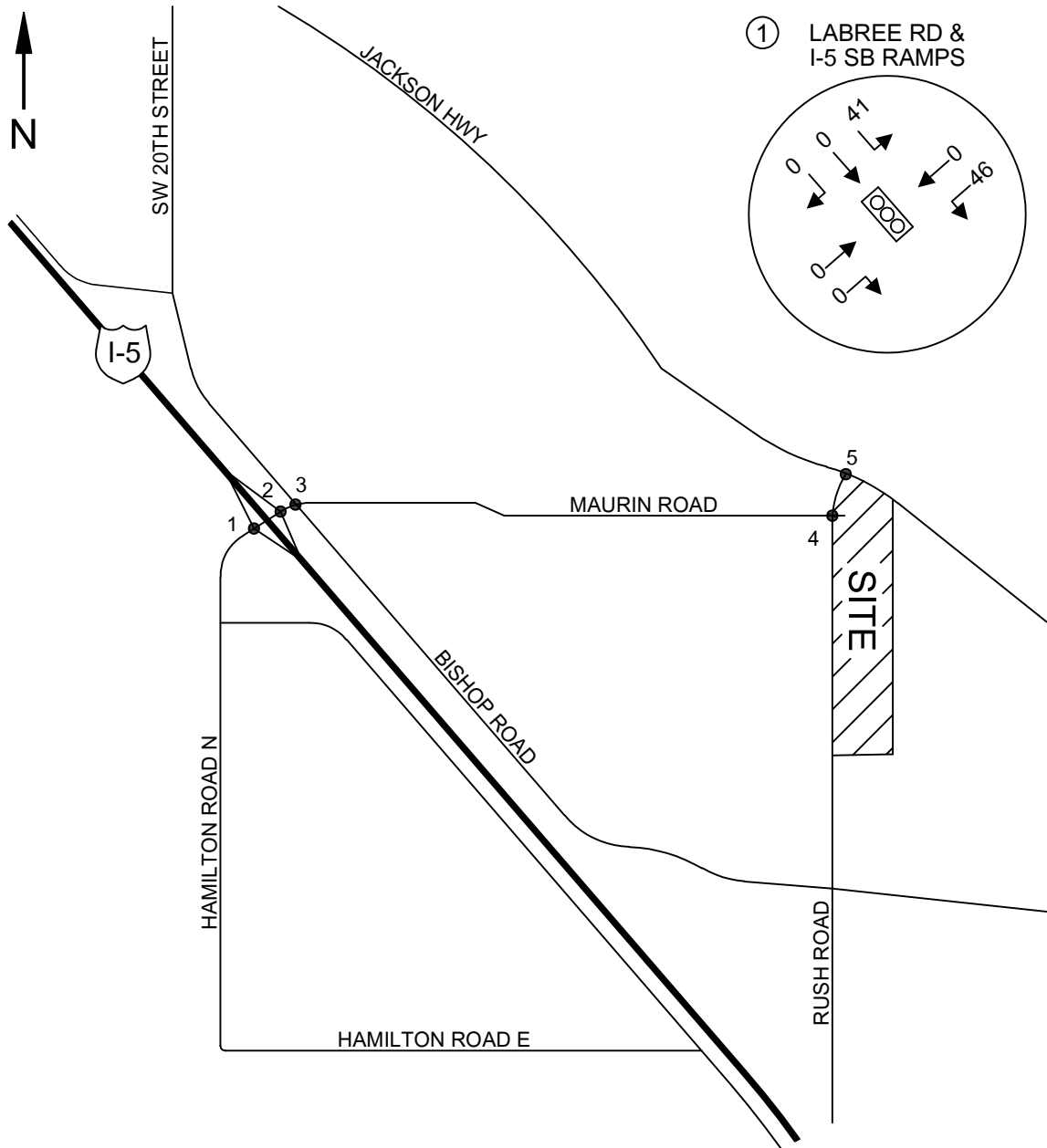
4.3 Future Peak Hour Volumes

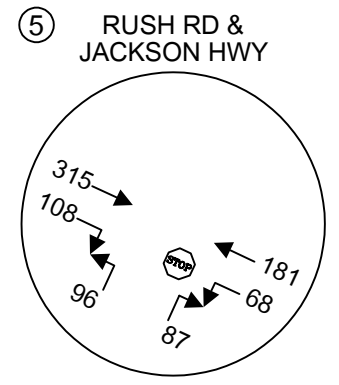
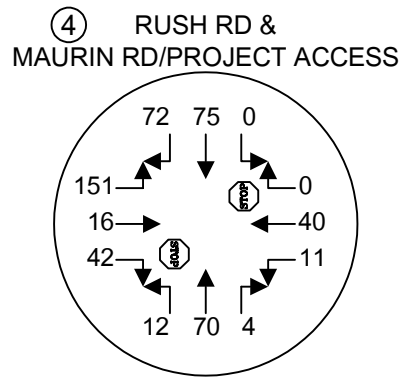
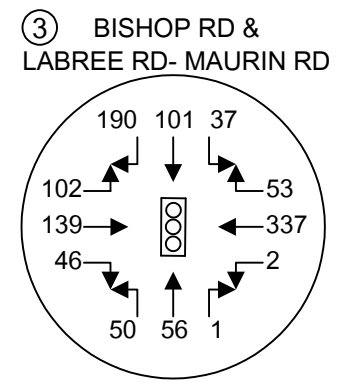
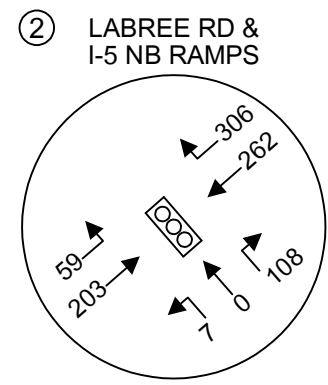
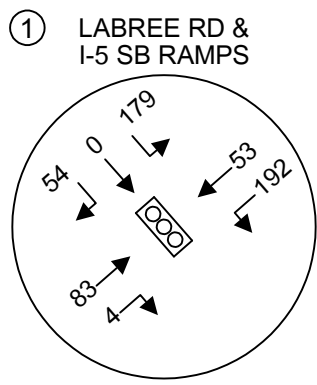
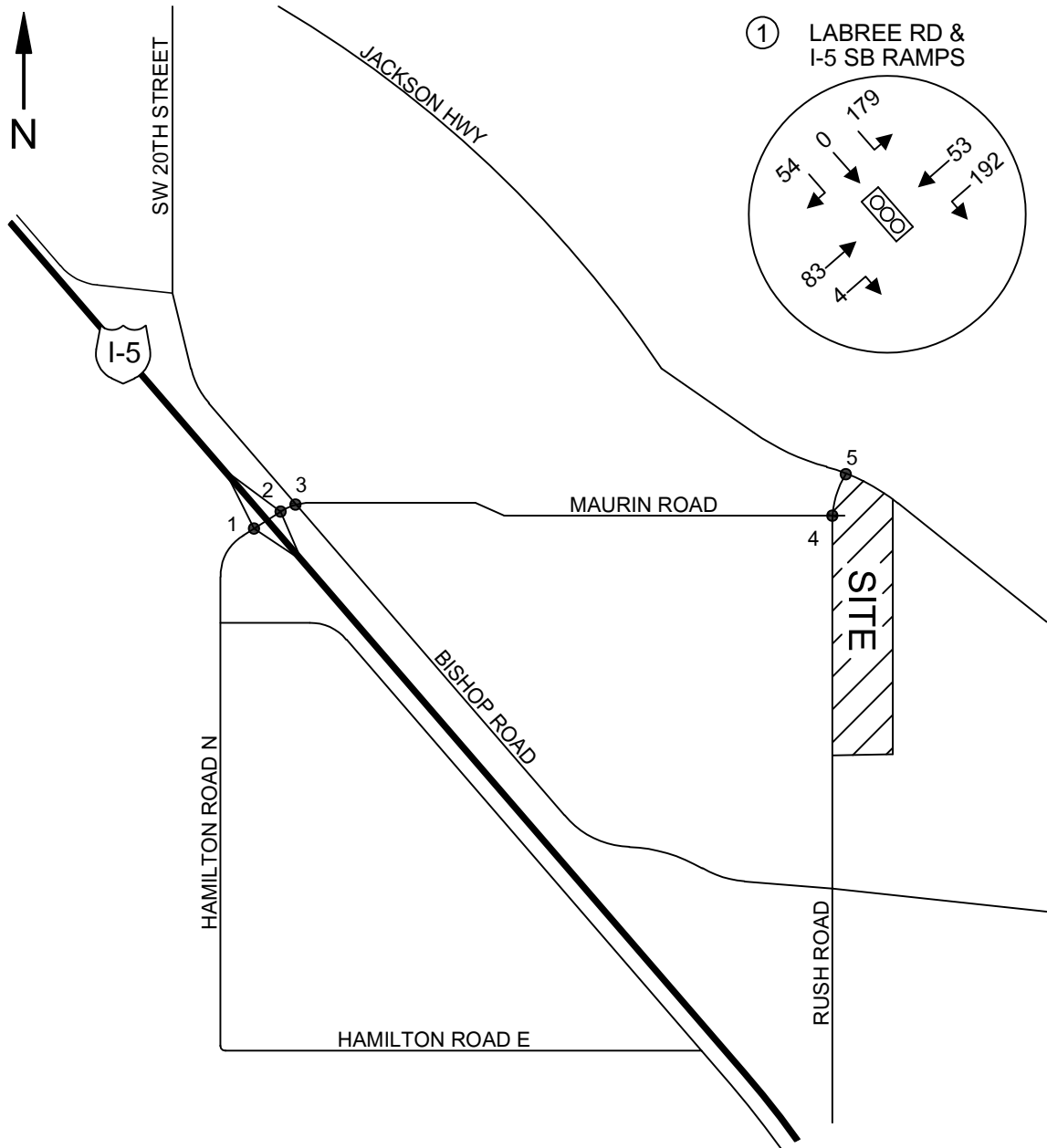
A 5-year horizon of 2027 was used to examine conditions both with and without the subject development under forecast conditions. The property is located within the Chehalis Urban Growth Area of Lewis County where, according to the city's Comprehensive Plan, is forecasted to grow at an annual 1.5% rate. All existing volumes from Figure 3 have therefore been adjusted up by applying a 2.0% compound annual growth rate.

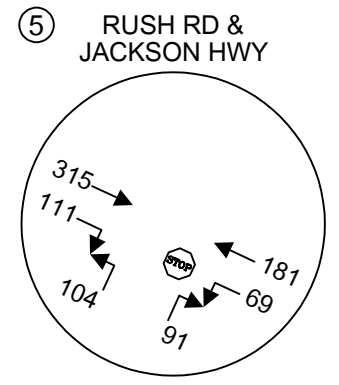
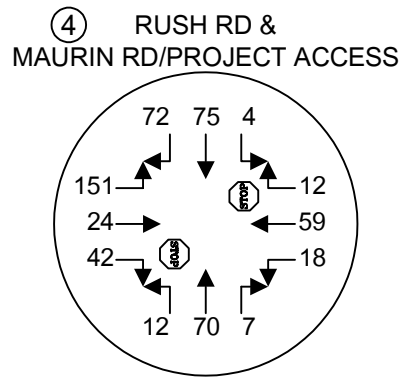
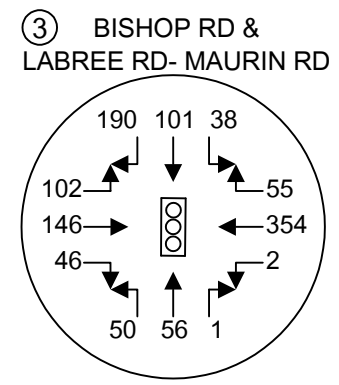
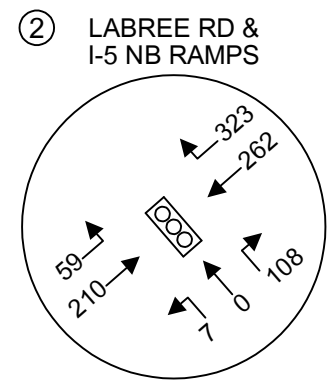
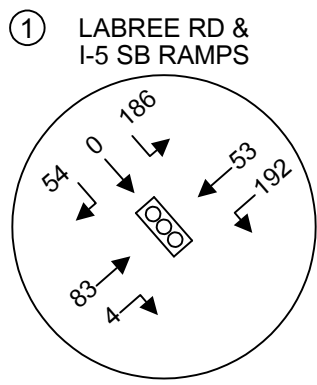
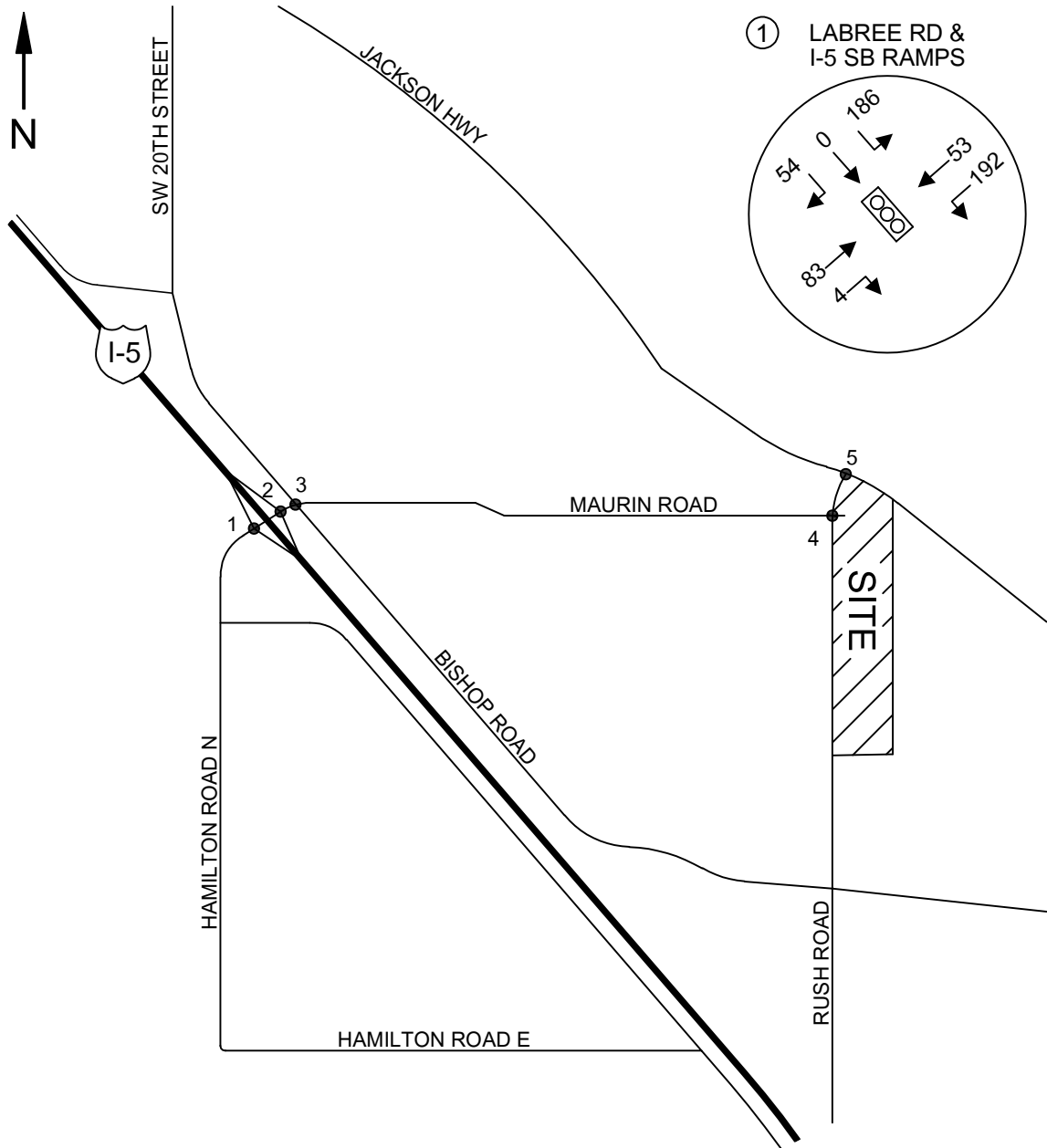
Moreover, pipeline volumes associated with the nearby Jackson Highway Warehouse and Port 17 Chehalis projects have been included in analysis and are displayed in Figure 5. For the Jackson Highway Warehouse pipeline volumes it was assumed that internal connectivity would be available thereby allowing routing through the subject site and via Maurin Road & Rush Road. See appendix for detailed pipeline volume derivations. Forecast 2027 PM peak hour volumes without and with the addition of project-generated traffic (to a consolidated access off Rush Road) are shown in Figures 6 and 7, respectively.



NEW PM PEAK HOUR TRIPS
 INBOUND: 15 VPH
 OUTBOUND: 38 VPH







4.4 Future Level of Service

Level of service analyses were made of the future PM peak hour volumes without (background) and with project related trips added to the key roadways and intersections. This analysis once again involved the use of the *Synchro 11* analysis program. Delays for the study intersections and consolidated project access under future conditions are shown below in Table 4.

Table 4: Forecast 2027 PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	Movement	<u>Background</u>		<u>With Project</u>	
			LOS	Delay	LOS	Delay
Labree Rd & I-5 SB Ramps	Signalized	Overall	B	19.2	B	19.3
Labree Rd & I-5 NB Ramps	Signalized	Overall	B	11.3	B	11.3
Labree/Maurin Rd & Bishop Rd	Signalized	Overall	B	16.7	B	16.8
Rush Rd & Maurin Rd/Access	Stop	EB	B	13.0	B	14.3
Jackson Hwy & Rush Rd	Stop	EB	C	15.1	C	15.8

All outlying study intersections are shown to operate with acceptable LOS C or better indicating stable conditions and no operational deficiencies under a future 2027 PM peak hour scenario. It is important to note that the pipeline project (Jackson Highway Warehouse) was conditioned to construct a left-turn lane along Jackson Highway at Rush Road; however, due to unknown timing this mitigation was not considered in the LOS modeling. The improvement, therefore, would likely result in reduced delays from the values presented in the table above.

4.5 Left Turn Lane Warrant

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures prescribed by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain storage requirements at the access intersection on Maurin Road. Based on forecast 2027 PM peak hour volumes with project traffic – a left turn lane *would not be warranted* at the proposed consolidated access (and therefore unwarranted at each individual driveway) given the traffic would predominately be arriving by way of Maurin Road (straight into the site) or Rush Road from the south (right-turn into the site). It should also be taken into consideration that the County’s Six-year Transportation Plan includes a widening effort along Rush Road which may include a center turn lane. Refer to the appendix for the warrant nomographs.

5. SUMMARY

The Port of Chehalis project proposes for the construction of a 525,000 square foot warehouse located in the Chehalis Urban Growth Area of Lewis County. The subject site is situated on tax parcel #: 017800014003 encompassing 34.07-acres. Access to and from the site is proposed via six new driveways. The first driveway is proposed to extend east from Rush Road aligned with Maurin Road. The other five driveways are also proposed to extend east from Rush Road, south of the access intersection with Maurin Road. Based on ITE data the project would be anticipated to generate 42 new AM peak hour trips (32 in / 10 out) and 53 new PM peak hour trips (15 in / 38 out). Approximately 25 percent of AM trips and 10 percent of PM trips are anticipated to be in the form of heavy vehicles.

Existing level of service (LOS) is summarized in Table 2 and indicates the intersections of study operating with delays of LOS B or better. For forecast analyses, a five-year horizon was evaluated to assess impacts under future conditions. Table 4 summarizes forecast 2027 PM peak hour LOS delays without and with the project. Forecast 2027 conditions are shown to operate satisfactorily with LOS C or better conditions indicating no operational deficiencies. A left-turn was found not warranted at the project access intersection of Maurin Road & Rush Road during forecast 2027 PM peak hour conditions.

Any frontage improvements should be coordinated with the City and County to ensure compatibility in design and placement to account for the future widening project along Rush Road.

Based on the analysis above, no offsite-mitigation is identified at this time.

PORT OF CHEHALIS
TRAFFIC IMPACT ANALYSIS

APPENDIX

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858f
Site Code : 00004858
Start Date : 3/10/2022
Page No : 1

Groups Printed- Passenger + - Heavy

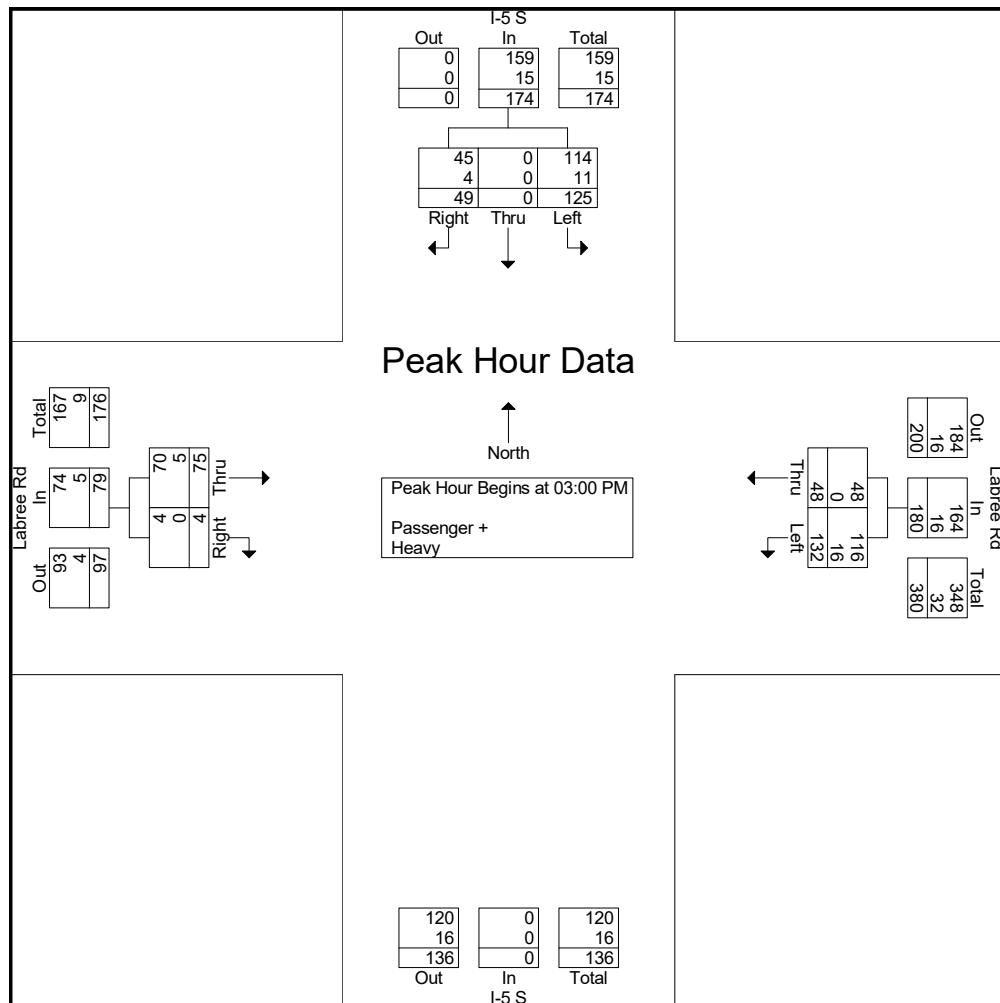
Start Time	I-5 S Southbound				Labree Rd Westbound			Labree Rd Eastbound			Int. Total
	Right	Thru	Left	App. Total	Thru	Left	App. Total	Right	Thru	App. Total	
03:00 PM	15	0	37	52	8	29	37	2	20	22	111
03:15 PM	8	0	32	40	20	35	55	0	16	16	111
03:30 PM	11	0	27	38	15	43	58	1	17	18	114
03:45 PM	15	0	29	44	5	25	30	1	22	23	97
Total	49	0	125	174	48	132	180	4	75	79	433
04:00 PM	10	0	33	43	11	23	34	5	12	17	94
04:15 PM	10	0	44	54	9	17	26	3	20	23	103
04:30 PM	23	0	40	63	15	35	50	0	12	12	125
04:45 PM	15	0	41	56	4	9	13	0	22	22	91
Total	58	0	158	216	39	84	123	8	66	74	413
05:00 PM	11	0	42	53	6	24	30	4	21	25	108
05:15 PM	10	2	47	59	9	9	18	3	23	26	103
05:30 PM	13	0	43	56	7	12	19	0	19	19	94
05:45 PM	7	0	33	40	5	8	13	2	13	15	68
Total	41	2	165	208	27	53	80	9	76	85	373
Grand Total	148	2	448	598	114	269	383	21	217	238	1219
Apprch %	24.7	0.3	74.9		29.8	70.2		8.8	91.2		
Total %	12.1	0.2	36.8	49.1	9.4	22.1	31.4	1.7	17.8	19.5	
Passenger +	128	2	429	559	114	241	355	17	207	224	1138
% Passenger +	86.5	100	95.8	93.5	100	89.6	92.7	81	95.4	94.1	93.4
Heavy	20	0	19	39	0	28	28	4	10	14	81
% Heavy	13.5	0	4.2	6.5	0	10.4	7.3	19	4.6	5.9	6.6

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858f
Site Code : 00004858
Start Date : 3/10/2022
Page No : 2

Start Time	I-5 S Southbound				Labree Rd Westbound			Labree Rd Eastbound			Int. Total
	Right	Thru	Left	App. Total	Thru	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 03:00 PM											
03:00 PM	15	0	37	52	8	29	37	2	20	22	111
03:15 PM	8	0	32	40	20	35	55	0	16	16	111
03:30 PM	11	0	27	38	15	43	58	1	17	18	114
03:45 PM	15	0	29	44	5	25	30	1	22	23	97
Total Volume	49	0	125	174	48	132	180	4	75	79	433
% App. Total	28.2	0	71.8		26.7	73.3		5.1	94.9		
PHF	.817	.000	.845	.837	.600	.767	.776	.500	.852	.859	.950
Passenger +	45	0	114	159	48	116	164	4	70	74	397
% Passenger +	91.8	0	91.2	91.4	100	87.9	91.1	100	93.3	93.7	91.7
Heavy	4	0	11	15	0	16	16	0	5	5	36
% Heavy	8.2	0	8.8	8.6	0	12.1	8.9	0	6.7	6.3	8.3



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858e
Site Code : 00004858
Start Date : 3/10/2022
Page No : 1

Groups Printed- Passenger + - Heavy

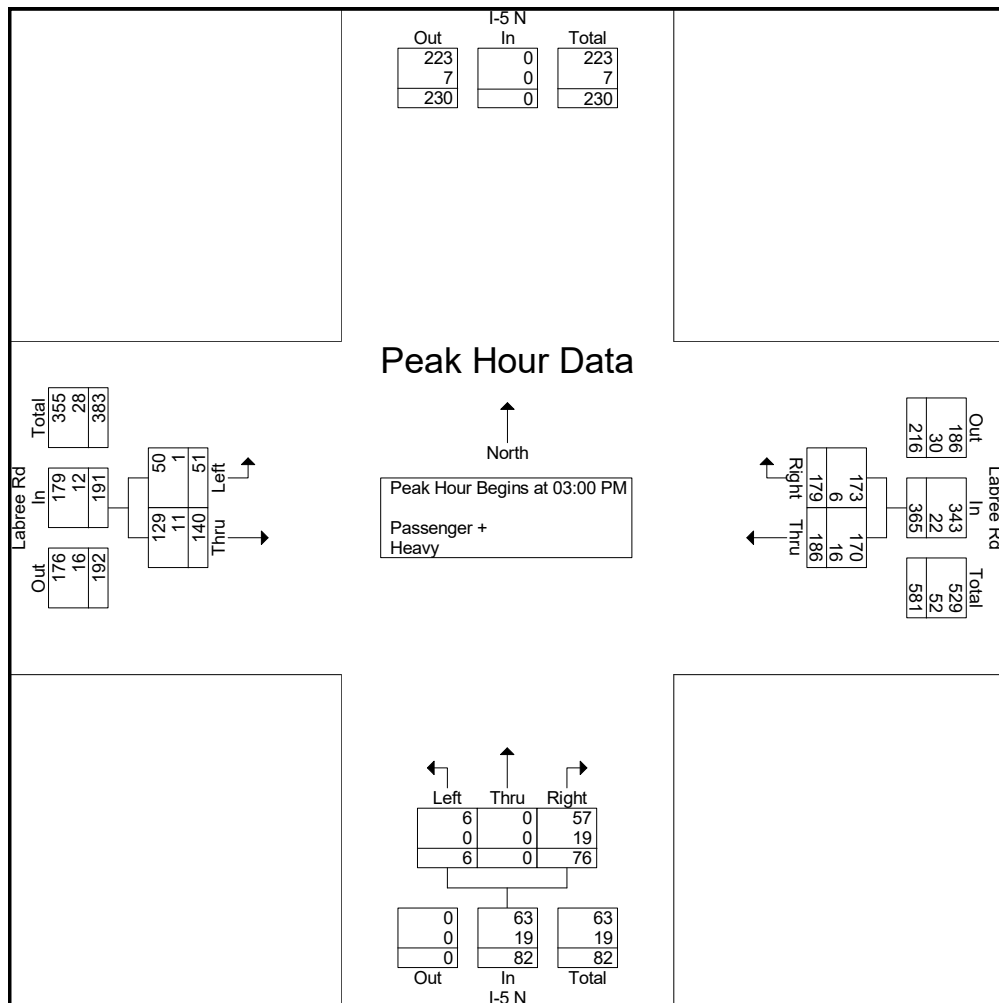
Start Time	Labree Rd Westbound			I-5 N Northbound				Labree Rd Eastbound			Int. Total
	Right	Thru	App. Total	Right	Thru	Left	App. Total	Thru	Left	App. Total	
03:00 PM	27	38	65	28	0	1	29	48	10	58	152
03:15 PM	46	57	103	17	0	2	19	36	13	49	171
03:30 PM	73	60	133	14	0	2	16	27	8	35	184
03:45 PM	33	31	64	17	0	1	18	29	20	49	131
Total	179	186	365	76	0	6	82	140	51	191	638
04:00 PM	35	31	66	7	1	1	9	44	14	58	133
04:15 PM	30	27	57	4	0	1	5	52	14	66	128
04:30 PM	39	58	97	10	1	3	14	46	11	57	168
04:45 PM	32	13	45	13	0	2	15	47	15	62	122
Total	136	129	265	34	2	7	43	189	54	243	551
05:00 PM	28	28	56	16	0	4	20	43	18	61	137
05:15 PM	33	20	53	17	1	0	18	53	19	72	143
05:30 PM	27	15	42	8	0	2	10	41	17	58	110
05:45 PM	12	11	23	11	1	1	13	39	10	49	85
Total	100	74	174	52	2	7	61	176	64	240	475
Grand Total	415	389	804	162	4	20	186	505	169	674	1664
Apprch %	51.6	48.4		87.1	2.2	10.8		74.9	25.1		
Total %	24.9	23.4	48.3	9.7	0.2	1.2	11.2	30.3	10.2	40.5	
Passenger +	400	362	762	128	3	16	147	486	165	651	1560
% Passenger +	96.4	93.1	94.8	79	75	80	79	96.2	97.6	96.6	93.8
Heavy	15	27	42	34	1	4	39	19	4	23	104
% Heavy	3.6	6.9	5.2	21	25	20	21	3.8	2.4	3.4	6.2

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858e
Site Code : 00004858
Start Date : 3/10/2022
Page No : 2

Start Time	Labree Rd Westbound			I-5 N Northbound				Labree Rd Eastbound			Int. Total
	Right	Thru	App. Total	Right	Thru	Left	App. Total	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 03:00 PM											
03:00 PM	27	38	65	28	0	1	29	48	10	58	152
03:15 PM	46	57	103	17	0	2	19	36	13	49	171
03:30 PM	73	60	133	14	0	2	16	27	8	35	184
03:45 PM	33	31	64	17	0	1	18	29	20	49	131
Total Volume	179	186	365	76	0	6	82	140	51	191	638
% App. Total	49	51		92.7	0	7.3		73.3	26.7		
PHF	.613	.775	.686	.679	.000	.750	.707	.729	.638	.823	.867
Passenger +	173	170	343	57	0	6	63	129	50	179	585
% Passenger +	96.6	91.4	94.0	75.0	0	100	76.8	92.1	98.0	93.7	91.7
Heavy	6	16	22	19	0	0	19	11	1	12	53
% Heavy	3.4	8.6	6.0	25.0	0	0	23.2	7.9	2.0	6.3	8.3



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PO Box 397
Puyallup, WA 98371

File Name : 4858b
Site Code : 00004858
Start Date : 3/10/2022
Page No : 1

Groups Printed- Passenger + - Heavy

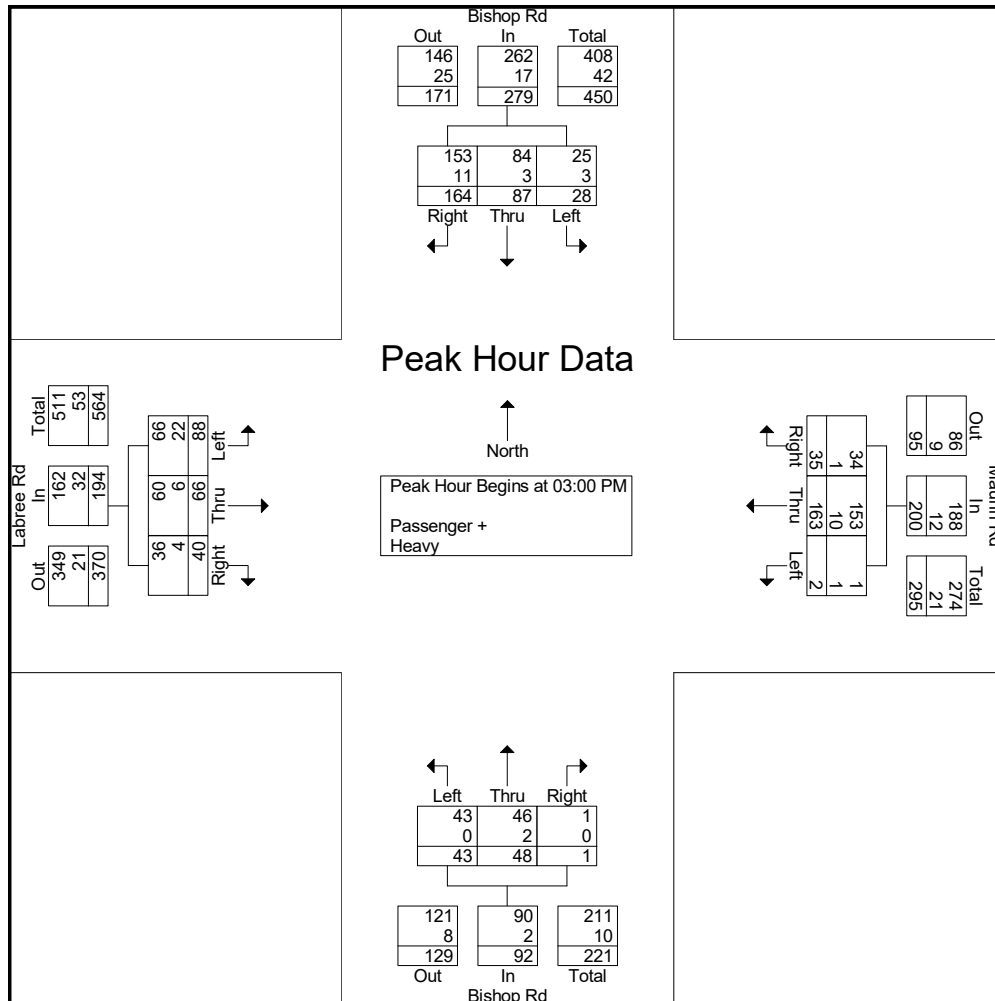
Start Time	Bishop Rd Southbound				Maurin Rd Westbound				Bishop Rd Northbound				Labree Rd Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
03:00 PM	37	19	10	66	5	17	1	23	0	17	11	28	5	23	30	58	175
03:15 PM	59	27	8	94	7	42	0	49	0	8	14	22	10	18	22	50	215
03:30 PM	45	27	4	76	13	79	1	93	0	8	9	17	16	10	19	45	231
03:45 PM	23	14	6	43	10	25	0	35	1	15	9	25	9	15	17	41	144
Total	164	87	28	279	35	163	2	200	1	48	43	92	40	66	88	194	765
04:00 PM	32	19	7	58	2	21	0	23	0	6	13	19	18	18	14	50	150
04:15 PM	17	13	3	33	9	25	0	34	2	4	13	19	19	30	10	59	145
04:30 PM	45	15	3	63	4	24	1	29	0	11	17	28	20	24	16	60	180
04:45 PM	11	13	5	29	1	18	1	20	0	3	10	13	23	20	15	58	120
Total	105	60	18	183	16	88	2	106	2	24	53	79	80	92	55	227	595
05:00 PM	17	10	6	33	1	22	0	23	1	3	13	17	17	26	16	59	132
05:15 PM	16	8	6	30	1	17	0	18	1	6	17	24	22	31	13	66	138
05:30 PM	10	5	0	15	6	18	0	24	0	5	13	18	14	19	9	42	99
05:45 PM	11	5	1	17	1	7	0	8	0	4	4	8	21	20	10	51	84
Total	54	28	13	95	9	64	0	73	2	18	47	67	74	96	48	218	453
Grand Total	323	175	59	557	60	315	4	379	5	90	143	238	194	254	191	639	1813
Apprch %	58	31.4	10.6		15.8	83.1	1.1		2.1	37.8	60.1		30.4	39.7	29.9		
Total %	17.8	9.7	3.3	30.7	3.3	17.4	0.2	20.9	0.3	5	7.9	13.1	10.7	14	10.5	35.2	
Passenger +	306	170	54	530	59	294	3	356	5	88	140	233	188	234	162	584	1703
% Passenger +	94.7	97.1	91.5	95.2	98.3	93.3	75	93.9	100	97.8	97.9	97.9	96.9	92.1	84.8	91.4	93.9
Heavy	17	5	5	27	1	21	1	23	0	2	3	5	6	20	29	55	110
% Heavy	5.3	2.9	8.5	4.8	1.7	6.7	25	6.1	0	2.2	2.1	2.1	3.1	7.9	15.2	8.6	6.1

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858b
Site Code : 00004858
Start Date : 3/10/2022
Page No : 2

Start Time	Bishop Rd Southbound				Maurin Rd Westbound				Bishop Rd Northbound				Labree Rd Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	37	19	10	66	5	17	1	23	0	17	11	28	5	23	30	58	175
03:15 PM	59	27	8	94	7	42	0	49	0	8	14	22	10	18	22	50	215
03:30 PM	45	27	4	76	13	79	1	93	0	8	9	17	16	10	19	45	231
03:45 PM	23	14	6	43	10	25	0	35	1	15	9	25	9	15	17	41	144
Total Volume	164	87	28	279	35	163	2	200	1	48	43	92	40	66	88	194	765
% App. Total	58.8	31.2	10		17.5	81.5	1		1.1	52.2	46.7		20.6	34	45.4		
PHF	.695	.806	.700	.742	.673	.516	.500	.538	.250	.706	.768	.821	.625	.717	.733	.836	.828
Passenger +	153	84	25	262	34	153	1	188	1	46	43	90	36	60	66	162	702
% Passenger +	93.3	96.6	89.3	93.9	97.1	93.9	50.0	94.0	100	95.8	100	97.8	90.0	90.9	75.0	83.5	91.8
Heavy	11	3	3	17	1	10	1	12	0	2	0	2	4	6	22	32	63
% Heavy	6.7	3.4	10.7	6.1	2.9	6.1	50.0	6.0	0	4.2	0	2.2	10.0	9.1	25.0	16.5	8.2



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858c
Site Code : 00004858
Start Date : 3/10/2022
Page No : 1

Groups Printed- Passenger + - Heavy

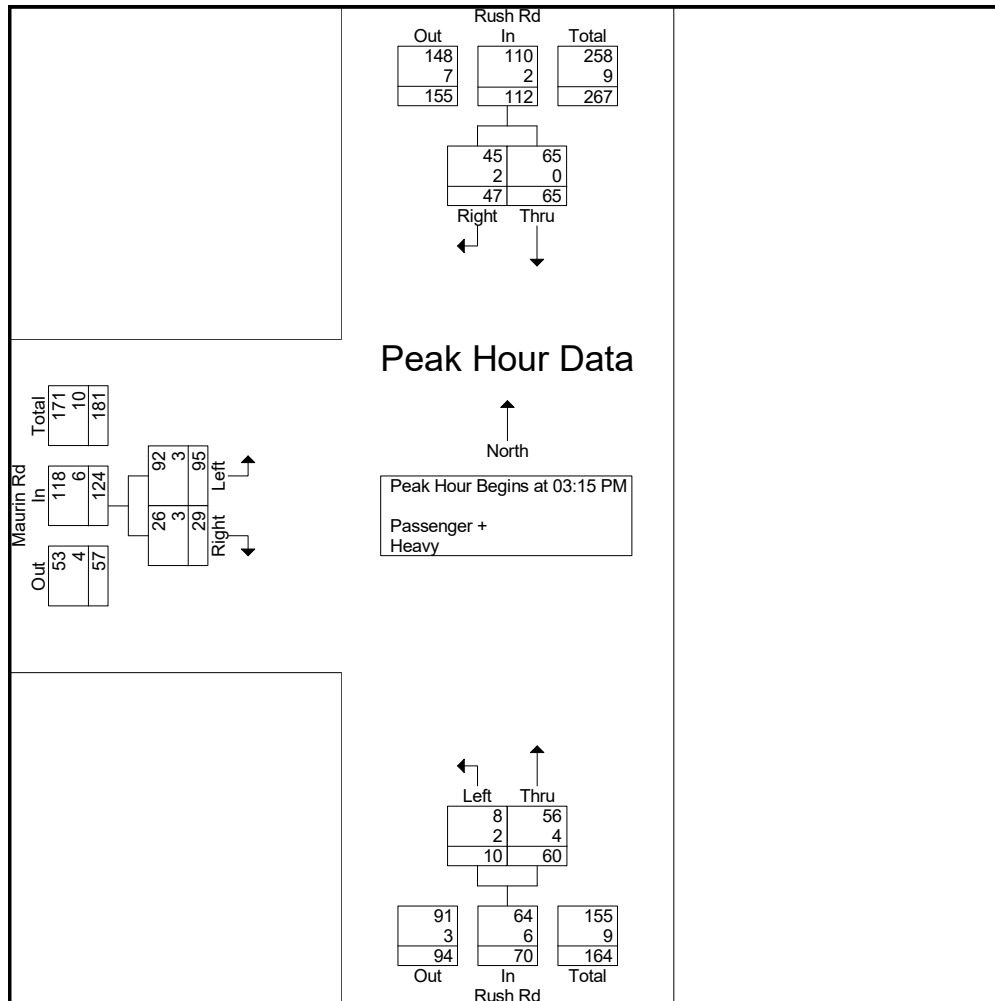
Start Time	Rush Rd Southbound			Rush Rd Northbound			Maurin Rd Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
03:00 PM	14	19	33	9	3	12	3	14	17	62
03:15 PM	9	12	21	17	3	20	3	26	29	70
03:30 PM	15	12	27	14	2	16	15	29	44	87
03:45 PM	13	24	37	14	3	17	5	13	18	72
Total	51	67	118	54	11	65	26	82	108	291
04:00 PM	10	17	27	15	2	17	6	27	33	77
04:15 PM	16	14	30	10	7	17	5	17	22	69
04:30 PM	12	27	39	12	5	17	4	20	24	80
04:45 PM	18	18	36	14	6	20	1	12	13	69
Total	56	76	132	51	20	71	16	76	92	295
05:00 PM	16	17	33	10	3	13	2	26	28	74
05:15 PM	16	12	28	15	4	19	6	13	19	66
05:30 PM	13	13	26	12	0	12	2	21	23	61
05:45 PM	11	16	27	13	1	14	0	17	17	58
Total	56	58	114	50	8	58	10	77	87	259
Grand Total	163	201	364	155	39	194	52	235	287	845
Apprch %	44.8	55.2		79.9	20.1		18.1	81.9		
Total %	19.3	23.8	43.1	18.3	4.6	23	6.2	27.8	34	
Passenger +	160	201	361	151	34	185	47	230	277	823
% Passenger +	98.2	100	99.2	97.4	87.2	95.4	90.4	97.9	96.5	97.4
Heavy	3	0	3	4	5	9	5	5	10	22
% Heavy	1.8	0	0.8	2.6	12.8	4.6	9.6	2.1	3.5	2.6

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PO Box 397
Puyallup, WA 98371

File Name : 4858c
Site Code : 00004858
Start Date : 3/10/2022
Page No : 2

Start Time	Rush Rd Southbound			Rush Rd Northbound			Maurin Rd Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:15 PM										
03:15 PM	9	12	21	17	3	20	3	26	29	70
03:30 PM	15	12	27	14	2	16	15	29	44	87
03:45 PM	13	24	37	14	3	17	5	13	18	72
04:00 PM	10	17	27	15	2	17	6	27	33	77
Total Volume	47	65	112	60	10	70	29	95	124	306
% App. Total	42	58		85.7	14.3		23.4	76.6		
PHF	.783	.677	.757	.882	.833	.875	.483	.819	.705	.879
Passenger +	45	65	110	56	8	64	26	92	118	292
% Passenger +	95.7	100	98.2	93.3	80.0	91.4	89.7	96.8	95.2	95.4
Heavy	2	0	2	4	2	6	3	3	6	14
% Heavy	4.3	0	1.8	6.7	20.0	8.6	10.3	3.2	4.8	4.6



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4858d
Site Code : 00004858
Start Date : 3/10/2022
Page No : 1

Groups Printed- Passenger + - Heavy

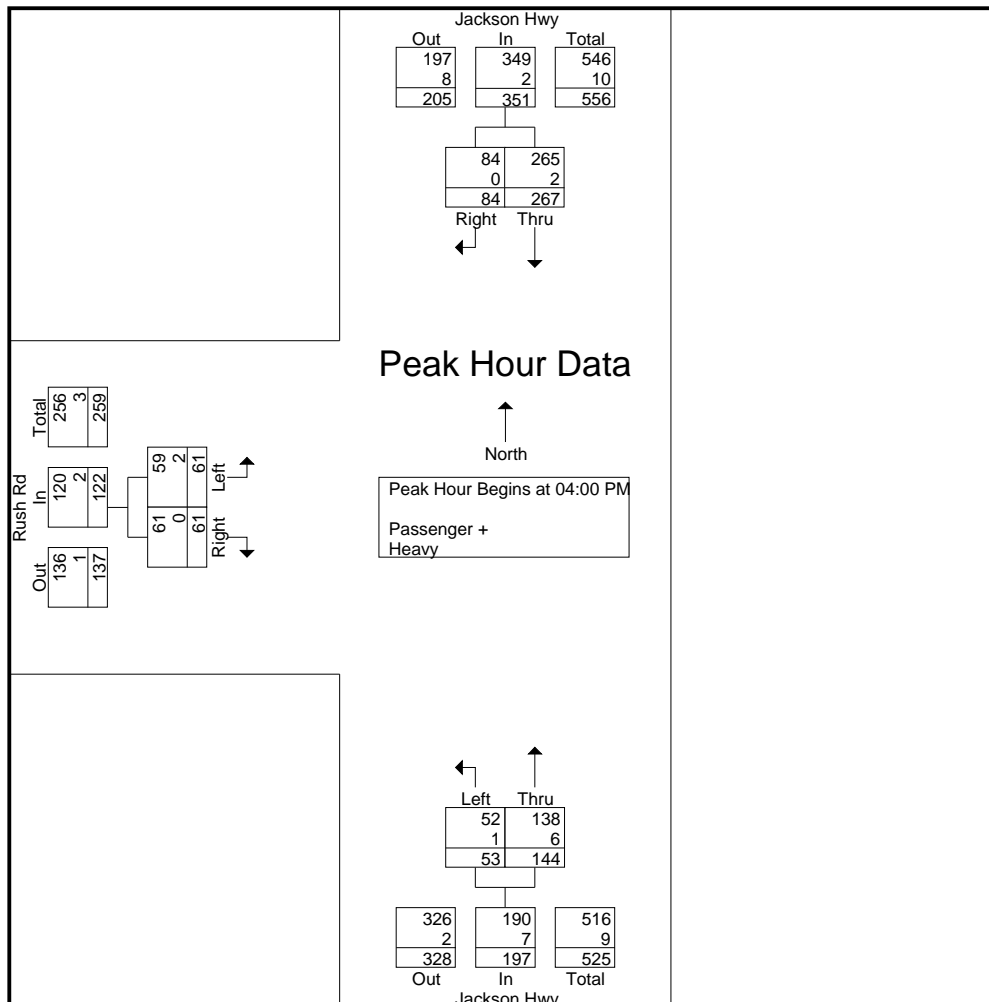
Start Time	Jackson Hwy Southbound			Jackson Hwy Northbound			Rush Rd Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
03:00 PM	20	56	76	27	13	40	14	21	35	151
03:15 PM	10	63	73	41	10	51	23	16	39	163
03:30 PM	12	49	61	37	13	50	22	22	44	155
03:45 PM	25	61	86	33	9	42	15	18	33	161
Total	67	229	296	138	45	183	74	77	151	630
04:00 PM	20	65	85	37	11	48	22	20	42	175
04:15 PM	16	71	87	29	15	44	12	14	26	157
04:30 PM	27	57	84	38	11	49	16	15	31	164
04:45 PM	21	74	95	40	16	56	11	12	23	174
Total	84	267	351	144	53	197	61	61	122	670
05:00 PM	19	54	73	31	13	44	17	16	33	150
05:15 PM	13	71	84	39	14	53	16	12	28	165
05:30 PM	12	49	61	36	14	50	17	10	27	138
05:45 PM	19	41	60	22	11	33	15	13	28	121
Total	63	215	278	128	52	180	65	51	116	574
Grand Total	214	711	925	410	150	560	200	189	389	1874
Apprch %	23.1	76.9		73.2	26.8		51.4	48.6		
Total %	11.4	37.9	49.4	21.9	8	29.9	10.7	10.1	20.8	
Passenger +	214	706	920	400	147	547	197	177	374	1841
% Passenger +	100	99.3	99.5	97.6	98	97.7	98.5	93.7	96.1	98.2
Heavy	0	5	5	10	3	13	3	12	15	33
% Heavy	0	0.7	0.5	2.4	2	2.3	1.5	6.3	3.9	1.8

Heath & Associates

PO Box 397
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File Name : 4858d
Site Code : 00004858
Start Date : 3/10/2022
Page No : 2

Start Time	Jackson Hwy Southbound			Jackson Hwy Northbound			Rush Rd Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	20	65	85	37	11	48	22	20	42	175
04:15 PM	16	71	87	29	15	44	12	14	26	157
04:30 PM	27	57	84	38	11	49	16	15	31	164
04:45 PM	21	74	95	40	16	56	11	12	23	174
Total Volume	84	267	351	144	53	197	61	61	122	670
% App. Total	23.9	76.1		73.1	26.9		50	50		
PHF	.778	.902	.924	.900	.828	.879	.693	.763	.726	.957
Passenger +	84	265	349	138	52	190	61	59	120	659
% Passenger +	100	99.3	99.4	95.8	98.1	96.4	100	96.7	98.4	98.4
Heavy	0	2	2	6	1	7	0	2	2	11
% Heavy	0	0.7	0.6	4.2	1.9	3.6	0	3.3	1.6	1.6



High-Cube Transload and Short-Term Storage Warehouse (154)

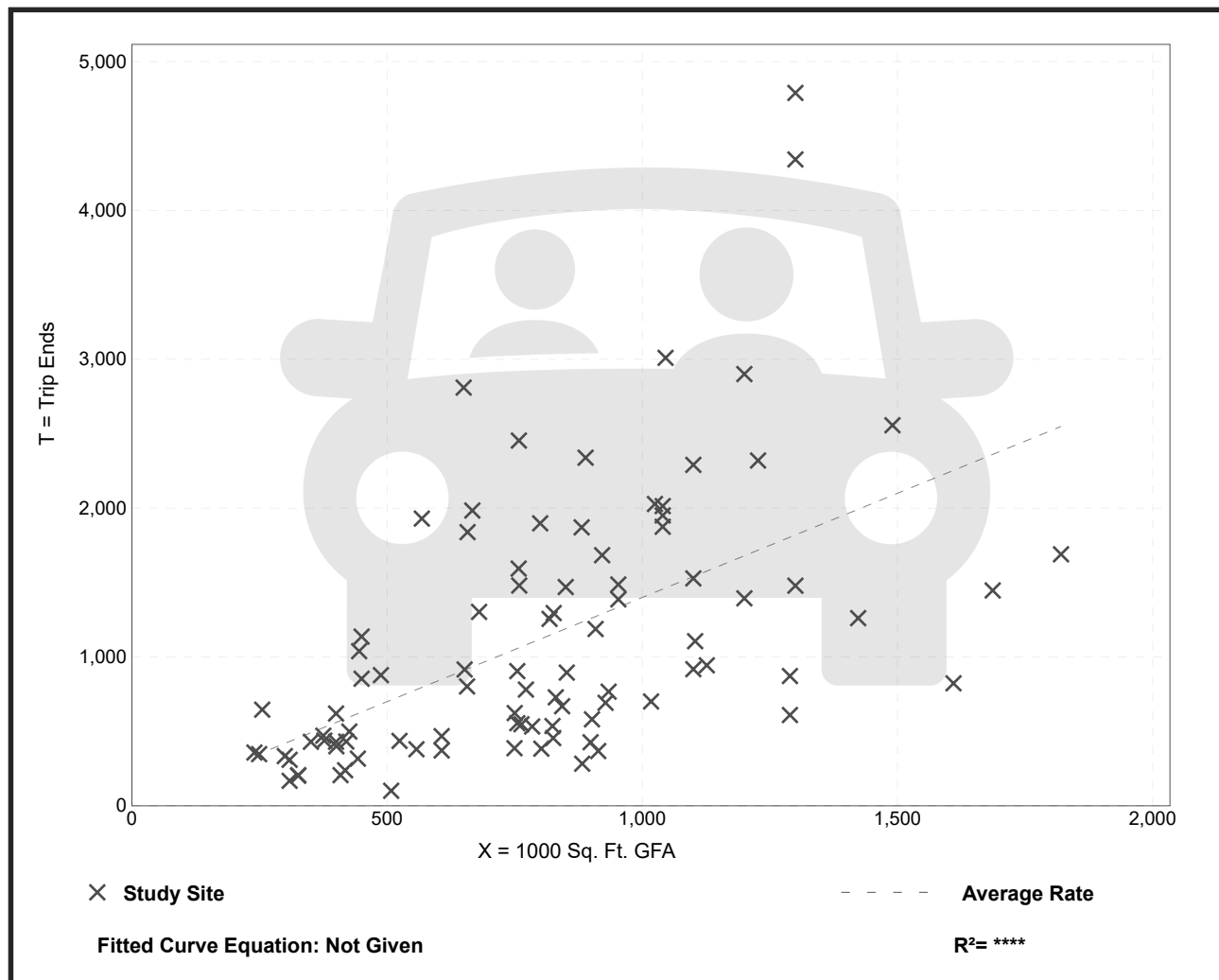
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 91
Avg. 1000 Sq. Ft. GFA: 798
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.40	0.20 - 4.32	0.86

Data Plot and Equation



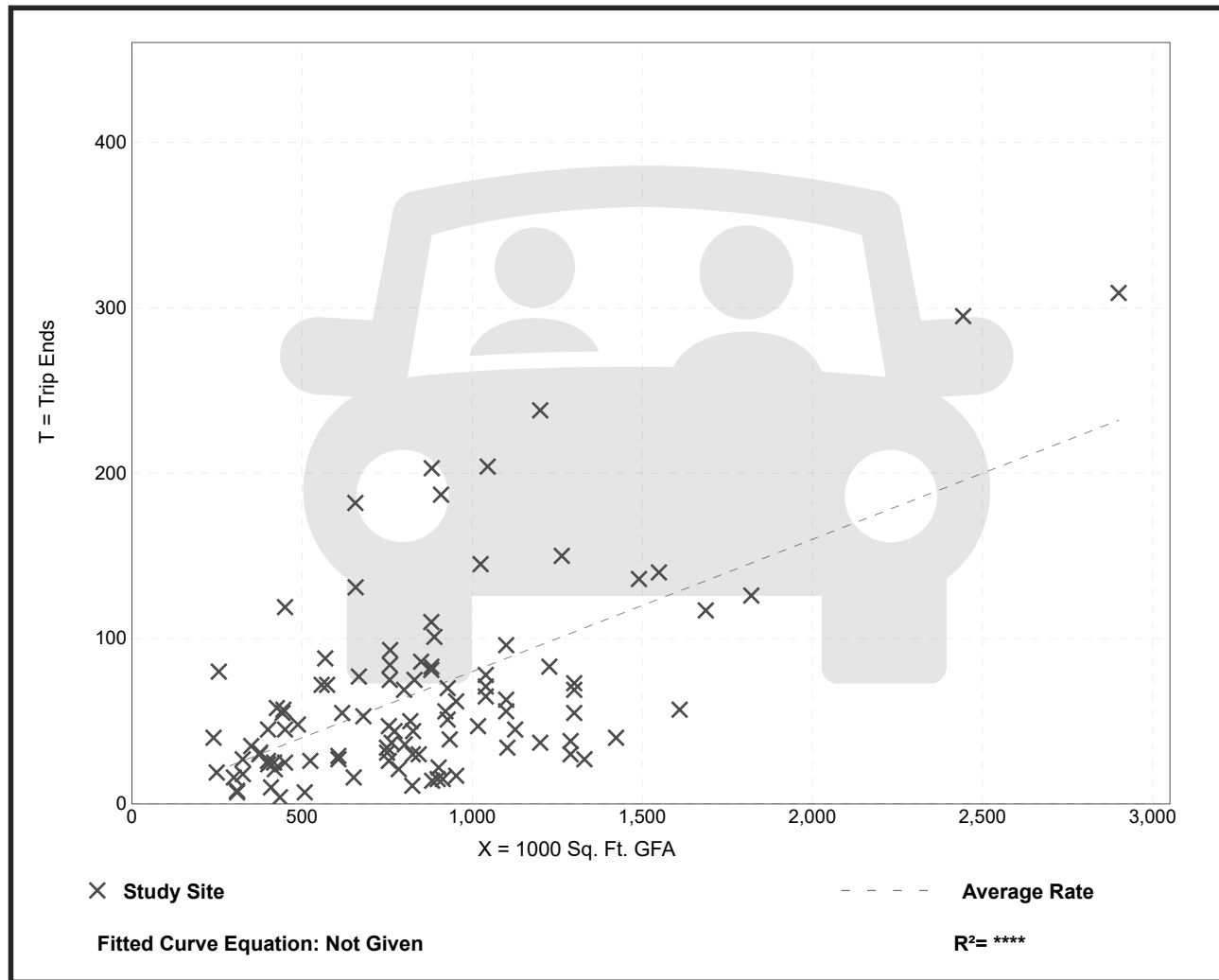
High-Cube Transload and Short-Term Storage Warehouse (154)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 102
 Avg. 1000 Sq. Ft. GFA: 846
 Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.08	0.01 - 0.31	0.05

Data Plot and Equation



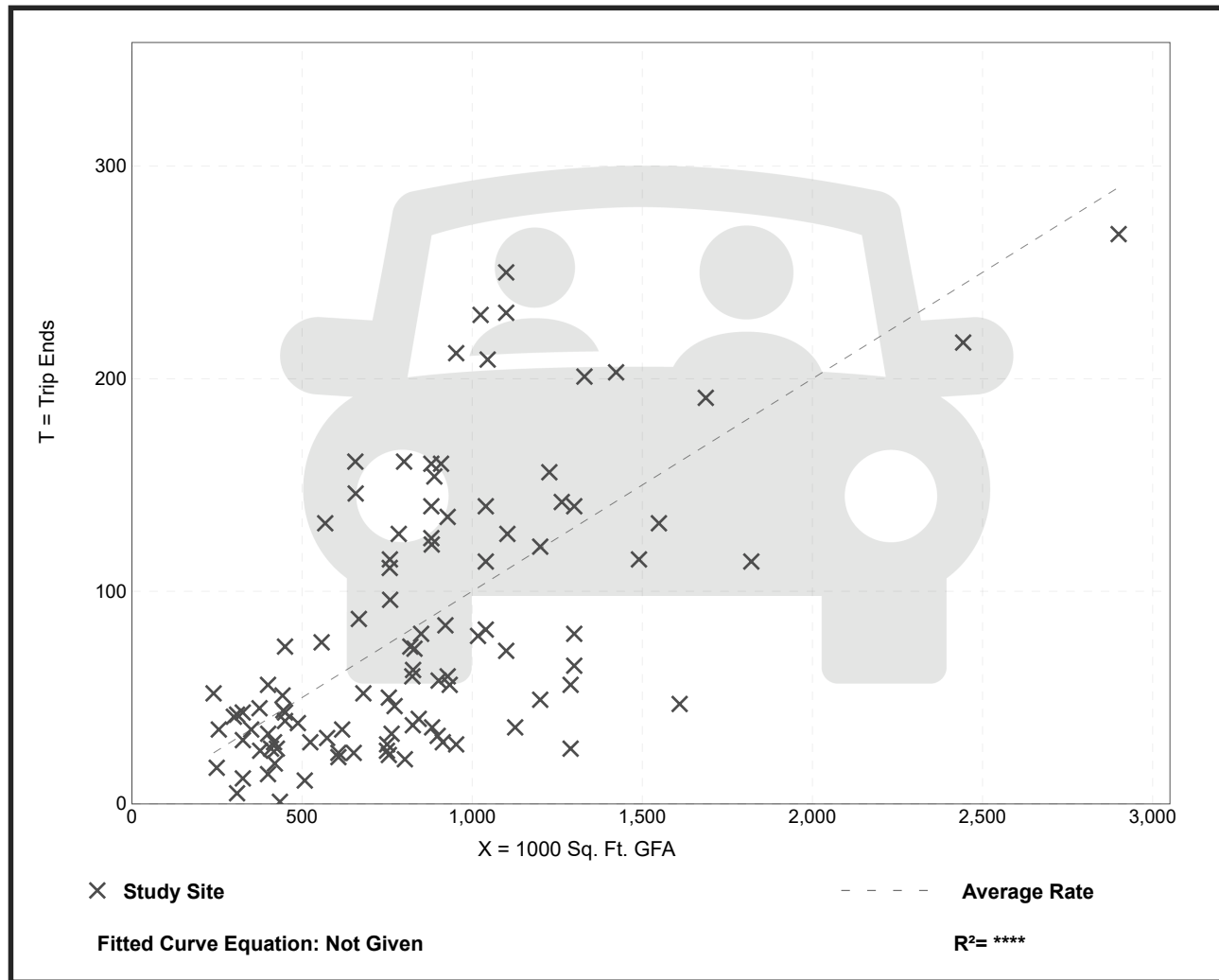
High-Cube Transload and Short-Term Storage Warehouse (154)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 103
 Avg. 1000 Sq. Ft. GFA: 840
 Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.10	0.00 - 0.25	0.06

Data Plot and Equation



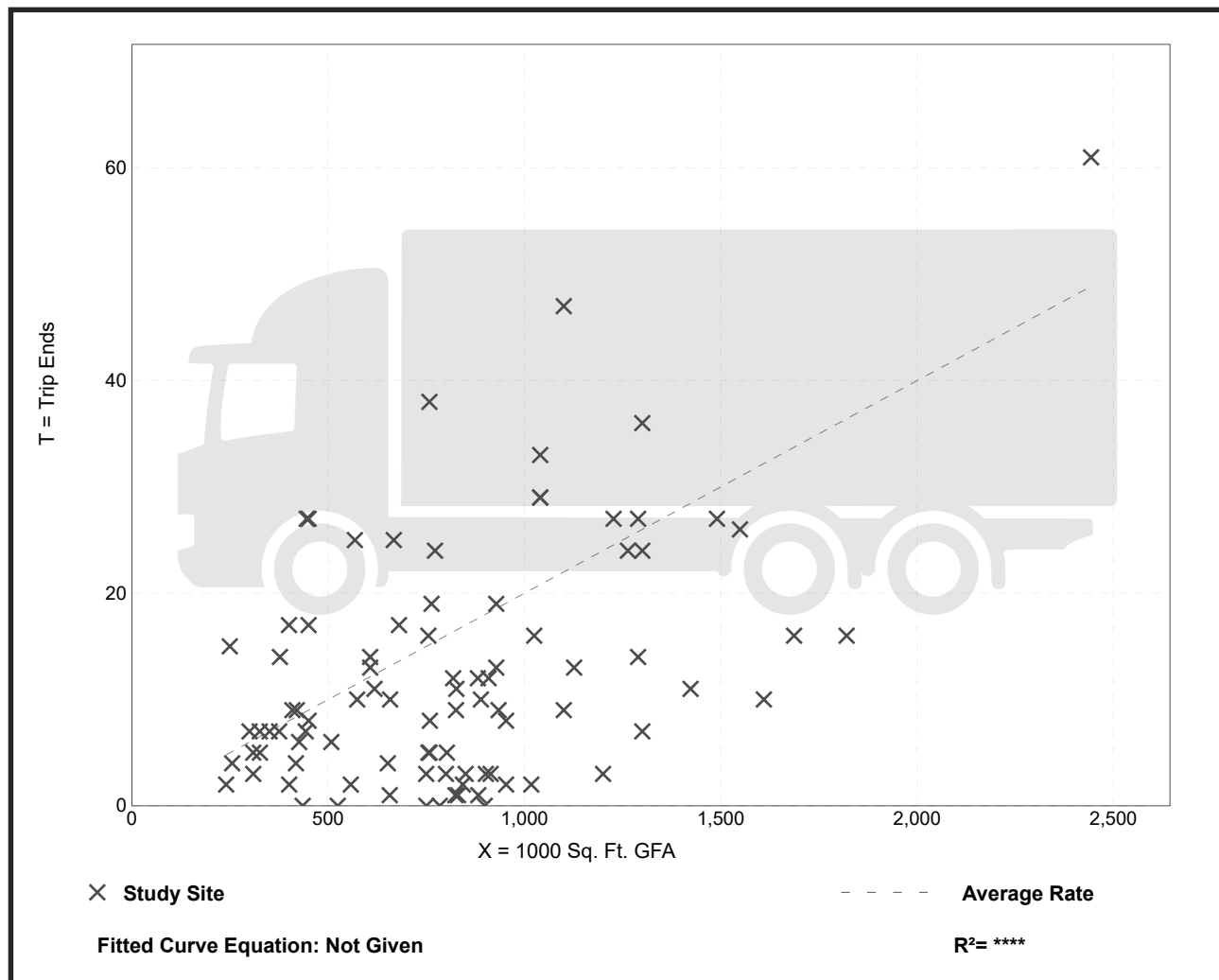
High-Cube Transload and Short-Term Storage Warehouse (154)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 90
 Avg. 1000 Sq. Ft. GFA: 812
 Directional Distribution: 49% entering, 51% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.02	0.00 - 0.06	0.01

Data Plot and Equation



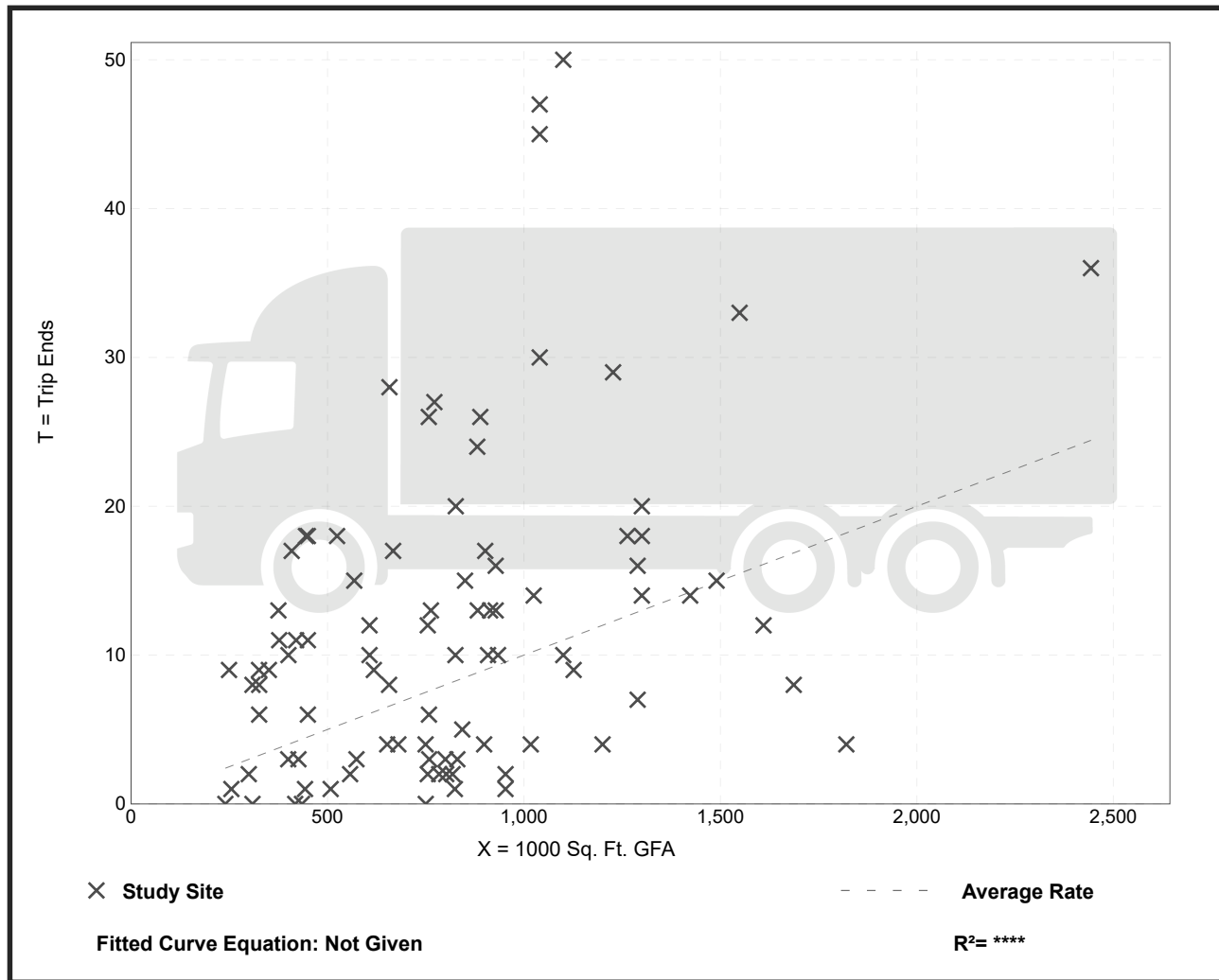
High-Cube Transload and Short-Term Storage Warehouse (154)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 91
 Avg. 1000 Sq. Ft. GFA: 807
 Directional Distribution: 47% entering, 53% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

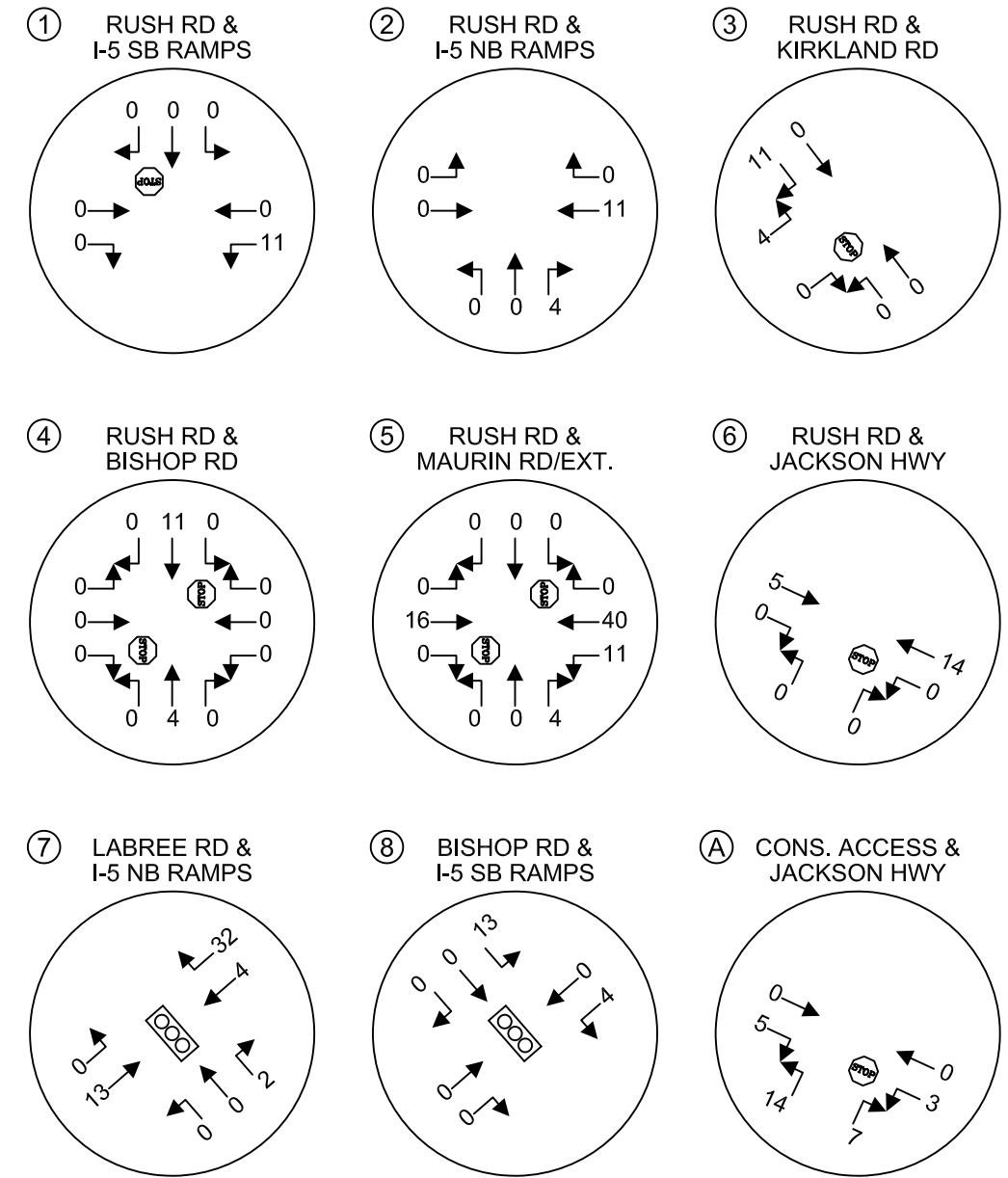
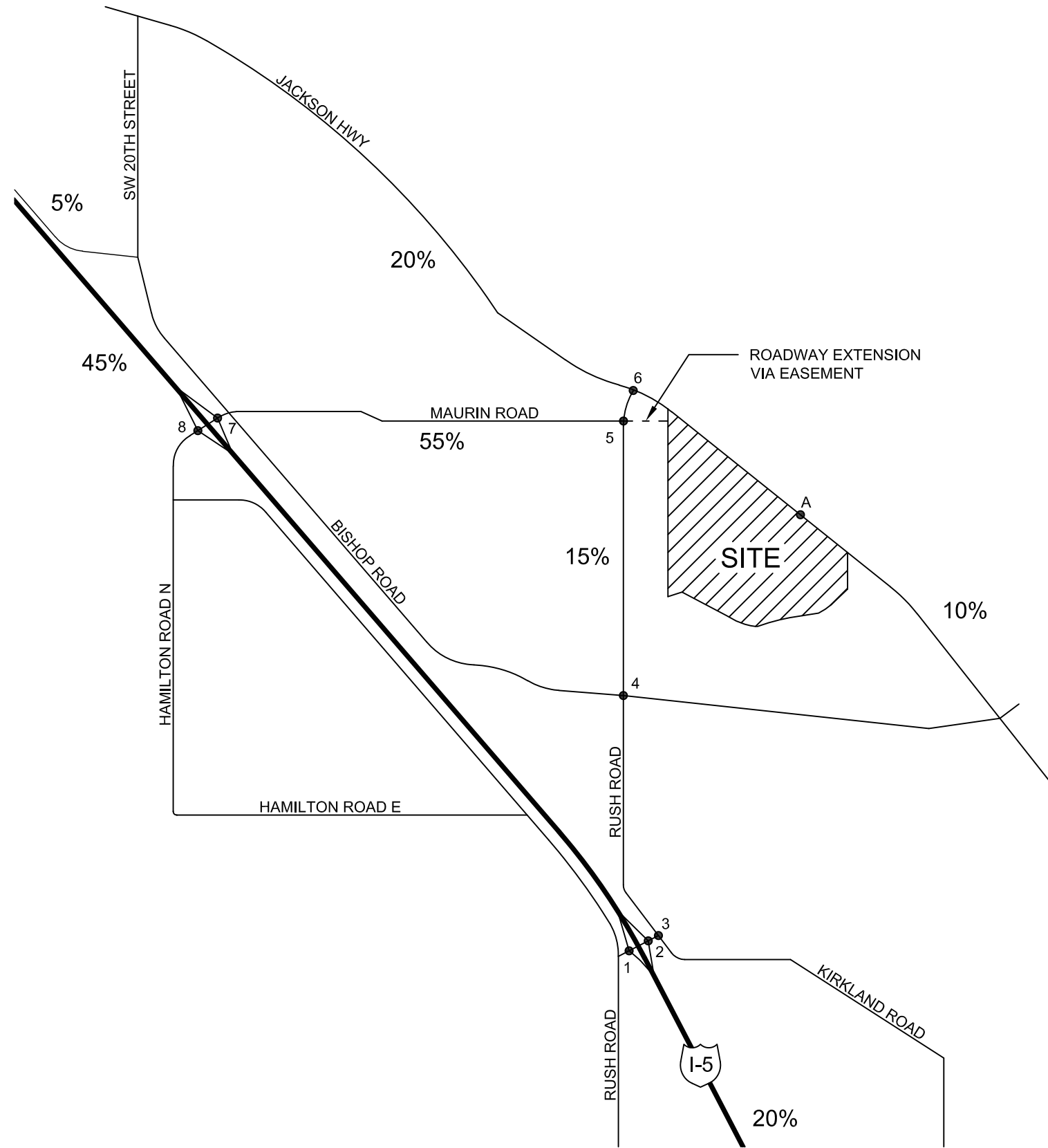
Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.05	0.01

Data Plot and Equation

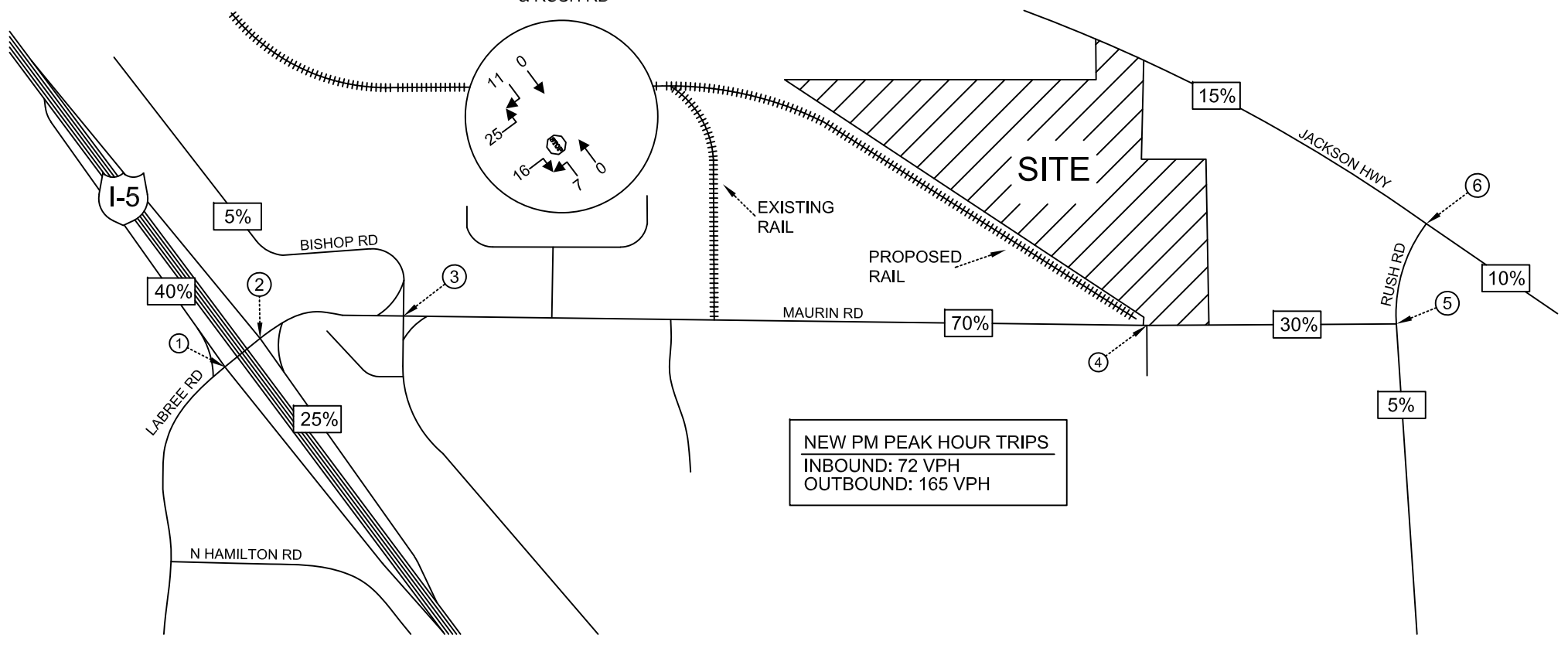
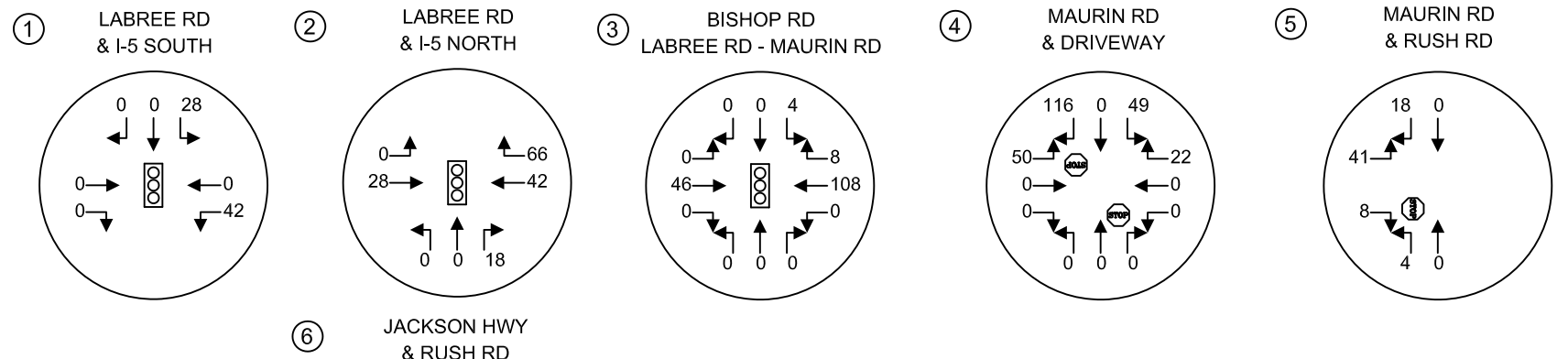


PORT OF CHEHALIS
TRAFFIC IMPACT ANALYSIS

PIPELINE PROJECTS
APPENDIX



NEW PM PEAK HOUR TRIPS
 INBOUND: 28 VPH
 OUTBOUND: 72 VPH



1. Labree Road & I-5 SB Ramps

PM Peak Hour

Pipeline Volume Summations

	←	↓	↘	↙	←	↓	↘	↙	↑	↗	→	↘
1. Jackson Hwy Warehouse			13				4					
2. Port 17 Chehalis			28			42						
Totals	0	0	41	0	0	46	0	0	0	0	0	0

* Pipeline Projects:

1. Jackson Highway Warehouse (with easement)
2. Port 17 Chehalis

2. Labree Road & I-5 NB Ramps

PM Peak Hour

Pipeline Volume Summations

	←	↓	↘	↙	←	↓	↘	↙	↑	↗	→	↘
1. Jackson Hwy Warehouse				32	4		2					13
2. Port 17 Chehalis				66	42		18					28
Totals	0	0	0	98	46	0	20	0	0	0	0	41

3. Labree Rd/Maurin Rd & Bishop Rd

PM Peak Hour

Pipeline Volume Summations

	←	↓	↘	↙	←	↓	↘	↙	↑	↗	→	↘
1. Jackson Hwy Warehouse				1	4	36						15
2. Port 17 Chehalis				4	8	108						47
Totals	0	0	5	12	144	0	0	0	0	0	0	62

4. Rush Road & Maurin Road/Project Access

PM Peak Hour

Pipeline Volume Summations

	←	↓	↘	↙	←	↓	↘	↙	↑	↗	→	↘
1. Jackson Hwy Warehouse					40	11	4					16
2. Port 17 Chehalis	18										8	41
Totals	18	0	0	0	40	11	4	0	0	0	8	41

5. Rush Road & Jackson Highway

PM Peak Hour

Pipeline Volume Summations

	←	↓	↘	↙	←	↓	↘	↙	↑	↗	→	↘
1. Jackson Hwy Warehouse		5							14			
2. Port 17 Chehalis	11								7	16		25
Totals	11	5	0	0	0	0	0	0	14	7	16	25

Peak Hour Forecast Intersection Volumes

Annual Growth Rate: 2 % 0.05 Covid Adjust. **2027**
 # of Years to Horizon: 5

PM

*Pipeline Projects

- 1. Jackson Highway Warehouse-(with easement)
- 2. Port 17 Chehalis

1. Labree Road & I-5 S Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing 2022	49	0	125	0	48	132	0	0	0	4	75	0
Baseline 2022	51	0	131	0	50	139	0	0	0	4	79	0
Project Trips	0	0	7	0	0	0	0	0	0	0	0	0
Pipeline	0	0	41	0	0	46	0	0	0	0	0	0
Without	54	0	179	0	53	192	0	0	0	4	83	0
With	54	0	186	0	53	192	0	0	0	4	83	0

2. Labree Road & I-5 N Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing 2022	0	0	0	179	186	0	76	0	6	0	140	51
Baseline 2022	0	0	0	188	195	0	80	0	6	0	147	54
Project Trips	0	0	0	17	0	0	0	0	0	0	7	0
Pipeline	0	0	0	98	46	0	20	0	0	0	41	0
Without	0	0	0	306	262	0	108	0	7	0	203	59
With	0	0	0	323	262	0	108	0	7	0	210	59

3. Bishop Road & Labree Road/Maurin Road

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing 2022	164	87	28	35	163	2	1	48	43	40	66	88
Baseline 2022	172	91	29	37	171	2	1	50	45	42	69	92
Project Trips	0	0	1	2	17	0	0	0	0	0	7	0
Pipeline	0	0	5	12	148	0	0	0	0	0	62	0
Without	190	101	37	53	337	2	1	56	50	46	139	102
With	190	101	38	55	354	2	1	56	50	46	146	102

4. Maurin Road & Rush Road-Access Intersection

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing 2022	47	65	0	0	0	0	0	60	10	29	0	95
Baseline 2022	49	68	0	0	0	0	0	63	11	30	0	100
Project Trips	0	0	4	12	19	7	3	0	0	0	8	0
Pipeline	18	0	0	0	40	11	4	0	0	8	16	41
Without	72	75	0	0	40	11	4	70	12	42	16	151
With	72	75	4	12	59	18	7	70	12	42	24	151

5. Jackson Highway & Rush Road

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing 2022	84	267	0	0	0	0	0	144	53	61	0	61
Baseline 2022	88	280	0	0	0	0	0	151	56	64	0	64
Project Trips	3	0	0	0	0	0	0	0	1	4	0	8
Pipeline	11	5	0	0	0	0	0	14	7	16	0	25
Without	108	315	0	0	0	0	0	181	68	87	0	96
With	111	315	0	0	0	0	0	181	69	91	0	104

Lanes, Volumes, Timings
1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd

Existing PM Peak Hour
07/04/2022
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑		↔↔	↑↑					↔	↔	↔
Traffic Volume (vph)	0	79	4	139	50	0	0	0	0	131	0	51
Future Volume (vph)	0	79	4	139	50	0	0	0	0	131	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.86	0.86	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00		1.00						1.00	1.00	0.99
Frt		0.993										0.850
Flt Protected				0.950						0.950	0.950	
Satd. Flow (prot)	0	6075	0	3127	3539	0	0	0	0	1573	1573	1495
Flt Permitted				0.950						0.950	0.950	
Satd. Flow (perm)	0	6075	0	3117	3539	0	0	0	0	1572	1570	1474
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4										55
Link Speed (mph)		35		35				35			35	
Link Distance (ft)		715		308				906			529	
Travel Time (s)		13.9		6.0				17.6			10.3	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	12%	2%	2%	2%	2%	2%	9%	2%	8%
Adj. Flow (vph)	0	83	4	146	53	0	0	0	0	138	0	54
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	87	0	146	53	0	0	0	0	69	69	54
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		2		1	6					7	4	
Permitted Phases												4
Total Split (s)		29.0		39.0	68.0					52.0	52.0	52.0
Total Lost Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Act Effct Green (s)		34.9		34.5	74.8					39.3	38.0	47.5
Actuated g/C Ratio		0.29		0.29	0.62					0.33	0.32	0.40
v/c Ratio		0.05		0.16	0.02					0.13	0.14	0.09
Control Delay		35.7		14.2	1.9					24.8	23.9	6.2
Queue Delay		0.0		0.0	0.0					0.0	0.0	0.0
Total Delay		35.7		14.2	1.9					24.8	23.9	6.2
LOS		D		B	A					C	C	A
Approach Delay		35.7			10.9							19.2
Approach LOS		D			B							B
Queue Length 50th (ft)		15		44	1					34	34	0
Queue Length 95th (ft)		27		71	2					69	69	25
Internal Link Dist (ft)		635			228			826			449	
Turn Bay Length (ft)												
Base Capacity (vph)		1769		899	2205					622	498	616
Starvation Cap Reductn		0		0	0					0	0	0
Spillback Cap Reductn		0		0	0					0	0	0
Storage Cap Reductn		0		0	0					0	0	0
Reduced v/c Ratio		0.05		0.16	0.02					0.11	0.14	0.09

Intersection Summary

Area Type: Other
Cycle Length: 120

Lanes, Volumes, Timings
 2: I-5 NB Off-Ramp/I-5 NB On-Ramp & Labree Rd

Existing PM Peak Hour
 07/04/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  							
Traffic Volume (vph)	54	147	0	0	195	188	6	0	80	0	0	0
Future Volume (vph)	54	147	0	0	195	188	6	0	80	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		325	325		250	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.86	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.99	1.00	1.00				
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3433	3343	0	0	5996	1568	1681	1681	1292	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3425	3343	0	0	5996	1546	1679	1678	1292	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						216			92			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		308			1105			711				460
Travel Time (s)		6.0			21.5			16.2				10.5
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	8%	2%	2%	9%	3%	2%	2%	25%	2%	2%	2%
Adj. Flow (vph)	62	169	0	0	224	216	7	0	92	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	62	169	0	0	224	216	3	4	92	0	0	0
Turn Type	Prot	NA			NA	Perm	Prot	NA	Prot			
Protected Phases	5	2			6		3	8	8			
Permitted Phases						6						
Total Split (s)	27.0	83.0			56.0	56.0	37.0	37.0	37.0			
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	4.5			
Act Effct Green (s)	19.1	78.5			56.9	56.9	11.0	6.5	32.5			
Actuated g/C Ratio	0.16	0.65			0.47	0.47	0.09	0.05	0.27			
v/c Ratio	0.11	0.08			0.08	0.26	0.02	0.04	0.22			
Control Delay	37.5	6.0			19.1	3.5	41.7	33.0	8.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	37.5	6.0			19.1	3.5	41.7	33.0	8.1			
LOS	D	A			B	A	D	C	A			
Approach Delay		14.5			11.5			10.1				
Approach LOS		B			B			B				
Queue Length 50th (ft)	14	14			29	0	2	~6	0			
Queue Length 95th (ft)	28	20			41	40	10	11	37			
Internal Link Dist (ft)		228			1025			631				380
Turn Bay Length (ft)						325	325		250			
Base Capacity (vph)	643	2186			2843	846	455	91	417			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.10	0.08			0.08	0.26	0.01	0.04	0.22			

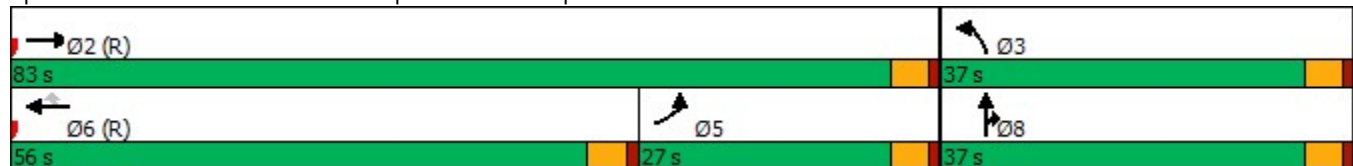
1. Existing PM Peak Hour 9:31 am 11/25/2020 Baseline

Synchro 11 Light Report
 Page 1









Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.26
Intersection Signal Delay:	12.2
Intersection LOS:	B
Intersection Capacity Utilization	45.4%
ICU Level of Service	A
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: I-5 NB Off-Ramp/I-5 NB On-Ramp & Labree Rd



Splits and Phases: 3: Bishop Rd & Labree Rd/Maurin Rd

 Ø1 9.5 s	 Ø2 23.5 s	 Ø3 9.5 s	 Ø4 22.5 s
 Ø5 10.5 s	 Ø6 22.5 s	 Ø7 9.5 s	 Ø8 22.5 s

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	100	30	11	63	68	49
Future Vol, veh/h	100	30	11	63	68	49
Conflicting Peds, #/hr	1	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	100	2	12	2	2	4
Mvmt Flow	108	32	12	68	73	53

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	194	102	127	0	-
Stage 1	101	-	-	-	-
Stage 2	93	-	-	-	-
Critical Hdwy	7.4	6.22	4.22	-	-
Critical Hdwy Stg 1	6.4	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-
Follow-up Hdwy	4.4	3.318	2.308	-	-
Pot Cap-1 Maneuver	617	953	1399	-	-
Stage 1	727	-	-	-	-
Stage 2	734	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	610	951	1398	-	-
Mov Cap-2 Maneuver	610	-	-	-	-
Stage 1	720	-	-	-	-
Stage 2	733	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1398	-	665	-	-
HCM Lane V/C Ratio	0.008	-	0.21	-	-
HCM Control Delay (s)	7.6	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	64	56	151	280	88
Future Vol, veh/h	64	64	56	151	280	88
Conflicting Peds, #/hr	1	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	3	2	2	4	2	2
Mvmt Flow	67	67	58	157	292	92

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	613	340	385	0	-	0
Stage 1	339	-	-	-	-	-
Stage 2	274	-	-	-	-	-
Critical Hdwy	6.43	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	454	702	1173	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	770	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	429	701	1172	-	-	-
Mov Cap-2 Maneuver	429	-	-	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	2.2	0
HCM LOS	B		

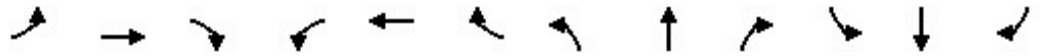
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1172	-	429	701	-	-
HCM Lane V/C Ratio	0.05	-	0.155	0.095	-	-
HCM Control Delay (s)	8.2	0	14.9	10.7	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	0.3	-	-

Lanes, Volumes, Timings

Forecast 2027 PM Peak Hour Without Project

1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd

07/04/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑		↔↔	↑↑					↔	↔	↔
Traffic Volume (vph)	0	83	4	192	53	0	0	0	0	179	0	54
Future Volume (vph)	0	83	4	192	53	0	0	0	0	179	0	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.86	0.86	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00		1.00						1.00	1.00	0.99
Frt		0.993										0.850
Flt Protected				0.950						0.950	0.950	
Satd. Flow (prot)	0	6074	0	3127	3539	0	0	0	0	1573	1573	1495
Flt Permitted				0.950						0.950	0.950	
Satd. Flow (perm)	0	6074	0	3117	3539	0	0	0	0	1572	1570	1474
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4										57
Link Speed (mph)		35			35			35				35
Link Distance (ft)		715			308			906				529
Travel Time (s)		13.9			6.0			17.6				10.3
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	12%	2%	2%	2%	2%	2%	9%	2%	8%
Adj. Flow (vph)	0	87	4	202	56	0	0	0	0	188	0	57
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	91	0	202	56	0	0	0	0	94	94	57
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		2		1	6					7	4	
Permitted Phases												4
Total Split (s)		29.0		39.0	68.0					52.0	52.0	52.0
Total Lost Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Act Effct Green (s)		24.5		34.5	63.5					47.5	47.5	47.5
Actuated g/C Ratio		0.20		0.29	0.53					0.40	0.40	0.40
v/c Ratio		0.07		0.22	0.03					0.15	0.15	0.09
Control Delay		37.1		14.8	1.9					24.2	24.2	6.2
Queue Delay		0.0		0.0	0.0					0.0	0.0	0.0
Total Delay		37.1		14.8	1.9					24.2	24.2	6.2
LOS		D		B	A					C	C	A
Approach Delay		37.1			12.0							20.0
Approach LOS		D			B							C
Queue Length 50th (ft)		15		62	1					48	48	0
Queue Length 95th (ft)		28		94	2					88	88	27
Internal Link Dist (ft)		635			228			826				449
Turn Bay Length (ft)												
Base Capacity (vph)		1243		899	1872					622	622	617
Starvation Cap Reductn		0		0	0					0	0	0
Spillback Cap Reductn		0		0	0					0	0	0
Storage Cap Reductn		0		0	0					0	0	0
Reduced v/c Ratio		0.07		0.22	0.03					0.15	0.15	0.09

Intersection Summary

Area Type: Other

Cycle Length: 120

Lanes, Volumes, Timings
 1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd

Forecast 2027 PM Peak Hour Without Project

07/04/2022

Actuated Cycle Length: 120

Offset: 94 (78%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.22

Intersection Signal Delay: 19.2

Intersection LOS: B

Intersection Capacity Utilization 49.5%

ICU Level of Service A

























Analysis Period (min) 15

Splits and Phases: 1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd



Lanes, Volumes, Timings
2: I-5 NB Off-Ramp/I-5 NB On-Ramp & Labree Rd

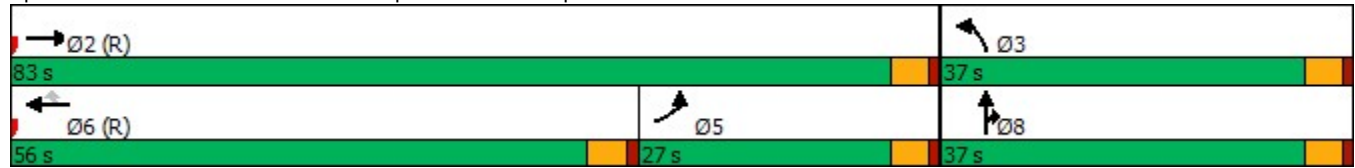
Forecast 2027 PM Peak Hour Without Project
07/04/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			   							
Traffic Volume (vph)	59	203	0	0	262	306	7	0	108	0	0	0
Future Volume (vph)	59	203	0	0	262	306	7	0	108	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		325	325		250	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.86	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.99	1.00	1.00				
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3433	3343	0	0	5996	1568	1681	1681	1292	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3426	3343	0	0	5996	1546	1679	1678	1292	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						360			127			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		308			1105			711				460
Travel Time (s)		6.0			21.5			16.2				10.5
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	2%	8%	2%	2%	9%	3%	2%	2%	25%	2%	2%	2%
Adj. Flow (vph)	69	239	0	0	308	360	8	0	127	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	69	239	0	0	308	360	4	4	127	0	0	0
Turn Type	Prot	NA			NA	Perm	Prot	NA	Prot			
Protected Phases	5	2			6		3	8	8			
Permitted Phases						6						
Total Split (s)	27.0	83.0			56.0	56.0	37.0	37.0	37.0			
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	4.5			
Act Effct Green (s)	19.2	78.5			56.9	56.9	11.1	6.5	32.5			
Actuated g/C Ratio	0.16	0.65			0.47	0.47	0.09	0.05	0.27			
v/c Ratio	0.13	0.11			0.11	0.39	0.03	0.04	0.29			
Control Delay	36.6	6.7			19.2	3.5	42.3	33.0	7.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.6	6.7			19.2	3.5	42.3	33.0	7.5			
LOS	D	A			B	A	D	C	A			
Approach Delay		13.4			10.8			9.3				
Approach LOS		B			B			A				
Queue Length 50th (ft)	15	22			40	0	3	~6	0			
Queue Length 95th (ft)	27	29			53	42	11	11	41			
Internal Link Dist (ft)		228			1025			631				380
Turn Bay Length (ft)						325	325		250			
Base Capacity (vph)	643	2186			2843	921	455	91	442			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.11	0.11			0.11	0.39	0.01	0.04	0.29			

Intersection Summary

























Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.39
Intersection Signal Delay:	11.3
Intersection LOS:	B
Intersection Capacity Utilization	49.5%
ICU Level of Service	A
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: I-5 NB Off-Ramp/I-5 NB On-Ramp & Labree Rd



Lanes, Volumes, Timings
3: Bishop Rd & Labree Rd/Maurin Rd









Forecast 2027 PM Peak Hour Without Project
06/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	139	46	2	337	53	50	56	1	37	101	190
Future Volume (vph)	102	139	46	2	337	53	50	56	1	37	101	190
Satd. Flow (prot)	1444	3312	1468	1203	3406	1568	1770	1827	1583	1626	1845	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1443	3312	1436	1202	3406	1534	1768	1827	1563	1625	1845	1490
Satd. Flow (RTOR)			176			176			176			229
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	25%	9%	10%	50%	6%	3%	2%	4%	2%	11%	3%	7%
Adj. Flow (vph)	123	167	55	2	406	64	60	67	1	45	122	229
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	167	55	2	406	64	60	67	1	45	122	229
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Total Split (s)	10.5	23.5	23.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	6.3	21.3	21.3	5.2	11.7	11.7	5.2	10.6	10.6	5.2	8.8	8.8
Actuated g/C Ratio	0.14	0.46	0.46	0.11	0.25	0.25	0.11	0.23	0.23	0.11	0.19	0.19
v/c Ratio	0.62	0.11	0.07	0.01	0.47	0.12	0.30	0.16	0.00	0.24	0.35	0.49
Control Delay	42.0	10.5	0.2	24.0	17.6	0.5	27.1	17.4	0.0	26.6	21.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	10.5	0.2	24.0	17.6	0.5	27.1	17.4	0.0	26.6	21.0	7.4
LOS	D	B	A	C	B	A	C	B	A	C	C	A
Approach Delay		20.1			15.3			21.8			13.8	
Approach LOS		C			B			C			B	
Queue Length 50th (ft)	34	13	0	1	53	0	16	12	0	12	31	0
Queue Length 95th (ft)	#113	38	0	6	87	0	48	43	0	39	69	37
Internal Link Dist (ft)		1447			605			768			523	
Turn Bay Length (ft)	205		250	330		330	200		200	400		400
Base Capacity (vph)	198	1544	763	137	1401	734	202	751	746	185	759	747
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.11	0.07	0.01	0.29	0.09	0.30	0.09	0.00	0.24	0.16	0.31

Intersection Summary

Cycle Length: 65
 Actuated Cycle Length: 45.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 16.7
 Intersection LOS: B
 Intersection Capacity Utilization 36.9%
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Bishop Rd & Labree Rd/Maurin Rd

 Ø1 9.5 s	 Ø2 23.5 s	 Ø3 9.5 s	 Ø4 22.5 s
 Ø5 10.5 s	 Ø6 22.5 s	 Ø7 9.5 s	 Ø8 22.5 s

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	151	16	42	11	40	0	12	70	4	0	75	72
Future Vol, veh/h	151	16	42	11	40	0	12	70	4	0	75	72
Conflicting Peds, #/hr	1	0	1	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	2	10	10	5	2	20	7	2	2	2	4
Mvmt Flow	172	18	48	13	45	0	14	80	5	0	85	82

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	261	240	128	271	279	84	168	0	0	85	0	0
Stage 1	127	127	-	111	111	-	-	-	-	-	-	-
Stage 2	134	113	-	160	168	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.52	6.3	7.2	6.55	6.22	4.3	-	-	4.12	-	-
Critical Hdwy Stg 1	6.13	5.52	-	6.2	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.52	-	6.2	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.018	3.39	3.59	4.045	3.318	2.38	-	-	2.218	-	-
Pot Cap-1 Maneuver	690	661	901	666	624	975	1308	-	-	1512	-	-
Stage 1	874	791	-	875	798	-	-	-	-	-	-	-
Stage 2	867	802	-	824	754	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	644	653	899	611	617	974	1307	-	-	1512	-	-
Mov Cap-2 Maneuver	644	653	-	611	617	-	-	-	-	-	-	-
Stage 1	864	790	-	865	789	-	-	-	-	-	-	-
Stage 2	807	793	-	762	753	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13		11.5		1.1		0	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1307	-	-	684	616	1512	-	-
HCM Lane V/C Ratio	0.01	-	-	0.347	0.094	-	-	-
HCM Control Delay (s)	7.8	0	-	13	11.5	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.6	0.3	0	-	-

Intersection						
Int Delay, s/veh	3.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	87	68	181	315	108
Future Vol, veh/h	96	87	68	181	315	108
Conflicting Peds, #/hr	1	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	3	2	2	4	2	2
Mvmt Flow	100	91	71	189	328	113

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	718	387	442	0	-	0
Stage 1	386	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.43	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	394	661	1118	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	365	660	1117	-	-	-
Mov Cap-2 Maneuver	365	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	2.3	0
HCM LOS	C		

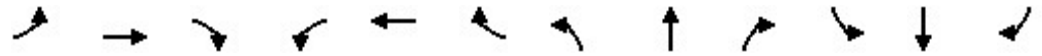
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1117	-	365	660	-	-
HCM Lane V/C Ratio	0.063	-	0.274	0.137	-	-
HCM Control Delay (s)	8.4	0	18.5	11.3	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	0.5	-	-

Lanes, Volumes, Timings

Forecast 2027 PM Peak Hour With Project

1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd

07/04/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑		↔↔	↑↑					↔	↔	↔
Traffic Volume (vph)	0	83	4	192	53	0	0	0	0	186	0	54
Future Volume (vph)	0	83	4	192	53	0	0	0	0	186	0	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.86	0.86	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00		1.00						1.00	1.00	0.99
Frt		0.993										0.850
Flt Protected				0.950						0.950	0.950	
Satd. Flow (prot)	0	6074	0	3127	3539	0	0	0	0	1573	1573	1495
Flt Permitted				0.950						0.950	0.950	
Satd. Flow (perm)	0	6074	0	3117	3539	0	0	0	0	1572	1570	1474
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4										57
Link Speed (mph)		35		35				35			35	
Link Distance (ft)		715		308				906			529	
Travel Time (s)		13.9		6.0				17.6			10.3	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	12%	2%	2%	2%	2%	2%	9%	2%	8%
Adj. Flow (vph)	0	87	4	202	56	0	0	0	0	196	0	57
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	91	0	202	56	0	0	0	0	98	98	57
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		2		1	6					7	4	
Permitted Phases												4
Total Split (s)		29.0		39.0	68.0					52.0	52.0	52.0
Total Lost Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Act Effct Green (s)		24.5		34.5	63.5					47.5	47.5	47.5
Actuated g/C Ratio		0.20		0.29	0.53					0.40	0.40	0.40
v/c Ratio		0.07		0.22	0.03					0.16	0.16	0.09
Control Delay		37.1		14.8	1.9					24.3	24.3	6.2
Queue Delay		0.0		0.0	0.0					0.0	0.0	0.0
Total Delay		37.1		14.8	1.9					24.3	24.3	6.2
LOS		D		B	A					C	C	A
Approach Delay		37.1			12.0						20.2	
Approach LOS		D			B						C	
Queue Length 50th (ft)		15		62	1					50	50	0
Queue Length 95th (ft)		28		94	2					91	91	27
Internal Link Dist (ft)		635			228			826			449	
Turn Bay Length (ft)												
Base Capacity (vph)		1243		899	1872					622	622	617
Starvation Cap Reductn		0		0	0					0	0	0
Spillback Cap Reductn		0		0	0					0	0	0
Storage Cap Reductn		0		0	0					0	0	0
Reduced v/c Ratio		0.07		0.22	0.03					0.16	0.16	0.09

Intersection Summary

Area Type: Other

Cycle Length: 120

Lanes, Volumes, Timings
 1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd

Forecast 2027 PM Peak Hour Without Project

07/04/2022

Actuated Cycle Length: 120

Offset: 94 (78%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.22

Intersection Signal Delay: 19.3

Intersection LOS: B

Intersection Capacity Utilization 50.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: I-5 SB On-Ramp/I-5 SB Off-Ramp & Labree Rd



Lanes, Volumes, Timings
2: I-5 NB Off-Ramp/I-5 NB On-Ramp & Labree Rd

Forecast 2027 PM Peak Hour With Project
07/04/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	210	0	0	262	323	7	0	108	0	0	0
Future Volume (vph)	59	210	0	0	262	323	7	0	108	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		325	325		250	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.86	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.99	1.00	1.00				
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3433	3343	0	0	5996	1538	1681	1681	1292	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3426	3343	0	0	5996	1517	1679	1678	1292	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						380			127			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		308			1105			711				460
Travel Time (s)		6.0			21.5			16.2				10.5
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	2%	8%	2%	2%	9%	5%	2%	2%	25%	2%	2%	2%
Adj. Flow (vph)	69	247	0	0	308	380	8	0	127	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	69	247	0	0	308	380	4	4	127	0	0	0
Turn Type	Prot	NA			NA	Perm	Prot	NA	Prot			
Protected Phases	5	2			6		3	8	8			
Permitted Phases						6						
Total Split (s)	27.0	83.0			56.0	56.0	37.0	37.0	37.0			
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	4.5			
Act Effct Green (s)	19.2	78.5			56.9	56.9	11.1	6.5	32.5			
Actuated g/C Ratio	0.16	0.65			0.47	0.47	0.09	0.05	0.27			
v/c Ratio	0.13	0.11			0.11	0.41	0.03	0.04	0.29			
Control Delay	36.5	6.7			19.2	3.6	42.3	33.0	7.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	36.5	6.7			19.2	3.6	42.3	33.0	7.5			
LOS	D	A			B	A	D	C	A			
Approach Delay		13.2			10.6			9.3				
Approach LOS		B			B			A				
Queue Length 50th (ft)	15	23			40	0	3	~6	0			
Queue Length 95th (ft)	28	31			53	43	11	11	41			
Internal Link Dist (ft)		228			1025			631				380
Turn Bay Length (ft)						325	325		250			
Base Capacity (vph)	643	2186			2843	918	455	91	442			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.11	0.11			0.11	0.41	0.01	0.04	0.29			

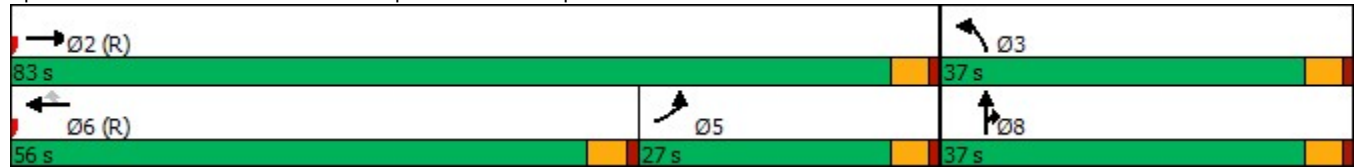
3. Forecast With 10:29 am 07/04/2022

Synchro 11 Light Report
Page 1

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.41
Intersection Signal Delay:	11.3
Intersection LOS:	B
Intersection Capacity Utilization	50.5%
ICU Level of Service	A
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: I-5 NB Off-Ramp/I-5 NB On-Ramp & Labree Rd



Lanes, Volumes, Timings
3: Bishop Rd & Labree Rd/Maurin Rd

Forecast 2027 PM Peak Hour With Project
06/29/2022









Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	146	46	2	354	55	50	56	1	38	101	190
Future Volume (vph)	102	146	46	2	354	55	50	56	1	38	101	190
Satd. Flow (prot)	1444	3312	1468	1203	3406	1568	1770	1827	1583	1626	1845	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1443	3312	1436	1202	3406	1534	1768	1827	1563	1625	1845	1490
Satd. Flow (RTOR)			176			176			176			229
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	25%	9%	10%	50%	6%	3%	2%	4%	2%	11%	3%	7%
Adj. Flow (vph)	123	176	55	2	427	66	60	67	1	46	122	229
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	176	55	2	427	66	60	67	1	46	122	229
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Total Split (s)	10.5	23.5	23.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	6.3	21.6	21.6	5.3	12.0	12.0	5.3	10.6	10.6	5.3	8.8	8.8
Actuated g/C Ratio	0.14	0.47	0.47	0.11	0.26	0.26	0.11	0.23	0.23	0.11	0.19	0.19
v/c Ratio	0.63	0.11	0.07	0.01	0.48	0.12	0.30	0.16	0.00	0.25	0.35	0.49
Control Delay	42.5	10.4	0.2	24.0	17.6	0.5	27.4	17.6	0.0	27.0	21.3	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	10.4	0.2	24.0	17.6	0.5	27.4	17.6	0.0	27.0	21.3	7.5
LOS	D	B	A	C	B	A	C	B	A	C	C	A
Approach Delay		20.0			15.4			22.1			14.0	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)	34	14	0	1	56	0	16	12	0	12	31	0
Queue Length 95th (ft)	#114	40	0	6	91	0	48	43	0	40	70	37
Internal Link Dist (ft)		1447			605			768			523	
Turn Bay Length (ft)	205		250	330		330	200		200	400		400
Base Capacity (vph)	196	1551	766	136	1391	730	200	747	743	184	753	743
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.11	0.07	0.01	0.31	0.09	0.30	0.09	0.00	0.25	0.16	0.31

Intersection Summary

Cycle Length: 65
 Actuated Cycle Length: 46.3
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 16.8
 Intersection LOS: B
 Intersection Capacity Utilization 37.4%
 ICU Level of Service A
 Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Bishop Rd & Labree Rd/Maurin Rd

 Ø1 9.5 s	 Ø2 23.5 s	 Ø3 9.5 s	 Ø4 22.5 s
 Ø5 10.5 s	 Ø6 22.5 s	 Ø7 9.5 s	 Ø8 22.5 s

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	151	24	42	18	59	12	12	70	7	4	75	72
Future Vol, veh/h	151	24	42	18	59	12	12	70	7	4	75	72
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	15	10	10	10	10	20	7	2	2	2	4
Mvmt Flow	172	27	48	20	67	14	14	80	8	5	85	82

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	291	254	128	288	291	86	168	0	0	89	0	0
Stage 1	137	137	-	113	113	-	-	-	-	-	-	-
Stage 2	154	117	-	175	178	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.65	6.3	7.2	6.6	6.3	4.3	-	-	4.12	-	-
Critical Hdwy Stg 1	6.13	5.65	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.65	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.135	3.39	3.59	4.09	3.39	2.38	-	-	2.218	-	-
Pot Cap-1 Maneuver	659	628	901	649	606	951	1308	-	-	1506	-	-
Stage 1	864	759	-	873	787	-	-	-	-	-	-	-
Stage 2	846	774	-	808	737	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	586	617	899	586	596	949	1307	-	-	1505	-	-
Mov Cap-2 Maneuver	586	617	-	586	596	-	-	-	-	-	-	-
Stage 1	854	755	-	863	778	-	-	-	-	-	-	-
Stage 2	753	765	-	734	733	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s	14.3		11.9		1		0.2			
HCM LOS	B		B							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1307	-	-	632	625	1505	-	-
HCM Lane V/C Ratio	0.01	-	-	0.39	0.162	0.003	-	-
HCM Control Delay (s)	7.8	0	-	14.3	11.9	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.8	0.6	0	-	-

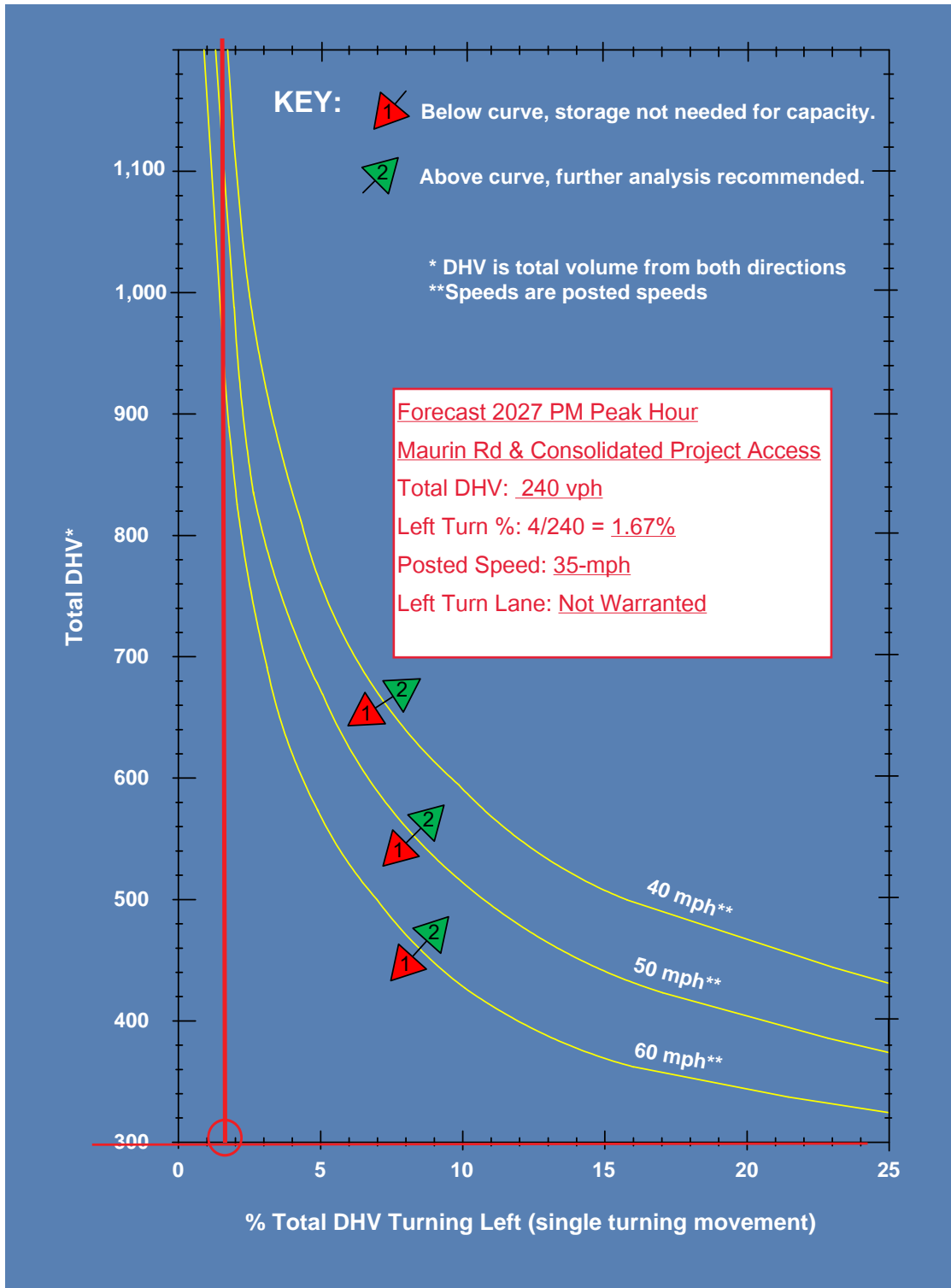
Intersection						
Int Delay, s/veh	4.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	104	91	69	181	315	111
Future Vol, veh/h	104	91	69	181	315	111
Conflicting Peds, #/hr	1	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	10	10	2	4	2	2
Mvmt Flow	108	95	72	189	328	116

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	721	388	445	0	-	0
Stage 1	387	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.5	6.3	4.12	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	2.218	-	-	-
Pot Cap-1 Maneuver	383	643	1115	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	355	642	1114	-	-	-
Mov Cap-2 Maneuver	355	-	-	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	707	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.8	2.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1114	-	355	642	-	-
HCM Lane V/C Ratio	0.065	-	0.305	0.148	-	-
HCM Control Delay (s)	8.5	0	19.5	11.6	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.3	0.5	-	-

Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized





SITE PLAN
1" = 140'-0"

PRELIMINARY

SEAL

CRG REAL ESTATE SOLUTIONS

35 E. WACKER DRIVE
CHICAGO, ILLINOIS 60601
Ph: 312.658.0747 Fx: 314.429.1890

Architect
CONSULTANT NAME

Civil Engineer
CONSULTANT NAME

Structural Engineer
CONSULTANT NAME

Landscape Architect
CONSULTANT NAME

Interior Architect
CONSULTANT NAME

MEP Engineer
CONSULTANT NAME

PROJECT:
CHEHALIS INDUSTRIAL PARK

Developer

LEWIS COUNTY, WA

DRAWING ISSUE 06/14/2022

Description	Date

Drawing Title
SITE PLAN

Drawing No.
SK-7

Clayco Job No.	#####	Consult Job No.	#####
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