



COWLITZ MEADOWS
TRAFFIC IMPACT ANALYSIS

Toledo, WA



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COWLITZ MEADOWS
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COWLITZ MEADOWS TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

The main goals of this study focus on the assessment of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent streets serving the subject site and gathering existing vehicular volumes within a defined study area. 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, if needed.

2. PROJECT DESCRIPTION

The Cowlitz Meadows project proposes for the construction of up to 100 single-family residential units located within the city of Toledo. The subject site is bordered to the north by Toledo-Vader Road and Plomondon Road, situated on 36.62-acres of undeveloped land within tax parcel #: 011438001000. Access to and from the Cowlitz Meadows project is to be provided via two new roadways. The first roadway would extend southwest from Toledo-Vader Road while the second roadway is proposed to extend southeast from Plomondon Road. Lots 2-11 fronting Plomondon Road in the provided site plan are proposed with direct access, while the remaining lots would have access internal to the plat. Illustrated below in Figure 1 is the general vicinity and adjacent street system with the subject parcel highlighted in blue. A conceptual site plan is presented in Figure 2 which highlights project access points.





3. EXISTING CONDITIONS

3.1 Existing Street System

The street network serving the proposed project consists of a variety of roadways. The major 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
State Route	SR-505	40-50 mph	2	No	No	No
Collector	Toledo-Vader Rd	50 mph	2	No	No	No
Local	Plomondon Rd	35 mph	2	No	No	No
	Drews Prairie Rd	35 mph	2	No	No	No

3.2 Roadway Improvement Projects

A review of the current Washington State Statewide Transportation Improvement Program (2022-2025), the Lewis County (2022-2027) Six-Year Transportation Improvement Program and the City of Toledo's Six-Year Transportation Improvement Program (2019-2024) indicates that projects are planned in the vicinity of the subject site.

2019 County Safety Improvement Program (P.N. # 22) (Lewis County TIP): This project entails the addition of safety improvements on various roads in Lewis County. Drews Prairie Road is an identified roadway within the safety improvement project. Please refer to the County's Local Road Safety Plan for more detailed information.

SR-505 Corridor Improvements (P.N. # 31) (Lewis County TIP): This project entails the construction of a truck climbing lane, intersection improvements, traffic signals, and other related work. Work includes the addition of a new signal at the intersection of SR-505 & Plomondon Road/Jackson Highway. A truck climbing lane for the SR-505 and I-5 interchange. The project has a total estimated cost of \$2,888,000.

SR-505 Sidewalk Improvements (P.N #4) (Toledo TIP): this project entails the addition or reconstruction of sidewalks along SR-505. The project has an estimated cost of \$245,000.

3.3 Existing Peak Hour Volumes

Field data for this study was obtained and collected in May of 2022 in order to establish baseline vehicular conditions near the subject site. Traffic counts were administered at the study intersections listed below and were based on discussion with City staff. The counts were administered between the PM peak period of 4:00-6:00 PM. The one-hour exhibiting highest overall volumes for the time period (peak hour) was then derived and used for intersection capacity analysis to present worst case conditions. Volumes from the turning movement counts were then extrapolated along the subject site's frontage. Full-count sheets have been included in the appendix. It should be noted that due to an ongoing overpass closure at the I-5/Toledo-Vader interchange, no traffic counts were conducted at these locations. The closure resulted in detours and would therefore not be representative of typical conditions.

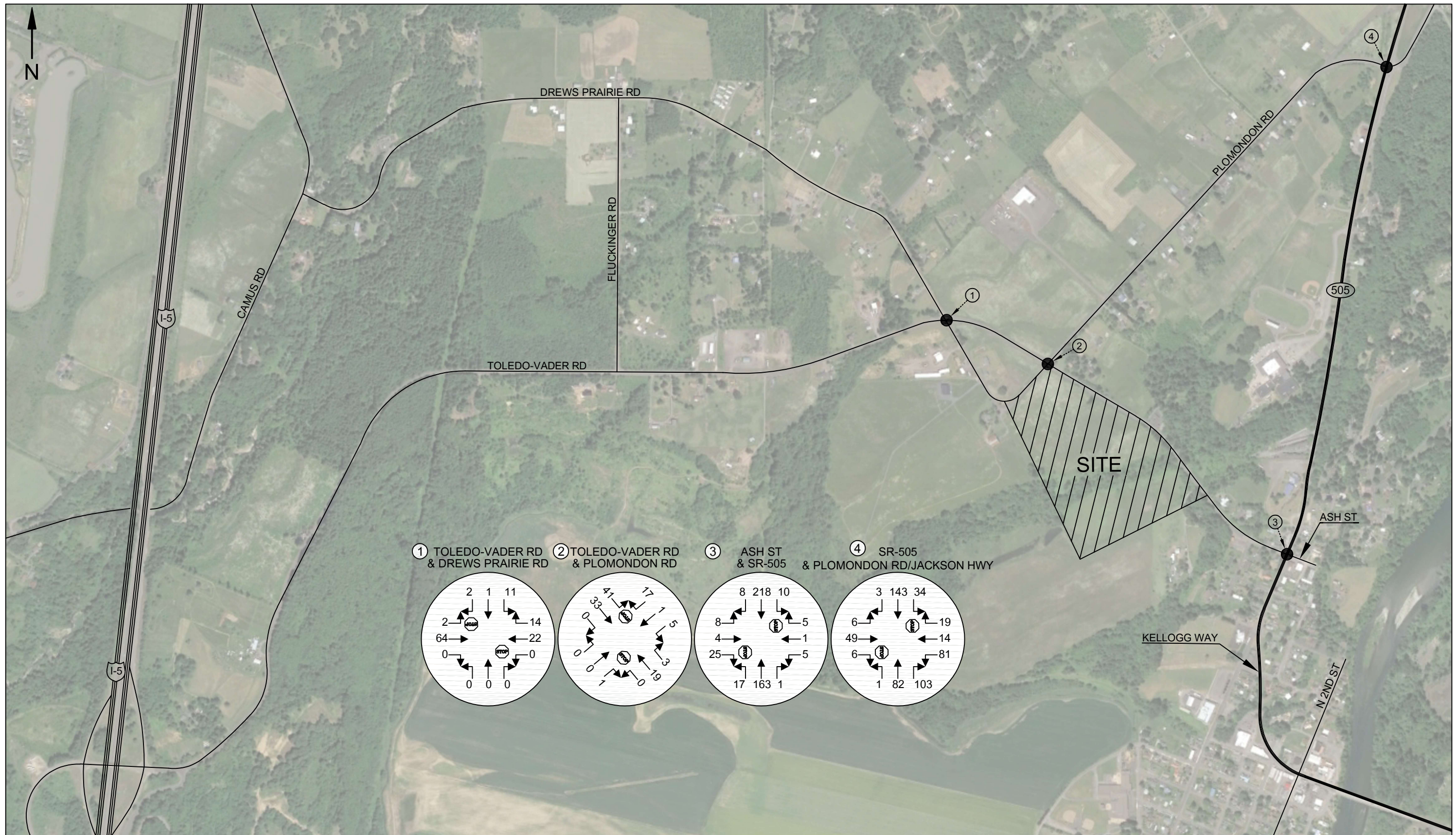
- Toledo-Vader Road & Plomondon Road/Drews Prairie Road
- Toledo-Vader Road & Plomondon Road
- Ash Street & N 5th Street/SR-505
- SR-505 & Jackson Highway/Plomondon Road

3.4 Non-Motorist Traffic

Non-motorist volumes were observed during the routine peak hour turning movement counts administered at the four listed intersection above. During the PM peak hour counts, non-motorist activity was noted at the study intersection of Ash Street & N 5th Street/SR-505. It was found that two pedestrians were noted crossing the northern leg of the intersection and three pedestrians were observed crossing the east leg of the intersection. The rural nature of the subject area and limited pedestrian infrastructure does not create a significant demand for non-motorist traffic. It should also be noted that sidewalk improvements, as part of the City's Six-Year TIP, are planned along SR-505 and would improve multi-mobility in the downtown area.

3.5 Access & Sight Distance

Access to and from the Cowlitz Meadows project is proposed via two new roadways. The first which is to extend southwest from Toledo-Vader Road and the second is to extend southeast from Plomondon Road. All lots fronting Plomondon Road would have direct driveway access (except for lot 1, see site plan). All new intersections shall be designed so as to allow sufficient entering sight distance and adhere to City and AASHTO engineering design standards. Verification may be required depending on final/approved access location.



3.6 Level of Service

Existing 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 range¹ 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. Table 2 below presents existing PM peak hour LOS delays for the key intersection of study.

Table 2: Existing PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	Movement	LOS	Delay
Toledo-Vader Rd & Drews Prairie Rd	Stop	SB	A	9.4
Toledo-Vader Rd & Plomondon Rd	Stop	SWB*	A	9.0
Ash St & SR-505	Stop	WB	B	11.4
SR-505 & Plomondon Rd/Jackson Hwy	Stop	WB	B	13.7

*SWB-Southwest Bound

Existing PM peak hour delays are shown to operate with LOS B conditions or better for all outlying study intersections. Toledo has adopted an LOS standard of LOS D². No intersection deficiencies are identified.

¹ *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

² City of Toledo 20-year comprehensive Plan, Transportation Element

4. FORECAST TRAFFIC DEMAND AND ANALYSIS

4.1 Project 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 Single-Family Detached Housing (LUC 210) with dwelling units as the input variable. Table 3 below summarizes the estimated project trip generation using ITE equations. 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	Dwelling Units	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Single-Family Detached	Up to 100	1009	19	55	74	62	37	99

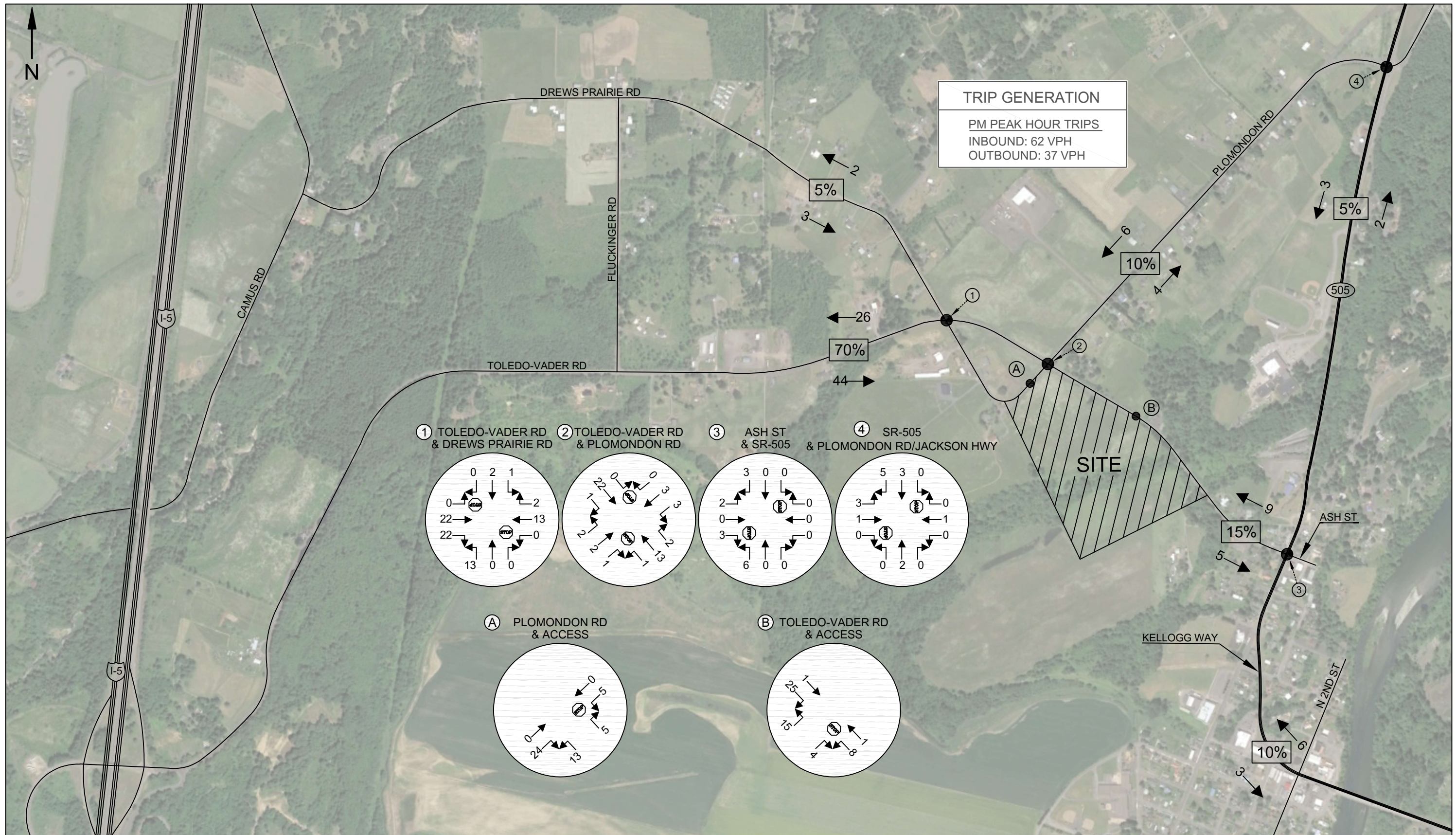
As shown in Table 2, the project is anticipated to generate a site total of 1009 new average weekday daily trips with 74 trips (19 inbound / 55 outbound) occurring in the AM peak hour and 99 trips (62 inbound / 37 outbound) occurring in the PM peak hour.

4.2 Distribution & Assignment

Trip distribution describes the anticipated travel routes for inbound and outbound project traffic relative to the local street system. Figure 4 illustrates the PM peak hour intersection trip distribution, which was derived based on existing travel patterns identified from field counts and location to nearby arterials. It is important to note that the lots fronting Plomondon Road will have direct driveway access to the roadway, to present conservative analysis all trips have been assigned to the two main ingress/egress points (Road A & Road C-Refer to site plan for roadway locations).

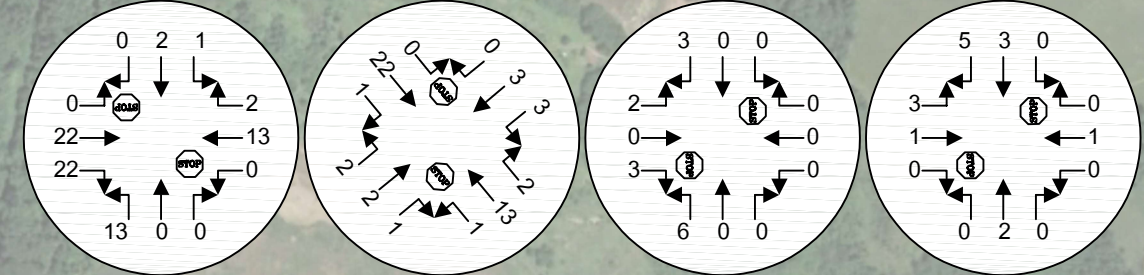
4.3 Future Traffic Volumes with and without the Project

A five-year horizon of 2027 was used for future traffic delay analysis. Forecast PM peak hour volumes were derived by applying a 2.0 percent compound annual growth rate to the existing volumes. According to the city of Toledo's Comprehensive Plan, the population in the city has remained stable for the last 10 to 15 years, to present conservative analysis, a 2.0 percent grow rate was applied. Forecast 2027 PM peak hour volumes without and with the addition of project-generated traffic are shown in Figures 5 and 6, respectively.



TRIP GENERATION
 PM PEAK HOUR TRIPS
 INBOUND: 62 VPH
 OUTBOUND: 37 VPH

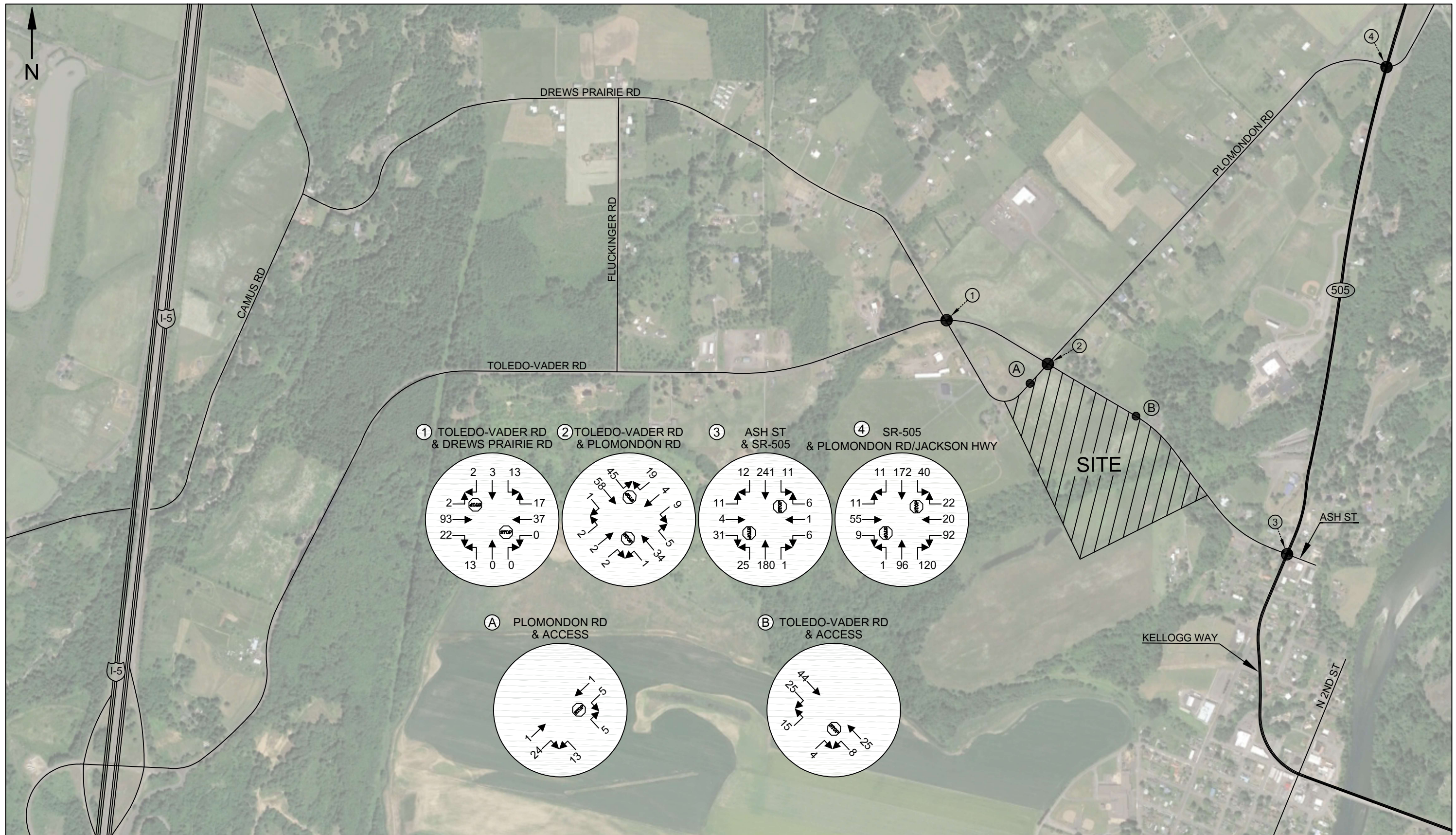
- ① TOLEDO-VADER RD & DREWS PRAIRIE RD
- ② TOLEDO-VADER RD & PLOMONDON RD
- ③ ASH ST & SR-505
- ④ SR-505 & PLOMONDON RD/JACKSON HWY



- (A) PLOMONDON RD & ACCESS
- (B) TOLEDO-VADER RD & ACCESS







4.4 Future Level of Service Results

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 and access intersections 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	<u>2027 Without</u>		<u>2027 With</u>	
		LOS	Delay	LOS	Delay
Toledo-Vader Rd & Drews Prairie Rd	Stop	A	9.5	B	10.2
Toledo-Vader Rd & Plomondon Rd	Stop	A	9.1	B	10.2
Ash St & SR-505	Stop	B	11.9	B	12.0
SR-505 & Plomondon Rd/Jackson Hwy	Stop	C	15.0	C	15.2
Toledo-Vader Rd & Access	Stop	--	--	A	9.1
Plomondon Rd & Access	Stop	--	--	A	8.6

Level of Service calculations show LOS C conditions for the intersection of SR-505 & Plomondon Road/Jackson Highway with or without project traffic. It is important to note that the intersection is planned for a signal, as no time estimations were available it was assumed the development would be constructed before the addition of the signal.

All other study and access intersections are shown to operate with LOS B conditions or better indicating acceptable operations. No intersection deficiencies are identified as a result of the proposal.

4.5 Left Turn Lane Warrants

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures described by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain storage requirements at both access intersections and the study intersection of Toledo-Vader Road & Plomondon Road under forecast 2027 conditions as illustrated in Figure 6. Given the minimum left turn lane threshold of 300 vehicles, either access intersection or the study intersection of Toledo-Vader Road & Plomondon Road would not warrant the need for a left turn lane.

5. CONCLUSIONS AND MITIGATING MEASURES

Cowlitz Meadows proposes for the construction of up to 100 single-family homes within the city of Toledo. The site is located south of Toledo-Vader Road and Plomondon Road, situated on 36.62-acres within tax parcel #: 011438001000. Access to the site is proposed via two new roadways. The first is to extend southwest from Toledo-Vader Road and the second is to extend southeast from Plomondon Road. A conceptual site design illustrating the proposed layout and internal roadway configuration is presented in Figure 2.

Based on ITE data, the project can be anticipated to generate 1009 average weekday daily trips with 74 (19 in / 55 out) trips occurring during the AM peak hour and 99 (62 in / 37 out) trips occurring during the PM peak hour. A five-year horizon of 2027 accounting for background growth was analyzed to assess future roadway conditions. The study and access intersections were evaluated in terms of Level of Service (LOS). Existing PM peak hour LOS at the study intersections (see Table 2) indicates LOS B or better conditions. Forecast 2027 PM peak hour LOS at the study intersections and proposed access points (see Table 4) indicates LOS C or better conditions. As the city of Toledo has adopted an LOS standard of D, no intersection deficiencies are identified. Left turn warrant calculations were analyzed at both access points based on forecast 2027 volumes with project generated traffic as illustrated in Figure 6. Based on low volumes at each access, a left turn lane was found not warranted.

Based on the above analysis, no further mitigation is recommended.

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APPENDIX

LEVEL OF SERVICE

The following are excerpts from the *2016 Highway Capacity Manual - Transportation Research Board Special Report 209*.

Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions.

Level-of-Service definitions

Level of service A represents primarily free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the arterial classification. Vehicles are seldom impeded in their ability to maneuver in the traffic stream. Delay at signalized intersections is minimal.

Level of service B represents reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the arterial classification. The ability to maneuver in the traffic stream is only slightly restricted and delays are not bothersome.

Level of service C represents stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than in LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the average free-flow speed for the arterial classification.

Level of service D borders on a range in which small increases in flow may cause substantial increases in approach delay and hence decreases in arterial speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40 percent of free-flow speed.

Level of service E is characterized by significant delays and average travel speeds of one-third the free-flow speed or less. Such operations are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

Level of service F characterizes arterial flow at extremely low speeds, from less than one-third to one-quarter of the free-flow speed. Intersection congestion is likely at critical signalized locations, with long delays and extensive queuing.

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Groups Printed- Passenger + - Heavy

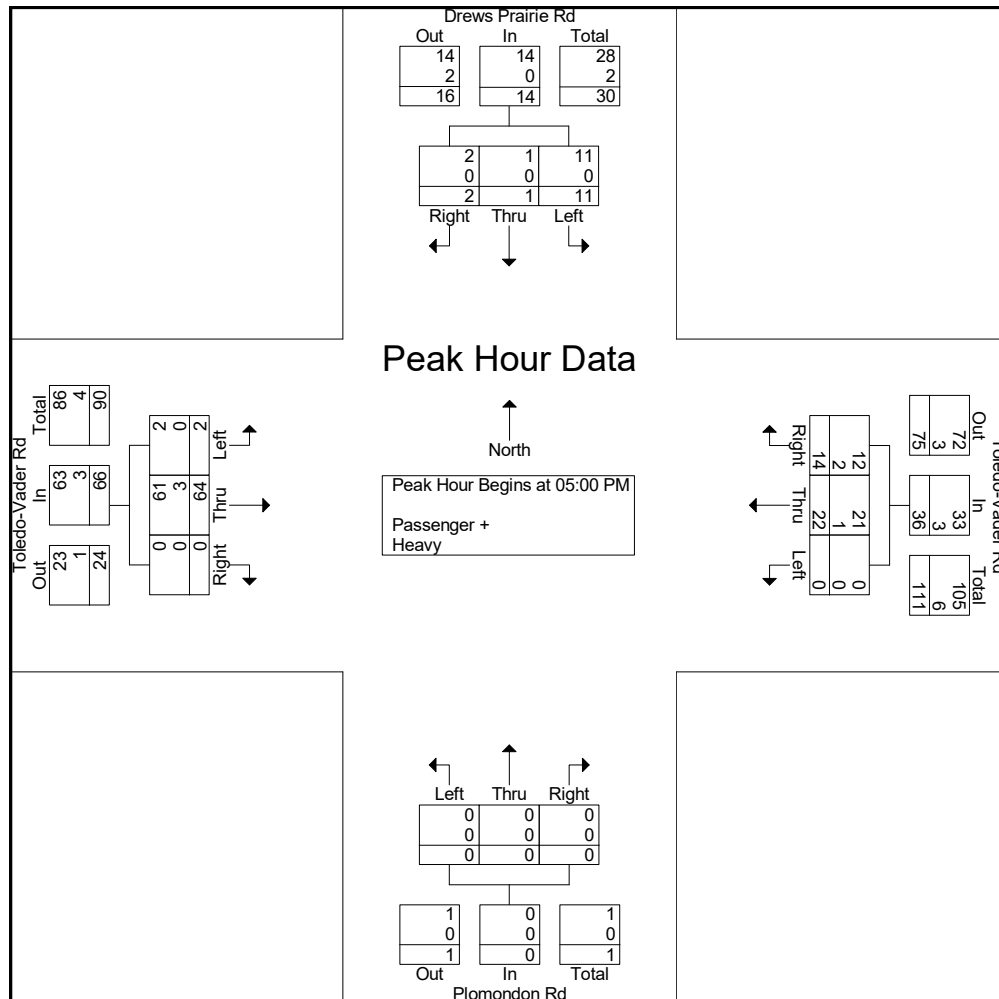
Start Time	Drews Prairie Rd Southbound				Toledo-Vader Rd Westbound				Plomondon Rd Northbound				Toledo-Vader Rd Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:00 PM	1	0	4	5	1	6	0	7	0	0	0	0	1	13	1	15	27
04:15 PM	0	0	2	2	3	10	0	13	0	0	1	1	0	11	0	11	27
04:30 PM	1	0	2	3	5	4	0	9	0	0	0	0	0	22	0	22	34
04:45 PM	0	0	1	1	3	7	0	10	0	0	0	0	0	12	0	12	23
Total	2	0	9	11	12	27	0	39	0	0	1	1	1	58	1	60	111
05:00 PM	1	0	1	2	3	3	0	6	0	0	0	0	0	7	1	8	16
05:15 PM	1	1	2	4	1	5	0	6	0	0	0	0	0	14	0	14	24
05:30 PM	0	0	7	7	5	8	0	13	0	0	0	0	0	23	0	23	43
05:45 PM	0	0	1	1	5	6	0	11	0	0	0	0	0	20	1	21	33
Total	2	1	11	14	14	22	0	36	0	0	0	0	0	64	2	66	116
Grand Total	4	1	20	25	26	49	0	75	0	0	1	1	1	122	3	126	227
Apprch %	16	4	80		34.7	65.3	0		0	0	100		0.8	96.8	2.4		
Total %	1.8	0.4	8.8	11	11.5	21.6	0	33	0	0	0.4	0.4	0.4	53.7	1.3	55.5	
Passenger +	4	1	19	24	24	47	0	71	0	0	1	1	1	117	3	121	217
% Passenger +	100	100	95	96	92.3	95.9	0	94.7	0	0	100	100	100	95.9	100	96	95.6
Heavy	0	0	1	1	2	2	0	4	0	0	0	0	0	5	0	5	10
% Heavy	0	0	5	4	7.7	4.1	0	5.3	0	0	0	0	0	4.1	0	4	4.4

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Start Time	Drews Prairie Rd Southbound				Toledo-Vader Rd Westbound				Plomondon Rd Northbound				Toledo-Vader 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 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	1	0	1	2	3	3	0	6	0	0	0	0	0	7	1	8	16
05:15 PM	1	1	2	4	1	5	0	6	0	0	0	0	0	14	0	14	24
05:30 PM	0	0	7	7	5	8	0	13	0	0	0	0	0	23	0	23	43
05:45 PM	0	0	1	1	5	6	0	11	0	0	0	0	0	20	1	21	33
Total Volume	2	1	11	14	14	22	0	36	0	0	0	0	0	64	2	66	116
% App. Total	14.3	7.1	78.6		38.9	61.1	0		0	0	0		0	97	3		
PHF	.500	.250	.393	.500	.700	.688	.000	.692	.000	.000	.000	.000	.000	.696	.500	.717	.674
Passenger +	2	1	11	14	12	21	0	33	0	0	0	0	0	61	2	63	110
% Passenger +	100	100	100	100	85.7	95.5	0	91.7	0	0	0	0	0	95.3	100	95.5	94.8
Heavy	0	0	0	0	2	1	0	3	0	0	0	0	0	3	0	3	6
% Heavy	0	0	0	0	14.3	4.5	0	8.3	0	0	0	0	0	4.7	0	4.5	5.2



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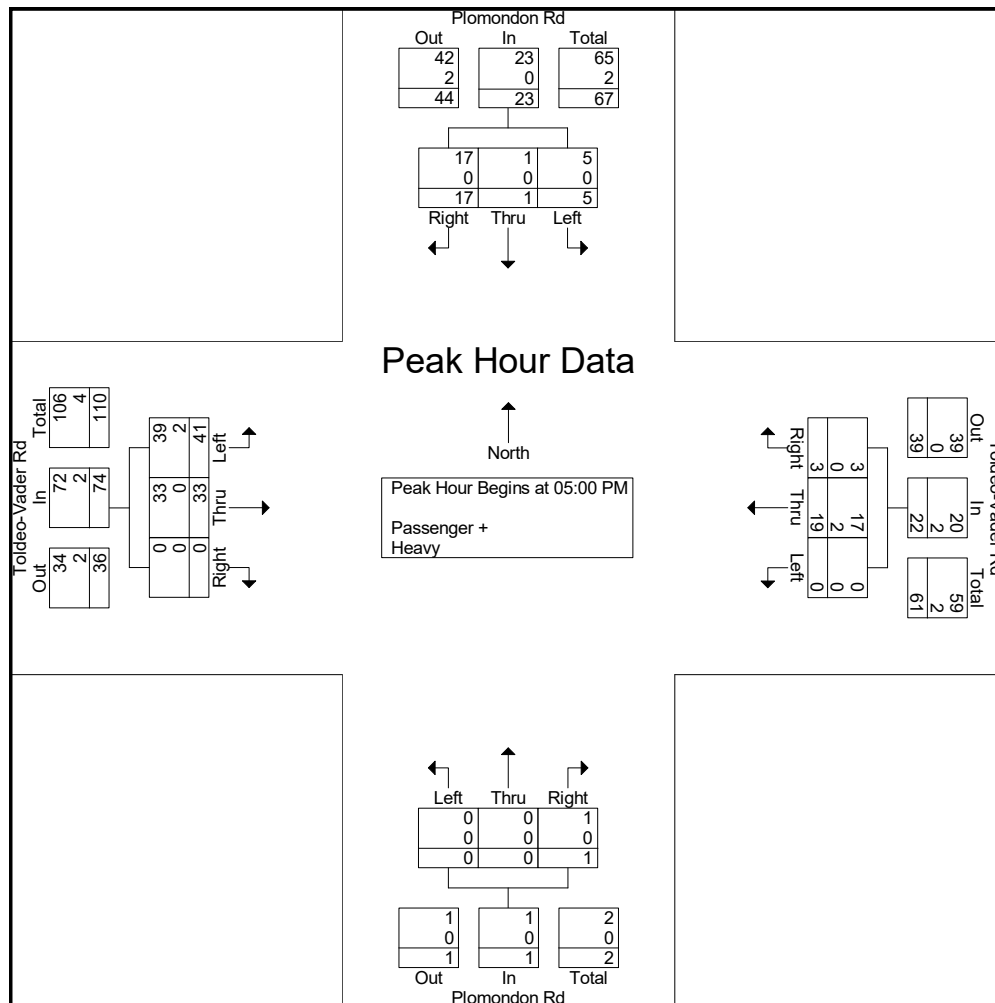
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04:15 PM	6	0	0	6	0	7	0	7	0	0	0	0	0	6	7	13	26
04:30 PM	2	0	1	3	2	7	0	9	0	0	0	0	0	12	11	23	35
04:45 PM	4	0	1	5	0	6	0	6	0	0	0	0	0	3	9	12	23
Total	17	0	3	20	3	22	0	25	1	0	0	1	0	25	40	65	111
05:00 PM	3	0	3	6	2	3	0	5	0	0	0	0	0	5	4	9	20
05:15 PM	4	1	1	6	1	2	0	3	1	0	0	1	0	9	6	15	25
05:30 PM	8	0	0	8	0	6	0	6	0	0	0	0	0	12	18	30	44
05:45 PM	2	0	1	3	0	8	0	8	0	0	0	0	0	7	13	20	31
Total	17	1	5	23	3	19	0	22	1	0	0	1	0	33	41	74	120
Grand Total	34	1	8	43	6	41	0	47	2	0	0	2	0	58	81	139	231
Apprch %	79.1	2.3	18.6		12.8	87.2	0		100	0	0		0	41.7	58.3		
Total %	14.7	0.4	3.5	18.6	2.6	17.7	0	20.3	0.9	0	0	0.9	0	25.1	35.1	60.2	
Passenger +	34	1	8	43	6	38	0	44	2	0	0	2	0	58	74	132	221
% Passenger +	100	100	100	100	100	92.7	0	93.6	100	0	0	100	0	100	91.4	95	95.7
Heavy	0	0	0	0	0	3	0	3	0	0	0	0	0	0	7	7	10
% Heavy	0	0	0	0	0	7.3	0	6.4	0	0	0	0	0	0	8.6	5	4.3

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Start Time	Plomondon Rd Southbound				Toldeo-Vader Rd Westbound				Plomondon Rd Northbound				Toldeo-Vader 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 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	3	0	3	6	2	3	0	5	0	0	0	0	0	5	4	9	20
05:15 PM	4	1	1	6	1	2	0	3	1	0	0	1	0	9	6	15	25
05:30 PM	8	0	0	8	0	6	0	6	0	0	0	0	0	12	18	30	44
05:45 PM	2	0	1	3	0	8	0	8	0	0	0	0	0	7	13	20	31
Total Volume	17	1	5	23	3	19	0	22	1	0	0	1	0	33	41	74	120
% App. Total	73.9	4.3	21.7		13.6	86.4	0		100	0	0		0	44.6	55.4		
PHF	.531	.250	.417	.719	.375	.594	.000	.688	.250	.000	.000	.250	.000	.688	.569	.617	.682
Passenger +	17	1	5	23	3	17	0	20	1	0	0	1	0	33	39	72	116
% Passenger +	100	100	100	100	100	89.5	0	90.9	100	0	0	100	0	100	95.1	97.3	96.7
Heavy	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	4
% Heavy	0	0	0	0	0	10.5	0	9.1	0	0	0	0	0	0	4.9	2.7	3.3



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Groups Printed- Passenger + - Heavy

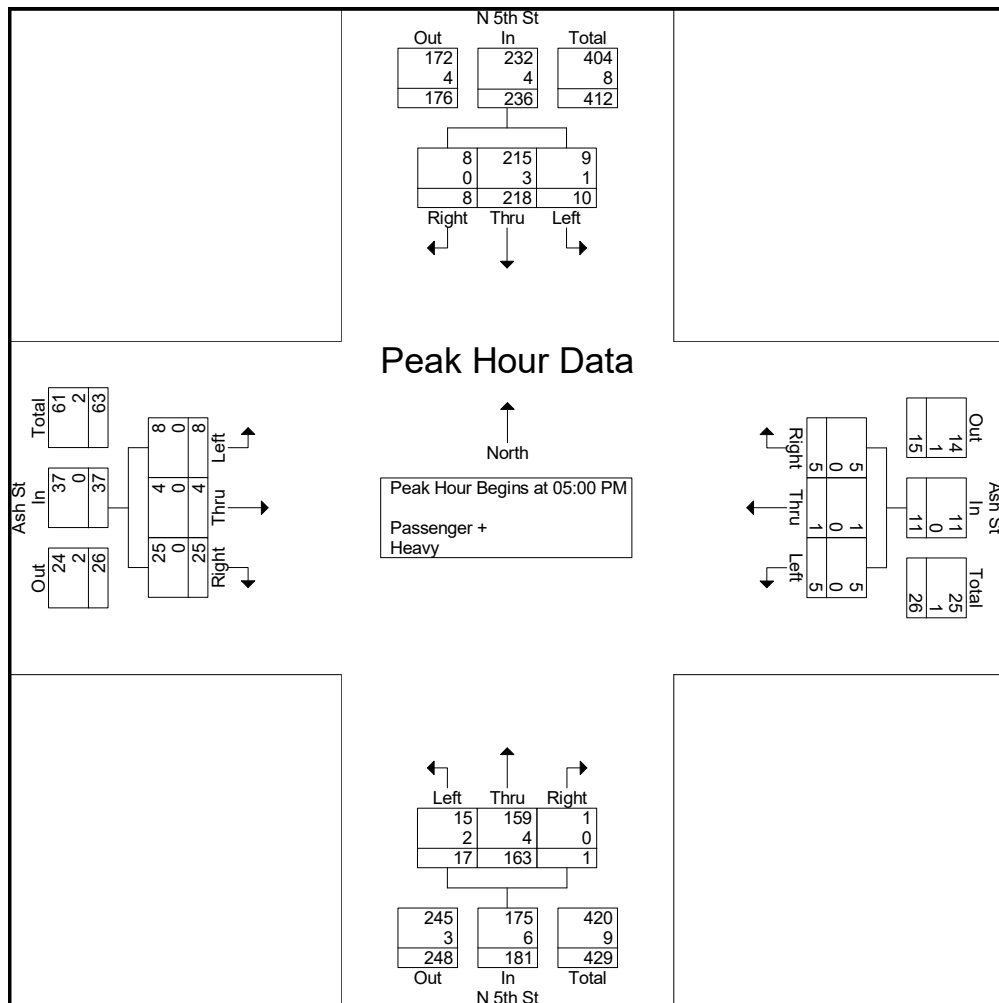
Start Time	N 5th St Southbound				Ash St Westbound				N 5th St Northbound				Ash St Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:00 PM	0	45	3	48	3	0	2	5	1	29	5	35	3	0	2	5	93
04:15 PM	1	50	1	52	1	0	0	1	2	44	6	52	3	1	0	4	109
04:30 PM	2	47	1	50	3	0	2	5	2	32	6	40	9	2	4	15	110
04:45 PM	1	39	1	41	1	0	1	2	0	28	6	34	3	0	3	6	83
Total	4	181	6	191	8	0	5	13	5	133	23	161	18	3	9	30	395
05:00 PM	4	55	2	61	1	0	0	1	1	38	2	41	6	1	1	8	111
05:15 PM	0	52	3	55	2	1	2	5	0	48	4	52	8	2	2	12	124
05:30 PM	2	58	1	61	1	0	1	2	0	31	2	33	6	1	2	9	105
05:45 PM	2	53	4	59	1	0	2	3	0	46	9	55	5	0	3	8	125
Total	8	218	10	236	5	1	5	11	1	163	17	181	25	4	8	37	465
Grand Total	12	399	16	427	13	1	10	24	6	296	40	342	43	7	17	67	860
Apprch %	2.8	93.4	3.7		54.2	4.2	41.7		1.8	86.5	11.7		64.2	10.4	25.4		
Total %	1.4	46.4	1.9	49.7	1.5	0.1	1.2	2.8	0.7	34.4	4.7	39.8	5	0.8	2	7.8	
Passenger +	12	388	15	415	12	1	10	23	6	289	37	332	43	7	17	67	837
% Passenger +	100	97.2	93.8	97.2	92.3	100	100	95.8	100	97.6	92.5	97.1	100	100	100	100	97.3
Heavy	0	11	1	12	1	0	0	1	0	7	3	10	0	0	0	0	23
% Heavy	0	2.8	6.2	2.8	7.7	0	0	4.2	0	2.4	7.5	2.9	0	0	0	0	2.7

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4902a
Site Code : 00004902
Start Date : 5/12/2022
Page No : 2

Start Time	N 5th St Southbound				Ash St Westbound				N 5th St Northbound				Ash St 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 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	4	55	2	61	1	0	0	1	1	38	2	41	6	1	1	8	111
05:15 PM	0	52	3	55	2	1	2	5	0	48	4	52	8	2	2	12	124
05:30 PM	2	58	1	61	1	0	1	2	0	31	2	33	6	1	2	9	105
05:45 PM	2	53	4	59	1	0	2	3	0	46	9	55	5	0	3	8	125
Total Volume	8	218	10	236	5	1	5	11	1	163	17	181	25	4	8	37	465
% App. Total	3.4	92.4	4.2		45.5	9.1	45.5		0.6	90.1	9.4		67.6	10.8	21.6		
PHF	.500	.940	.625	.967	.625	.250	.625	.550	.250	.849	.472	.823	.781	.500	.667	.771	.930
Passenger +	8	215	9	232	5	1	5	11	1	159	15	175	25	4	8	37	455
% Passenger +	100	98.6	90.0	98.3	100	100	100	100	100	97.5	88.2	96.7	100	100	100	100	97.8
Heavy	0	3	1	4	0	0	0	0	0	4	2	6	0	0	0	0	10
% Heavy	0	1.4	10.0	1.7	0	0	0	0	0	2.5	11.8	3.3	0	0	0	0	2.2



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4902c
Site Code : 00004902
Start Date : 5/24/2022
Page No : 1

Groups Printed- Passenger + - Heavy

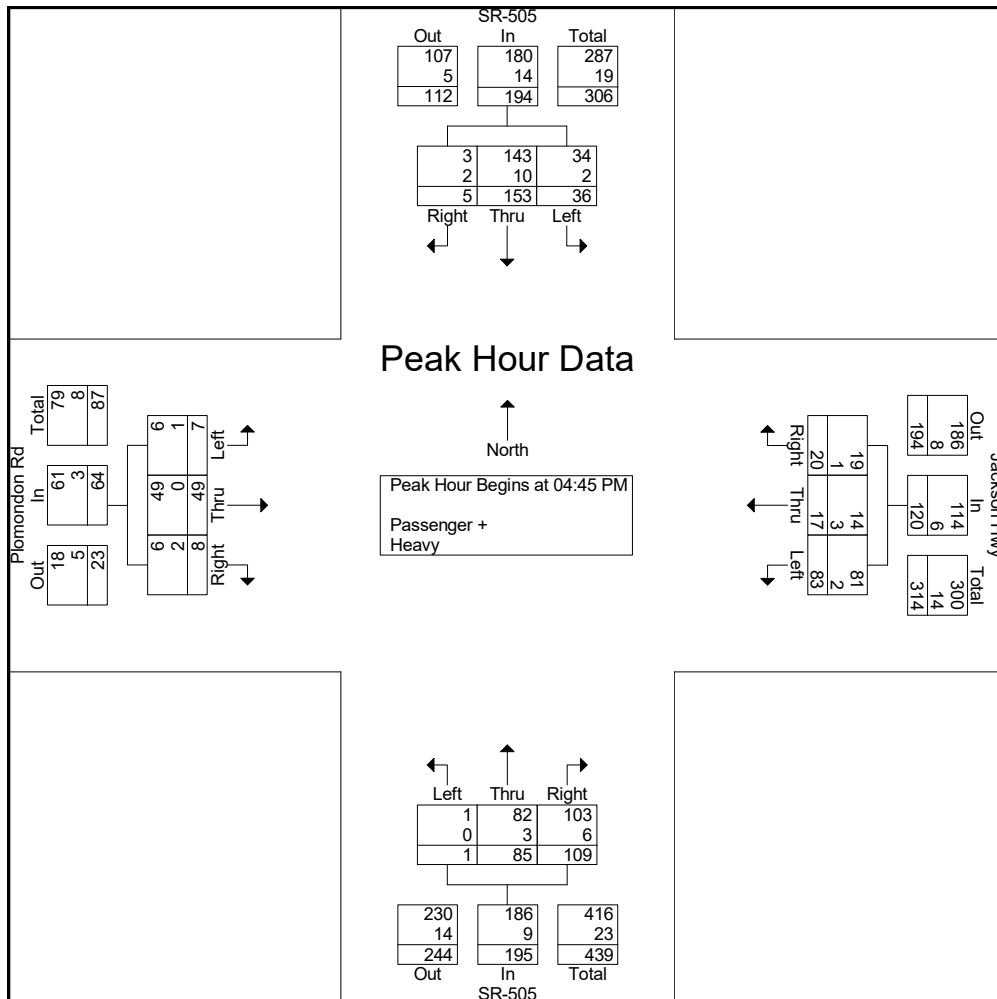
Start Time	SR-505 Southbound				Jackson Hwy Westbound				SR-505 Northbound				Plomondon Rd Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:00 PM	2	38	6	46	7	7	17	31	11	31	2	44	2	8	1	11	132
04:15 PM	1	46	6	53	13	5	15	33	17	22	0	39	0	17	2	19	144
04:30 PM	3	22	6	31	9	8	15	32	18	21	1	40	2	13	0	15	118
04:45 PM	0	31	11	42	3	4	19	26	28	26	0	54	0	10	1	11	133
Total	6	137	29	172	32	24	66	122	74	100	3	177	4	48	4	56	527
05:00 PM	1	35	15	51	5	3	22	30	25	21	1	47	2	14	2	18	146
05:15 PM	2	49	7	58	6	4	26	36	28	23	0	51	3	11	2	16	161
05:30 PM	2	38	3	43	6	6	16	28	28	15	0	43	3	14	2	19	133
05:45 PM	1	31	7	39	3	8	17	28	15	13	0	28	1	13	0	14	109
Total	6	153	32	191	20	21	81	122	96	72	1	169	9	52	6	67	549
Grand Total	12	290	61	363	52	45	147	244	170	172	4	346	13	100	10	123	1076
Apprch %	3.3	79.9	16.8		21.3	18.4	60.2		49.1	49.7	1.2		10.6	81.3	8.1		
Total %	1.1	27	5.7	33.7	4.8	4.2	13.7	22.7	15.8	16	0.4	32.2	1.2	9.3	0.9	11.4	
Passenger +	9	274	58	341	51	41	145	237	162	168	4	334	8	100	8	116	1028
% Passenger +	75	94.5	95.1	93.9	98.1	91.1	98.6	97.1	95.3	97.7	100	96.5	61.5	100	80	94.3	95.5
Heavy	3	16	3	22	1	4	2	7	8	4	0	12	5	0	2	7	48
% Heavy	25	5.5	4.9	6.1	1.9	8.9	1.4	2.9	4.7	2.3	0	3.5	38.5	0	20	5.7	4.5

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4902c
Site Code : 00004902
Start Date : 5/24/2022
Page No : 2

Start Time	SR-505 Southbound				Jackson Hwy Westbound				SR-505 Northbound				Plomondon 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 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	31	11	42	3	4	19	26	28	26	0	54	0	10	1	11	133
05:00 PM	1	35	15	51	5	3	22	30	25	21	1	47	2	14	2	18	146
05:15 PM	2	49	7	58	6	4	26	36	28	23	0	51	3	11	2	16	161
05:30 PM	2	38	3	43	6	6	16	28	28	15	0	43	3	14	2	19	133
Total Volume	5	153	36	194	20	17	83	120	109	85	1	195	8	49	7	64	573
% App. Total	2.6	78.9	18.6		16.7	14.2	69.2		55.9	43.6	0.5		12.5	76.6	10.9		
PHF	.625	.781	.600	.836	.833	.708	.798	.833	.973	.817	.250	.903	.667	.875	.875	.842	.890
Passenger +	3	143	34	180	19	14	81	114	103	82	1	186	6	49	6	61	541
% Passenger +	60.0	93.5	94.4	92.8	95.0	82.4	97.6	95.0	94.5	96.5	100	95.4	75.0	100	85.7	95.3	94.4
Heavy	2	10	2	14	1	3	2	6	6	3	0	9	2	0	1	3	32
% Heavy	40.0	6.5	5.6	7.2	5.0	17.6	2.4	5.0	5.5	3.5	0	4.6	25.0	0	14.3	4.7	5.6



Single-Family Detached Housing (210)

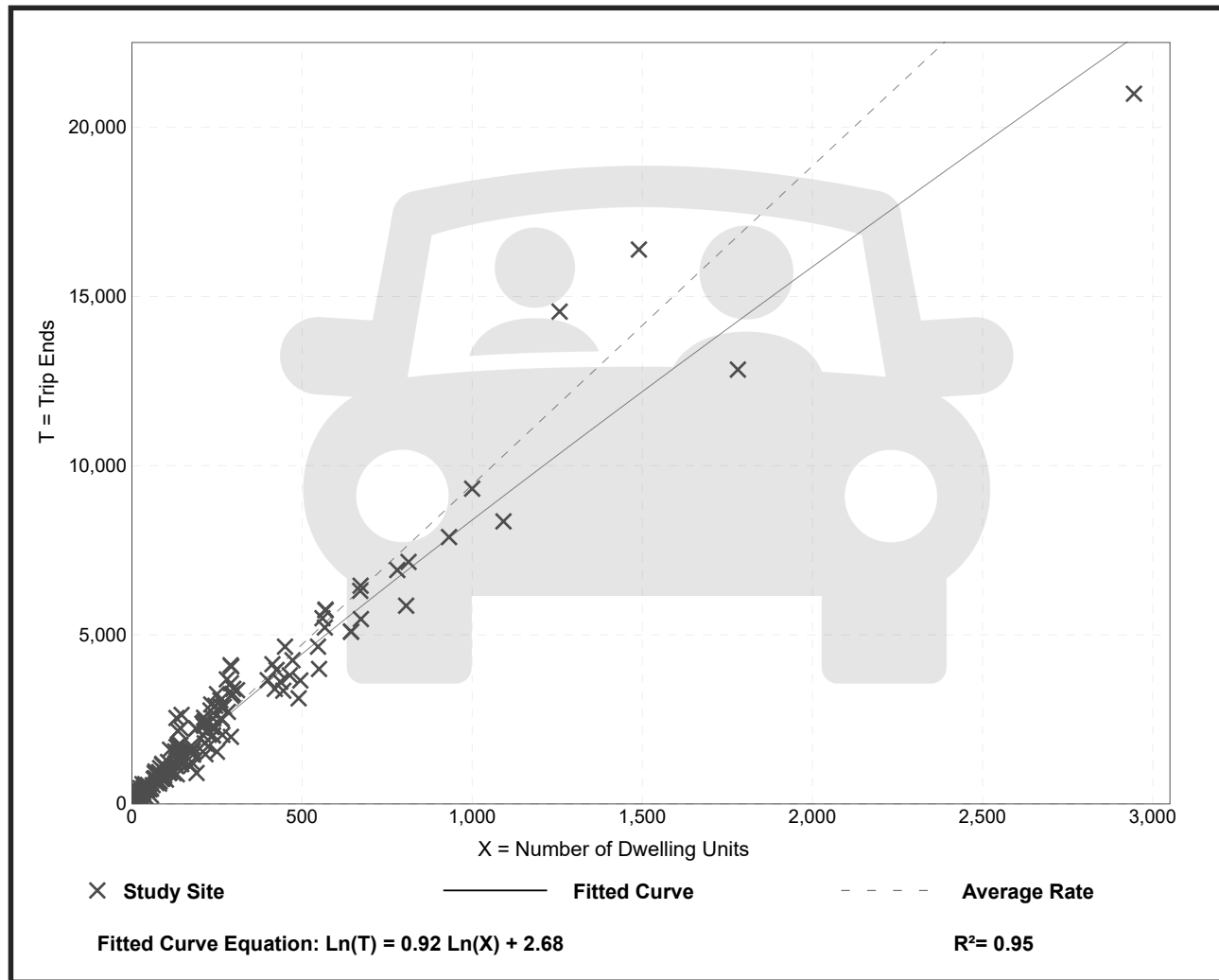
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Trip Gen Manual, 11th Edition

Institute of Transportation Engineers

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

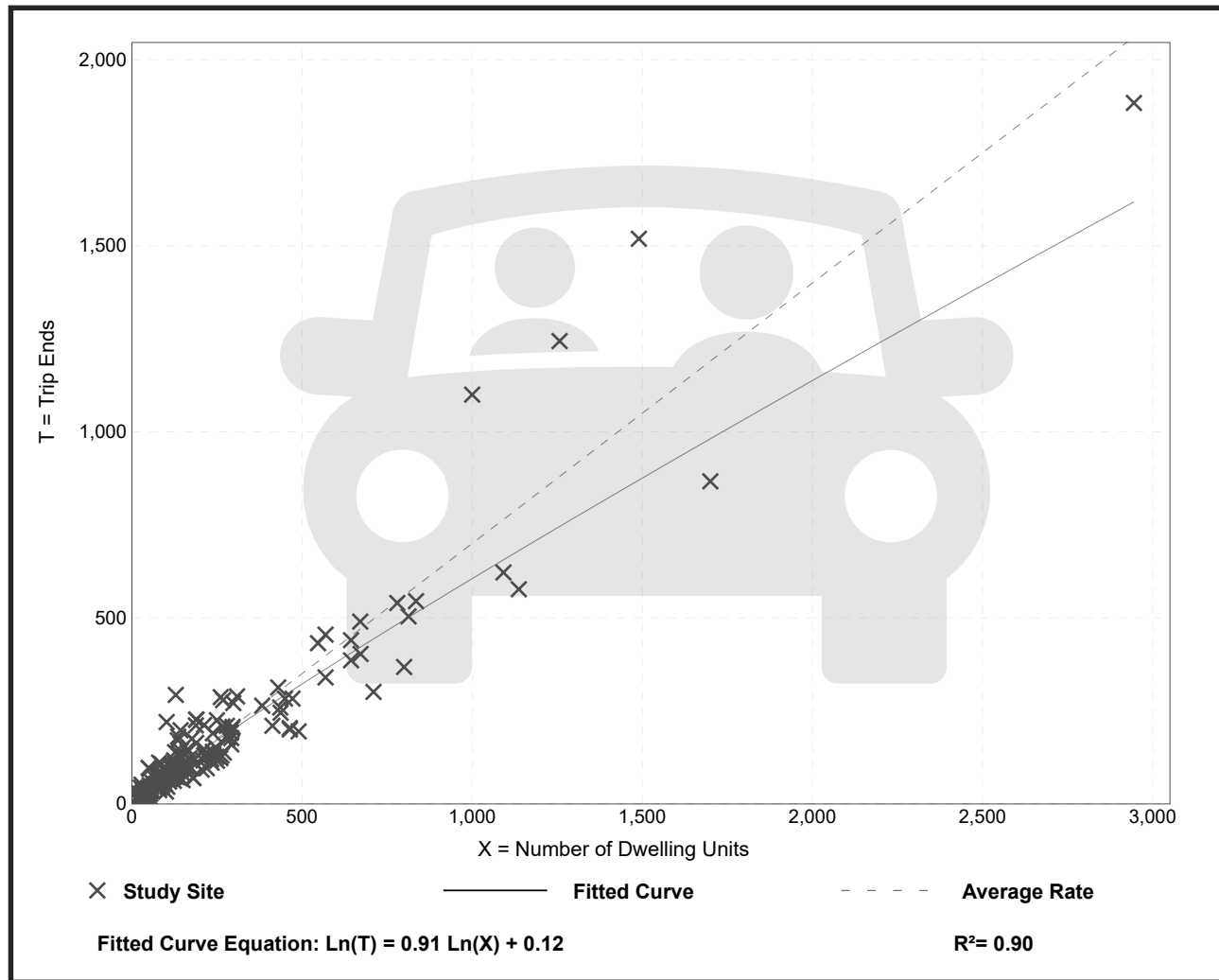
Setting/Location: General Urban/Suburban

Number of Studies: 192
 Avg. Num. of Dwelling Units: 226
 Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

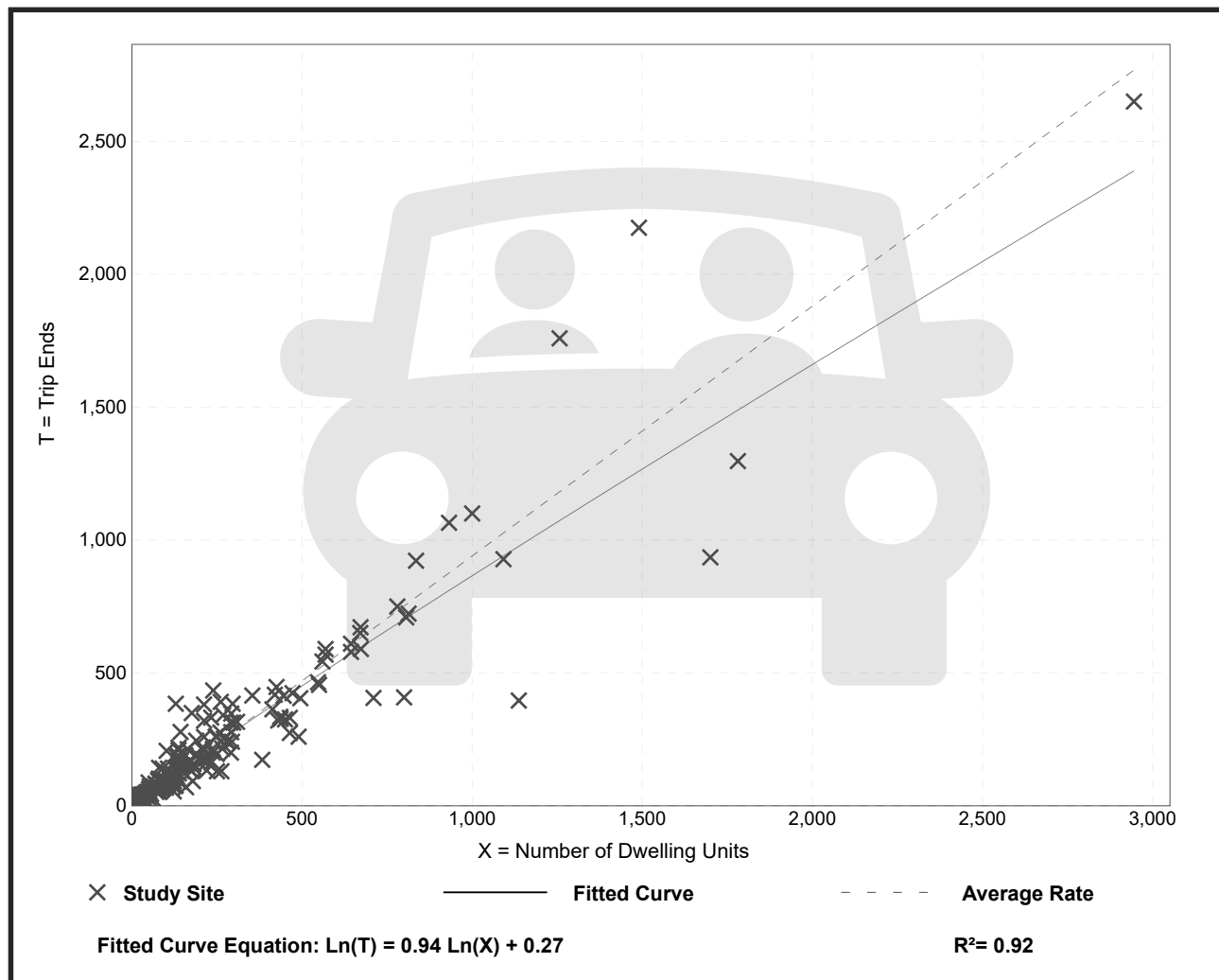
Setting/Location: General Urban/Suburban

Number of Studies: 208
 Avg. Num. of Dwelling Units: 248
 Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



PM Peak Hour Forecast Intersection Volumes

Annual Growth Rate: 2 % 2027
 # of Years to Horizon: 5

1. Toledo-Vader Rd & Drews Prairie Rd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	2	1	11	14	22	0	0	0	0	0	64	2
Project Trips	0	2	1	2	13	0	0	0	13	22	22	0
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0
Without	2	1	12	15	24	0	0	0	0	0	71	2
With	2	3	13	17	37	0	0	0	13	22	93	2

2. Toldeo-Vader Rd & Plomondon Rd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	17	1	5	3	19	0	1	0	0	0	33	41
Project Trips	0	3	3	2	13	1	1	2	2	1	22	0
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0
Without	19	1	6	3	21	0	1	0	0	0	36	45
With	19	4	9	5	34	1	2	2	2	1	58	45

3. Ash St & SR-505

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	8	218	10	5	1	5	1	163	17	25	4	8
Project Trips	3	0	0	0	0	0	0	0	6	3	0	2
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0
Without	9	241	11	6	1	6	1	180	19	28	4	9
With	12	241	11	6	1	6	1	180	25	31	4	11

4. SR-505 & Plomondon Rd/Jackson Hwy

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	5	153	36	20	17	83	109	85	1	8	49	7
Project Trips	5	3	0	0	1	0	0	2	0	0	1	3
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0
Without	6	169	40	22	19	92	120	94	1	9	54	8
With	11	172	40	22	20	92	120	96	1	9	55	11

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	64	0	0	22	14	0	0	0	11	1	2
Future Vol, veh/h	2	64	0	0	22	14	0	0	0	11	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	2	5	2	2	5	14	2	2	2	2	2	2
Mvmt Flow	3	96	0	0	33	21	0	0	0	16	1	3

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	54	0	0	96	0	0	148	156	96	146	146	44
Stage 1	-	-	-	-	-	-	102	102	-	44	44	-
Stage 2	-	-	-	-	-	-	46	54	-	102	102	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1551	-	-	1498	-	-	820	736	960	823	745	1026
Stage 1	-	-	-	-	-	-	904	811	-	970	858	-
Stage 2	-	-	-	-	-	-	968	850	-	904	811	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	1551	-	-	1498	-	-	815	735	960	821	744	1026
Mov Cap-2 Maneuver	-	-	-	-	-	-	815	735	-	821	744	-
Stage 1	-	-	-	-	-	-	902	809	-	968	858	-
Stage 2	-	-	-	-	-	-	964	850	-	902	809	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	9.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1551	-	-	1498	-	-	839
HCM Lane V/C Ratio	-	0.002	-	-	-	-	-	0.025
HCM Control Delay (s)	0	7.3	0	-	0	-	-	9.4
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	41	33	0	0	19	3	0	0	1	5	1	17
Future Vol, veh/h	41	33	0	0	19	3	0	0	1	5	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	5	2	2	2	11	2	2	2	2	2	2	2
Mvmt Flow	60	49	0	0	28	4	0	0	1	7	1	25

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	32	0	0	49	0	0	212	201	49	200	199	30
Stage 1	-	-	-	-	-	-	169	169	-	30	30	-
Stage 2	-	-	-	-	-	-	43	32	-	170	169	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1561	-	-	1558	-	-	745	695	1020	759	697	1044
Stage 1	-	-	-	-	-	-	833	759	-	987	870	-
Stage 2	-	-	-	-	-	-	971	868	-	832	759	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	1561	-	-	1558	-	-	704	667	1020	735	669	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	704	667	-	735	669	-
Stage 1	-	-	-	-	-	-	800	729	-	948	870	-
Stage 2	-	-	-	-	-	-	946	868	-	798	729	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.1	0	8.5	9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1020	1561	-	-	1558	-	-	936
HCM Lane V/C Ratio	0.001	0.039	-	-	-	-	-	0.036
HCM Control Delay (s)	8.5	7.4	0	-	0	-	-	9
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	4	25	5	1	5	17	163	1	10	218	8
Future Vol, veh/h	8	4	25	5	1	5	17	163	1	10	218	8
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	12	3	2	10	2	2
Mvmt Flow	9	4	27	5	1	5	18	175	1	11	234	9

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	486	483	249	498	487	186	248	0	0	181	0	0
Stage 1	266	266	-	217	217	-	-	-	-	-	-	-
Stage 2	220	217	-	281	270	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.22	-	-	4.2	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.308	-	-	2.29	-	-
Pot Cap-1 Maneuver	492	483	790	483	481	856	1261	-	-	1347	-	-
Stage 1	739	689	-	785	723	-	-	-	-	-	-	-
Stage 2	782	723	-	726	686	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	474	466	782	450	464	848	1255	-	-	1341	-	-
Mov Cap-2 Maneuver	474	466	-	450	464	-	-	-	-	-	-	-
Stage 1	723	679	-	769	708	-	-	-	-	-	-	-
Stage 2	760	708	-	687	676	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11		11.4		0.7		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1255	-	-	644	574	1341	-
HCM Lane V/C Ratio	0.015	-	-	0.062	0.021	0.008	-
HCM Control Delay (s)	7.9	0	-	11	11.4	7.7	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	
Traffic Vol, veh/h	7	49	8	83	17	20	1	85	109	36	153	5
Future Vol, veh/h	7	49	8	83	17	20	1	85	109	36	153	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	400	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	14	2	25	2	18	5	2	4	6	6	7	40
Mvmt Flow	8	55	9	93	19	22	1	96	122	40	172	6

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	435	475	175	385	356	96	178	0	0	218	0	0
Stage 1	255	255	-	98	98	-	-	-	-	-	-	-
Stage 2	180	220	-	287	258	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.52	6.45	7.12	6.68	6.25	4.12	-	-	4.16	-	-
Critical Hdwy Stg 1	6.24	5.52	-	6.12	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.52	-	6.12	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4.018	3.525	3.518	4.162	3.345	2.218	-	-	2.254	-	-
Pot Cap-1 Maneuver	511	488	812	573	545	952	1398	-	-	1328	-	-
Stage 1	724	696	-	908	784	-	-	-	-	-	-	-
Stage 2	795	721	-	720	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	473	471	812	503	526	952	1398	-	-	1328	-	-
Mov Cap-2 Maneuver	473	471	-	503	526	-	-	-	-	-	-	-
Stage 1	723	673	-	907	783	-	-	-	-	-	-	-
Stage 2	757	720	-	632	644	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.5		13.7		0		1.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1398	-	-	497	550	1328	-
HCM Lane V/C Ratio	0.001	-	-	0.145	0.245	0.03	-
HCM Control Delay (s)	7.6	0	-	13.5	13.7	7.8	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0.5	1	0.1	-

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	71	0	0	24	15	0	0	0	12	1	2
Future Vol, veh/h	2	71	0	0	24	15	0	0	0	12	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	2	5	2	2	5	14	2	2	2	2	2	2
Mvmt Flow	3	106	0	0	36	22	0	0	0	18	1	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	58	0	0	106	0	0	161	170	106	159	159	47
Stage 1	-	-	-	-	-	-	112	112	-	47	47	-
Stage 2	-	-	-	-	-	-	49	58	-	112	112	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1546	-	-	1485	-	-	804	723	948	807	733	1022
Stage 1	-	-	-	-	-	-	893	803	-	967	856	-
Stage 2	-	-	-	-	-	-	964	847	-	893	803	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1546	-	-	1485	-	-	799	722	948	805	732	1022
Mov Cap-2 Maneuver	-	-	-	-	-	-	799	722	-	805	732	-
Stage 1	-	-	-	-	-	-	891	801	-	965	856	-
Stage 2	-	-	-	-	-	-	960	847	-	891	801	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1546	-	-	1485	-	-	823
HCM Lane V/C Ratio	-	0.002	-	-	-	-	-	0.027
HCM Control Delay (s)	0	7.3	0	-	0	-	-	9.5
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	36	0	0	21	3	0	0	1	6	1	19
Future Vol, veh/h	45	36	0	0	21	3	0	0	1	6	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	5	2	2	2	11	2	2	2	2	2	2	2
Mvmt Flow	66	53	0	0	31	4	0	0	1	9	1	28

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	35	0	0	53	0	0	233	220	53	219	218	33
Stage 1	-	-	-	-	-	-	185	185	-	33	33	-
Stage 2	-	-	-	-	-	-	48	35	-	186	185	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1557	-	-	1553	-	-	722	678	1014	737	680	1041
Stage 1	-	-	-	-	-	-	817	747	-	983	868	-
Stage 2	-	-	-	-	-	-	965	866	-	816	747	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1557	-	-	1553	-	-	678	648	1014	711	650	1041
Mov Cap-2 Maneuver	-	-	-	-	-	-	678	648	-	711	650	-
Stage 1	-	-	-	-	-	-	781	714	-	940	868	-
Stage 2	-	-	-	-	-	-	938	866	-	779	714	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.1	0	8.6	9.1
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1014	1557	-	-	1553	-	-	921
HCM Lane V/C Ratio	0.001	0.043	-	-	-	-	-	0.042
HCM Control Delay (s)	8.6	7.4	0	-	0	-	-	9.1
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	4	28	6	1	6	19	180	1	11	241	9
Future Vol, veh/h	9	4	28	6	1	6	19	180	1	11	241	9
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	12	3	2	10	2	2
Mvmt Flow	10	4	30	6	1	6	20	194	1	12	259	10

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	536	533	274	550	538	205	274	0	0	200	0	0
Stage 1	293	293	-	240	240	-	-	-	-	-	-	-
Stage 2	243	240	-	310	298	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.22	-	-	4.2	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.308	-	-	2.29	-	-
Pot Cap-1 Maneuver	455	453	765	446	450	836	1234	-	-	1326	-	-
Stage 1	715	670	-	763	707	-	-	-	-	-	-	-
Stage 2	761	707	-	700	667	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	436	436	758	412	433	828	1228	-	-	1320	-	-
Mov Cap-2 Maneuver	436	436	-	412	433	-	-	-	-	-	-	-
Stage 1	699	659	-	745	691	-	-	-	-	-	-	-
Stage 2	737	691	-	657	656	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.3		11.9		0.8		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1228	-	-	614	539	1320	-	-
HCM Lane V/C Ratio	0.017	-	-	0.072	0.026	0.009	-	-
HCM Control Delay (s)	8	0	-	11.3	11.9	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	
Traffic Vol, veh/h	8	54	9	92	19	22	1	94	120	40	169	6
Future Vol, veh/h	8	54	9	92	19	22	1	94	120	40	169	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	400	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	14	2	25	2	18	5	2	4	6	6	7	40
Mvmt Flow	9	61	10	103	21	25	1	106	135	45	190	7

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	483	527	194	427	395	106	197	0	0	241	0	0
Stage 1	284	284	-	108	108	-	-	-	-	-	-	-
Stage 2	199	243	-	319	287	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.52	6.45	7.12	6.68	6.25	4.12	-	-	4.16	-	-
Critical Hdwy Stg 1	6.24	5.52	-	6.12	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.52	-	6.12	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4.018	3.525	3.518	4.162	3.345	2.218	-	-	2.254	-	-
Pot Cap-1 Maneuver	475	456	792	538	518	940	1376	-	-	1302	-	-
Stage 1	698	676	-	897	776	-	-	-	-	-	-	-
Stage 2	776	705	-	693	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	434	438	792	461	497	940	1376	-	-	1302	-	-
Mov Cap-2 Maneuver	434	438	-	461	497	-	-	-	-	-	-	-
Stage 1	697	650	-	896	775	-	-	-	-	-	-	-
Stage 2	734	704	-	596	621	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	15	0	1.5
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1376	-	-	464	509	1302	-
HCM Lane V/C Ratio	0.001	-	-	0.172	0.294	0.035	-
HCM Control Delay (s)	7.6	0	-	14.4	15	7.9	0
HCM Lane LOS	A	A	-	B	C	A	A
HCM 95th %tile Q(veh)	0	-	-	0.6	1.2	0.1	-

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	93	22	0	37	17	13	0	0	13	3	2
Future Vol, veh/h	2	93	22	0	37	17	13	0	0	13	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	2	5	2	2	5	14	2	2	2	2	2	2
Mvmt Flow	3	139	33	0	55	25	19	0	0	19	4	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	80	0	0	172	0	0	233	242	156	230	246	68
Stage 1	-	-	-	-	-	-	162	162	-	68	68	-
Stage 2	-	-	-	-	-	-	71	80	-	162	178	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1518	-	-	1405	-	-	722	660	890	725	656	995
Stage 1	-	-	-	-	-	-	840	764	-	942	838	-
Stage 2	-	-	-	-	-	-	939	828	-	840	752	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1518	-	-	1405	-	-	715	659	890	724	655	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	715	659	-	724	655	-
Stage 1	-	-	-	-	-	-	838	762	-	940	838	-
Stage 2	-	-	-	-	-	-	931	828	-	838	750	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			10.2			10.1		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	715	1518	-	-	1405	-	-	733
HCM Lane V/C Ratio	0.027	0.002	-	-	-	-	-	0.037
HCM Control Delay (s)	10.2	7.4	0	-	0	-	-	10.1
HCM Lane LOS	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	58	1	1	34	5	2	2	2	9	4	19
Future Vol, veh/h	45	58	1	1	34	5	2	2	2	9	4	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	5	2	2	2	11	2	2	2	2	2	2	2
Mvmt Flow	66	85	1	1	50	7	3	3	3	13	6	28

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	57	0	0	86	0	0	291	277	86	277	274	54
Stage 1	-	-	-	-	-	-	218	218	-	56	56	-
Stage 2	-	-	-	-	-	-	73	59	-	221	218	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1528	-	-	1510	-	-	661	631	973	675	633	1013
Stage 1	-	-	-	-	-	-	784	723	-	956	848	-
Stage 2	-	-	-	-	-	-	937	846	-	781	723	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1528	-	-	1510	-	-	615	602	973	647	604	1013
Mov Cap-2 Maneuver	-	-	-	-	-	-	615	602	-	647	604	-
Stage 1	-	-	-	-	-	-	749	690	-	913	847	-
Stage 2	-	-	-	-	-	-	904	845	-	740	690	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	3.2		0.2		10.2		9.7	
HCM LOS					B		A	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	695	1528	-	-	1510	-	-	814
HCM Lane V/C Ratio	0.013	0.043	-	-	0.001	-	-	0.058
HCM Control Delay (s)	10.2	7.5	0	-	7.4	0	-	9.7
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	11	4	31	6	1	6	25	180	1	11	241	12
Future Vol, veh/h	11	4	31	6	1	6	25	180	1	11	241	12
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	12	3	2	10	2	2
Mvmt Flow	12	4	33	6	1	6	27	194	1	12	259	13

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	552	549	276	567	555	205	277	0	0	200	0	0
Stage 1	295	295	-	254	254	-	-	-	-	-	-	-
Stage 2	257	254	-	313	301	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.22	-	-	4.2	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.308	-	-	2.29	-	-
Pot Cap-1 Maneuver	444	443	763	434	440	836	1230	-	-	1326	-	-
Stage 1	713	669	-	750	697	-	-	-	-	-	-	-
Stage 2	748	697	-	698	665	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	424	423	756	397	420	828	1224	-	-	1320	-	-
Mov Cap-2 Maneuver	424	423	-	397	420	-	-	-	-	-	-	-
Stage 1	692	658	-	728	676	-	-	-	-	-	-	-
Stage 2	719	676	-	652	654	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.5		12		1		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1224	-	-	602	525	1320	-	-
HCM Lane V/C Ratio	0.022	-	-	0.082	0.027	0.009	-	-
HCM Control Delay (s)	8	0	-	11.5	12	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.1	0	-	-

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	
Traffic Vol, veh/h	11	55	9	92	20	22	1	96	120	40	172	11
Future Vol, veh/h	11	55	9	92	20	22	1	96	120	40	172	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	400	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	14	2	25	2	18	5	2	4	6	6	7	40
Mvmt Flow	12	62	10	103	22	25	1	108	135	45	193	12

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	490	534	199	435	405	108	205	0	0	243	0	0
Stage 1	289	289	-	110	110	-	-	-	-	-	-	-
Stage 2	201	245	-	325	295	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.52	6.45	7.12	6.68	6.25	4.12	-	-	4.16	-	-
Critical Hdwy Stg 1	6.24	5.52	-	6.12	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.52	-	6.12	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4.018	3.525	3.518	4.162	3.345	2.218	-	-	2.254	-	-
Pot Cap-1 Maneuver	470	452	787	531	511	938	1366	-	-	1300	-	-
Stage 1	693	673	-	895	774	-	-	-	-	-	-	-
Stage 2	774	703	-	687	641	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	428	434	787	453	491	938	1366	-	-	1300	-	-
Mov Cap-2 Maneuver	428	434	-	453	491	-	-	-	-	-	-	-
Stage 1	692	647	-	894	773	-	-	-	-	-	-	-
Stage 2	731	702	-	589	616	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.6		15.2		0		1.4	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1366	-	-	458	501	1300	-	-
HCM Lane V/C Ratio	0.001	-	-	0.184	0.301	0.035	-	-
HCM Control Delay (s)	7.6	0	-	14.6	15.2	7.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	1.3	0.1	-	-

Intersection						
Int Delay, s/veh	3.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	24	5	1	13	5
Future Vol, veh/h	1	24	5	1	13	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	5	1	14	5

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	27	0	25
Stage 1	-	-	-	-	14
Stage 2	-	-	-	-	11
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1587	-	991
Stage 1	-	-	-	-	1009
Stage 2	-	-	-	-	1012
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1587	-	988
Mov Cap-2 Maneuver	-	-	-	-	988
Stage 1	-	-	-	-	1009
Stage 2	-	-	-	-	1009

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1008	-	-	1587	-
HCM Lane V/C Ratio	0.019	-	-	0.003	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	1.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	44	25	8	25	15	4
Future Vol, veh/h	44	25	8	25	15	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	27	9	27	16	4

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	75	0	107 62
Stage 1	-	-	-	-	62 -
Stage 2	-	-	-	-	45 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1524	-	891 1003
Stage 1	-	-	-	-	961 -
Stage 2	-	-	-	-	977 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1524	-	886 1003
Mov Cap-2 Maneuver	-	-	-	-	886 -
Stage 1	-	-	-	-	961 -
Stage 2	-	-	-	-	971 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	908	-	-	1524	-
HCM Lane V/C Ratio	0.023	-	-	0.006	-
HCM Control Delay (s)	9.1	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

PRELIMINARY PLAT

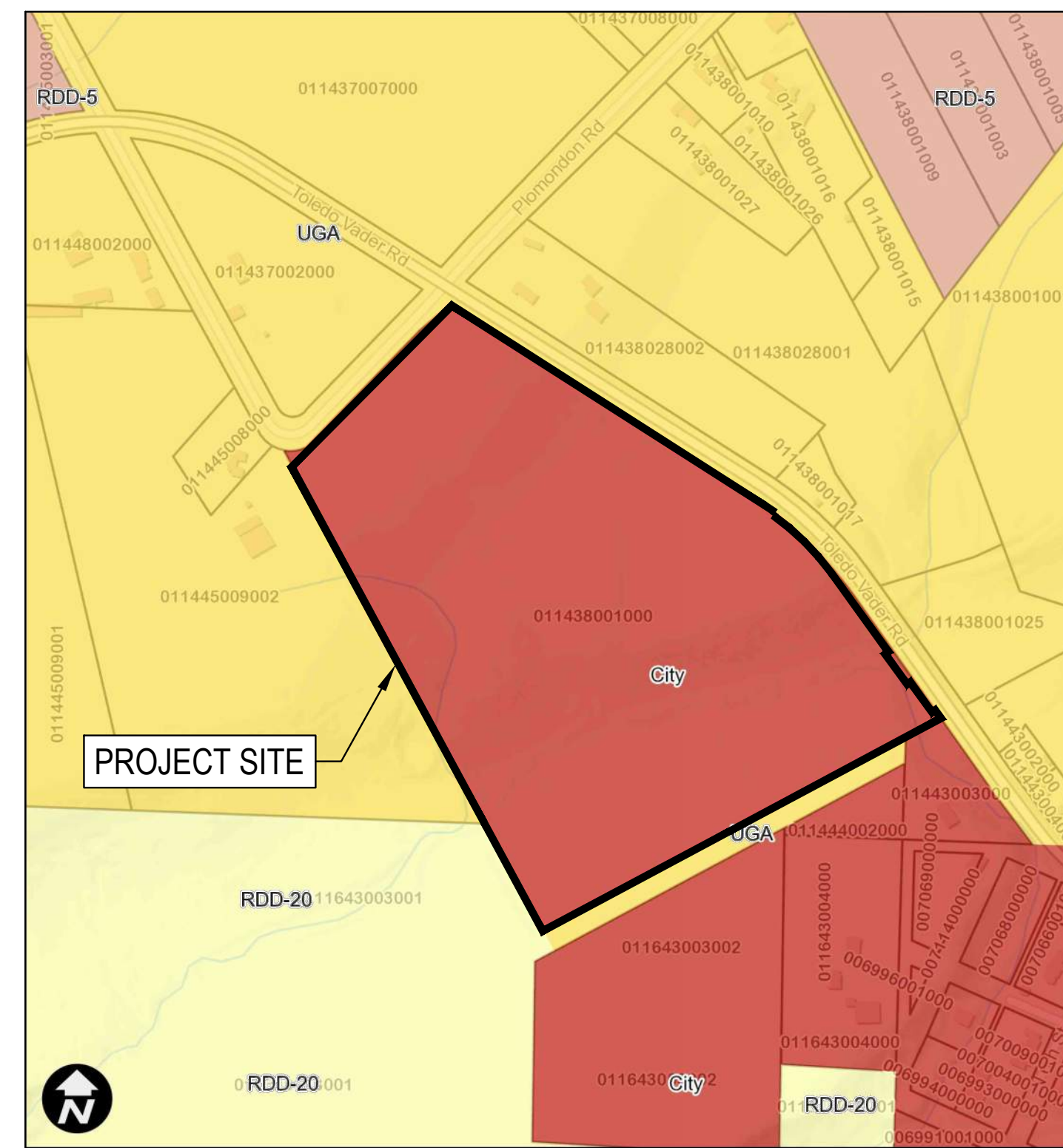
FOR COWLITZ MEADOWS

TOLEDO, WA

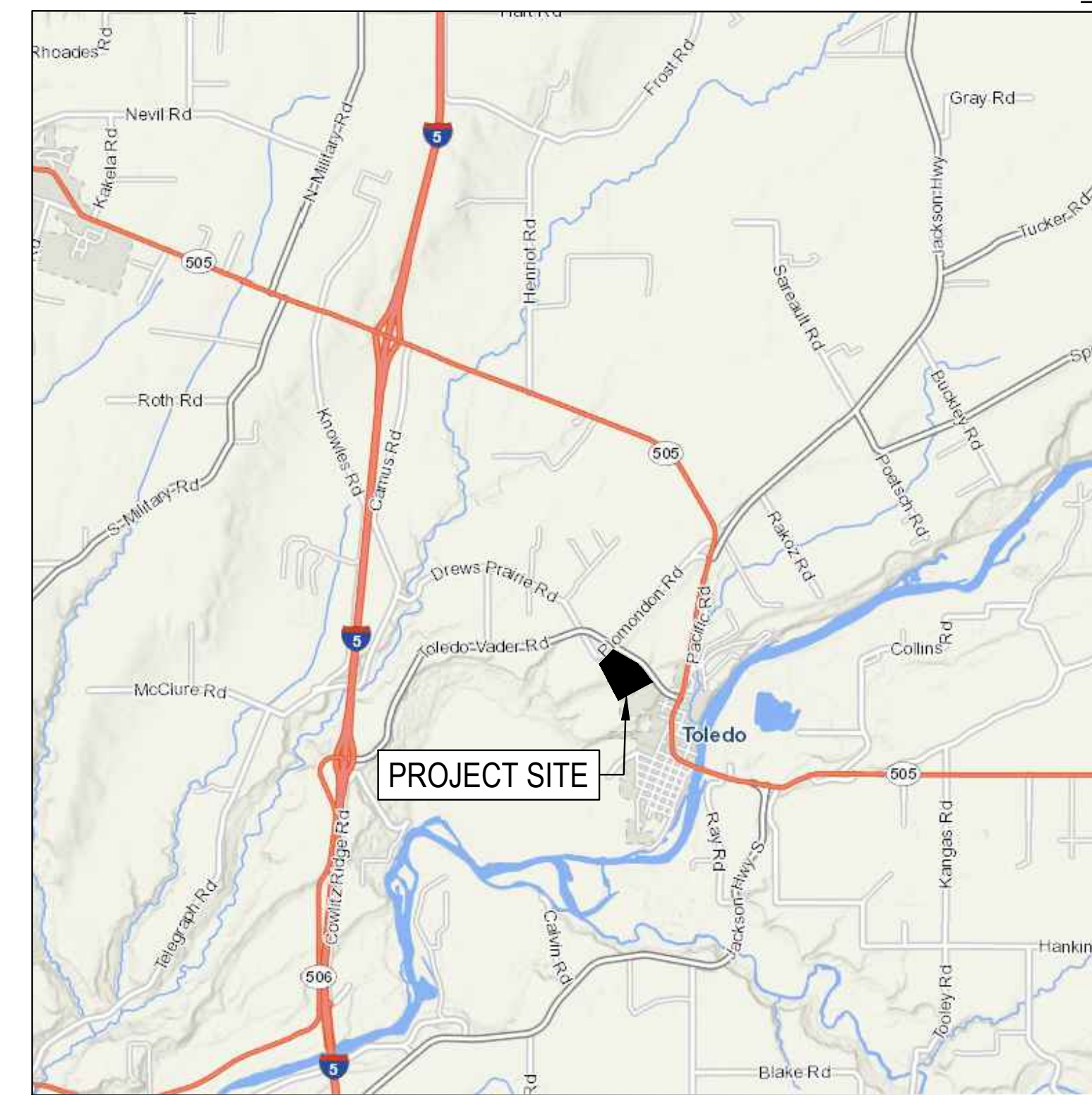
OWNER:
RED ROCK CONSTRUCTION, LLC
 PO BOX 1080
 TOLEDO, WA 98591
 CONTACT: MAX HALBERG
 PHONE: (360) 864-8819
 EMAIL: MAX@MIDWAYUNDERGROUNDLLC.COM

ENGINEER:
WINDSOR ENGINEERS
 CONTACT: EMILY STEPHENS
 PHONE: 612-351-2331
 EMAIL: ESTEPHENS@WINDSORENGINEERS.COM

SHEET INDEX	
P1	COVER
P2	EXISTING CONDITIONS
P3	PRELIMINARY PLAT
P4	PRELIMINARY STREET PLAN
P5	PRELIMINARY GRADING
P6	PRELIMINARY STORMWATER POND ENLARGED PLAN
P7	PRELIMINARY POND SECTIONS



PARCEL AND ZONING MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

SITE INFORMATION

SITE ADDRESS:
 PLOMONDON RD & TOLEDO-VADER RD
 TOLEDO, WA 98591

PARCEL NUMBER: 011438001000

PARCEL SIZE: 36.62 ACRES

ZONING: R-RESIDENTIAL

ASSESSOR'S USE DESCRIPTION:
 91 RESIDENTIAL LAND - UNDIVIDED

PARTIAL LEGAL DESCRIPTION:
 SECTION 07 TOWNSHIP 11N RANGE 01W PT S. PLOMONDON DLC S W
 MCNULTY-BURBEE RD SE COWLITZ-OLYMPIA RD SECS 7/8



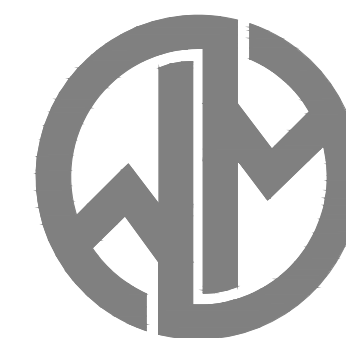
Know what's below.
Call before you dig.

CALL 2 BUSINESS DAYS BEFORE YOU DIG.
 CAUTION: UTILITY INFORMATION IS APPROXIMATE.
 VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION.

Revisions:

No.	Description	Date

LINE IS 1" ON FULL
 SCALE DRAWING



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 TOLEDO, WA

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 Issue Date: 2022-06-21

Project Manager ES
 Drawn by CKJ
 Checked by TS

COVER

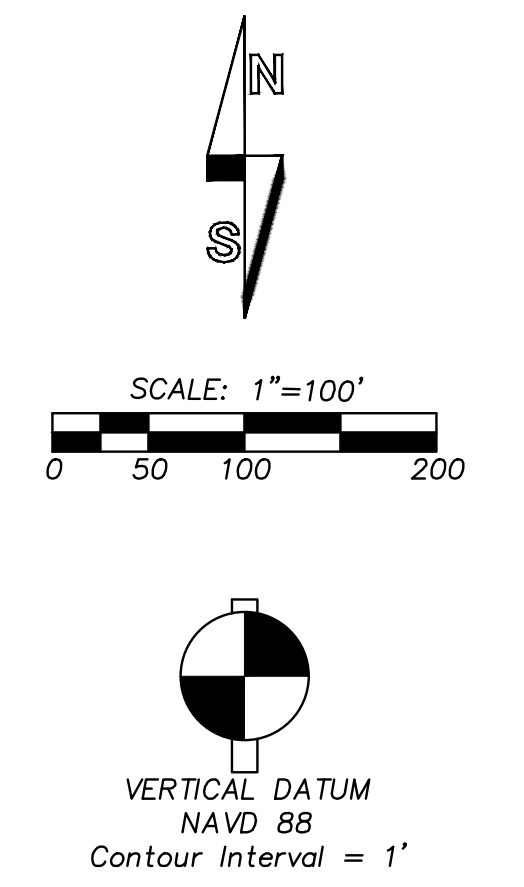
P1

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BOUNDARY & TOPOGRAPHIC SURVEY
 A portion of the Northwest Quarter of the Northeast Quarter of Section 15,
 Township 17 North, Range 2 West, W.M. in Thurston County, Washington.

BUTLER SURVEYING 476 NW CHERHALIS AVENUE P.O. BOX 148, CHERHALIS, WA 98632 360/748-8803		
Drawn: TS	Date: 5/5/22	
Checked: CB	Job No.: 21-425	
Scale: 1" = 100'	Sheet 1 of 1	

- LEGEND**
- FOUND CORNER AS NOTED
 - SET 1/2" REBAR WITH CAP "PLS 36792-86894 PLS"
 - ⊕ CALCULATED POSITION
 - WM WATER METER
 - WV WATER VALVE
 - ⊕ FIRE HYDRANT
 - ⊕ UTILITY POLE
 - EB ELECTRIC BOX
 - GA GUY ANCHOR
 - TP TELEPHONE PEDESTAL
 - S SEPTIC LID
 - CO SEPTIC CLEAN OUT
 - ⊕ SANITARY SEWER MANHOLE
 - ⊕ STORM DRAINAGE MANHOLE
 - RS ROAD SIGN
 - FENCE LINE
 - OH OVERHEAD UTILITY WIRES
 - UE UNDERGROUND ELECTRIC CONDUIT
 - 40" FIR Tree Size and Type
 - Tree Location
 - WELL



AFN 3532426 KJB

TBM #2
 SET 5/8" REBAR W/ CAP "TRAV"
 N: 415617.75
 E: 1046551.27
 EL=304.45'
 INV=301.86'
 24" RCP
 INV=301.39'

TBM #1
 SET 5/8" REBAR W/ CAP "TRAV"
 N: 415403.81
 E: 1046409.13
 EL=304.60'

1 EXISTING CONDITIONS
 Scale: 1" = 100'

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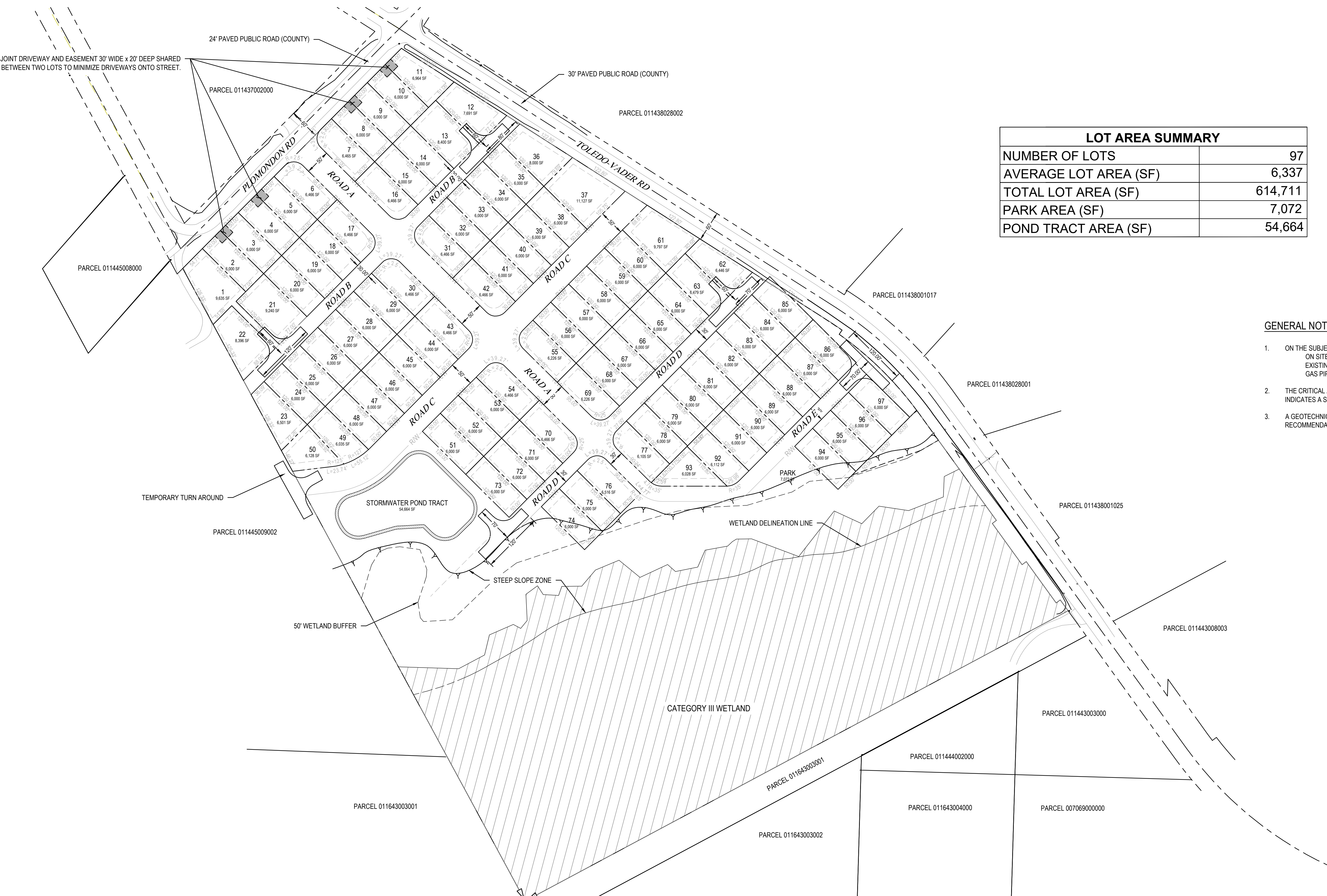
EXISTING CONDITIONS

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 Drawn by: CKJ
 Checked by: TS

P2

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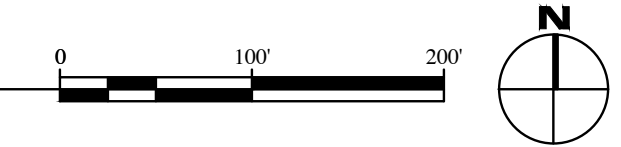
PLOT DATE: 02/17/2022 12:53 PM - FILE: C:\Users\Christine.James\Windsor Crew\Dropbox\03_Operations\01_Current\Projects\21217\Cowlitz Meadows\02_Drawings\01_Working\Sheets\21217_plat.dwg



LOT AREA SUMMARY	
NUMBER OF LOTS	97
AVERAGE LOT AREA (SF)	6,337
TOTAL LOT AREA (SF)	614,711
PARK AREA (SF)	7,072
POND TRACT AREA (SF)	54,664

- GENERAL NOTES:**
- ON THE SUBJECT PARCEL, THERE ARE NO KNOWN ON SITE SEPTIC TANKS, DRAIN FIELDS EXISTING/PROPOSED WELLS GAS PIPELINES/EASEMENTS
 - THE CRITICAL AREAS REPORT PREPARED BY LOOWIT CONSULTING GROUP INDICATES A STEEP SLOPE ZONE AND A CATEGORY III WETLAND.
 - A GEOTECHNICAL REPORT PREPARED BY STRATA, INC. PROVIDES RECOMMENDATIONS FOR THIS SITE.

1 PLAN
Scale: 1" = 100'



Revisions:

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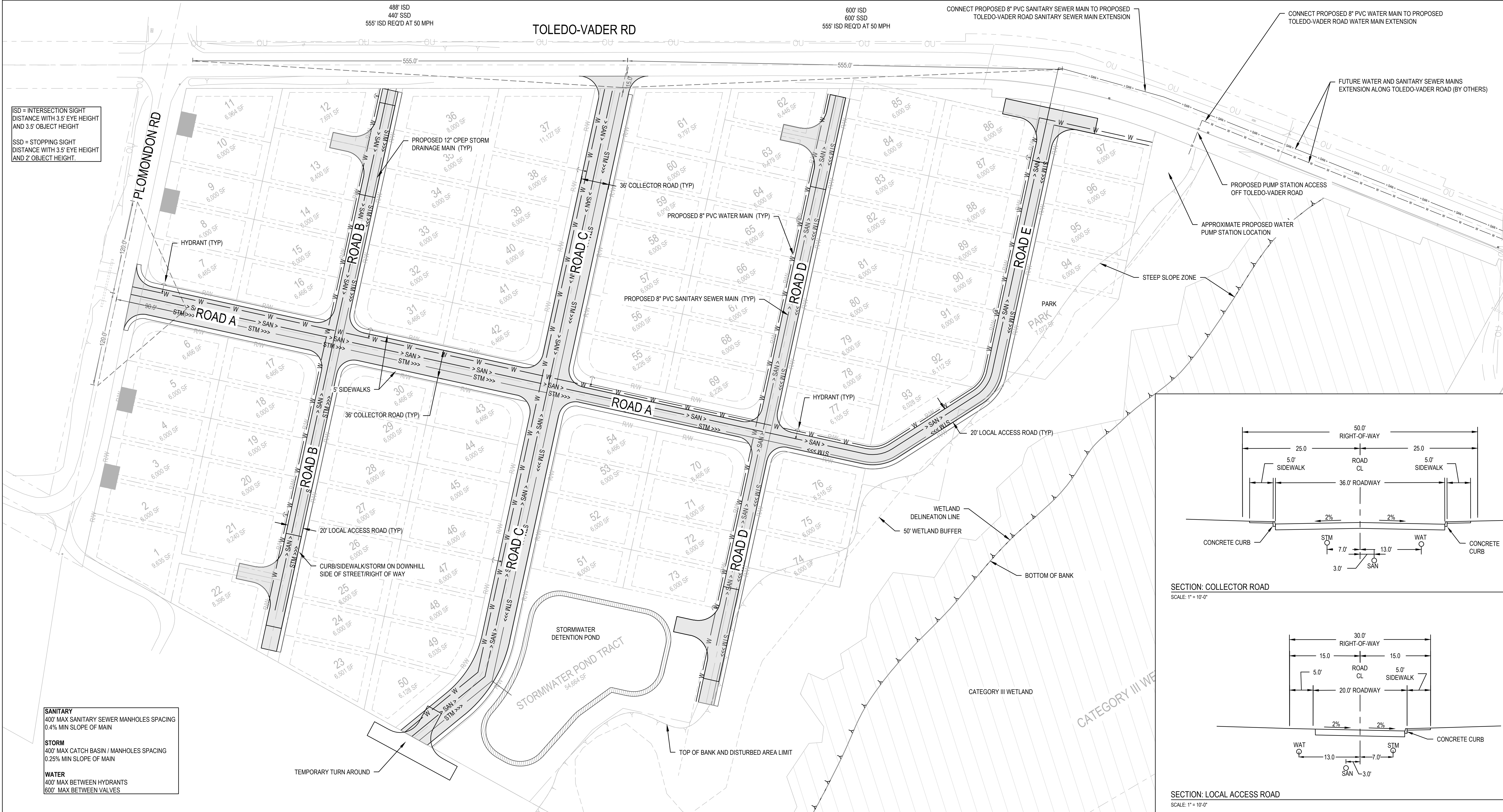
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PRELIMINARY PLAT

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 Drawn by CKJ
 Checked by TS

P3

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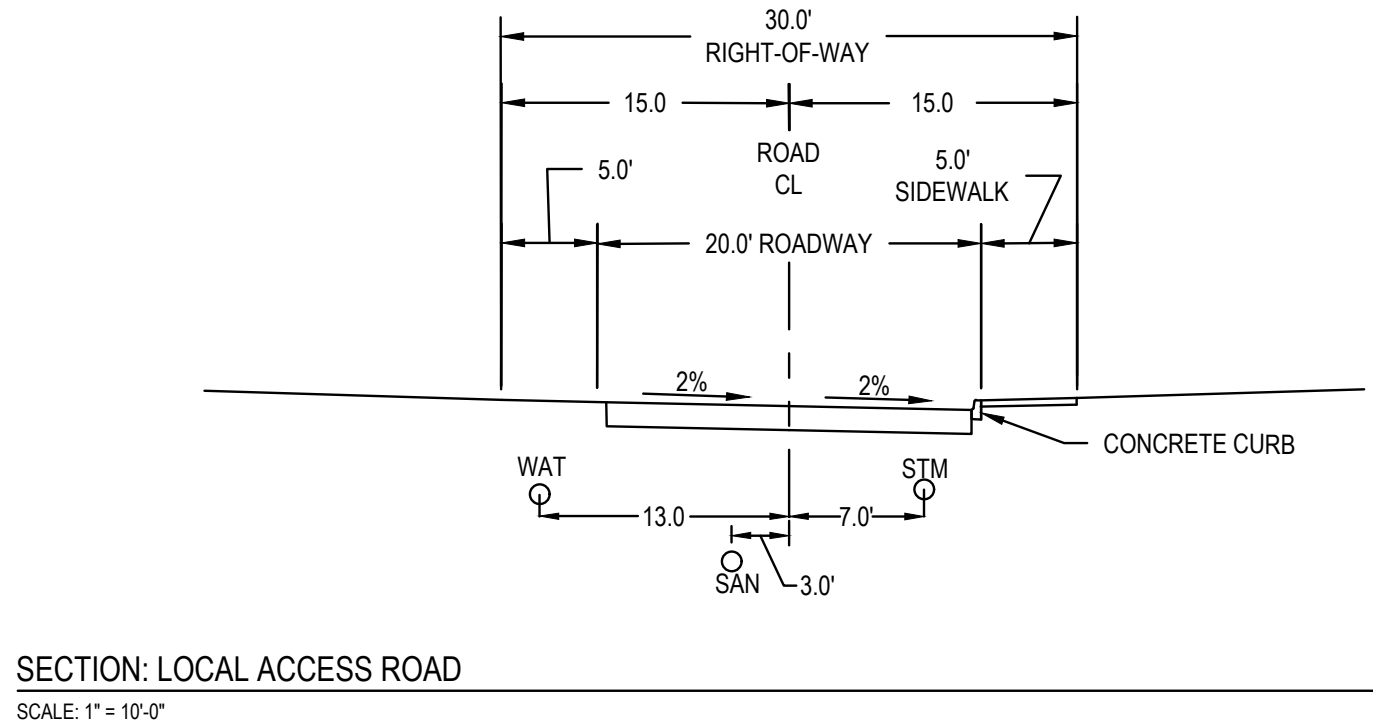
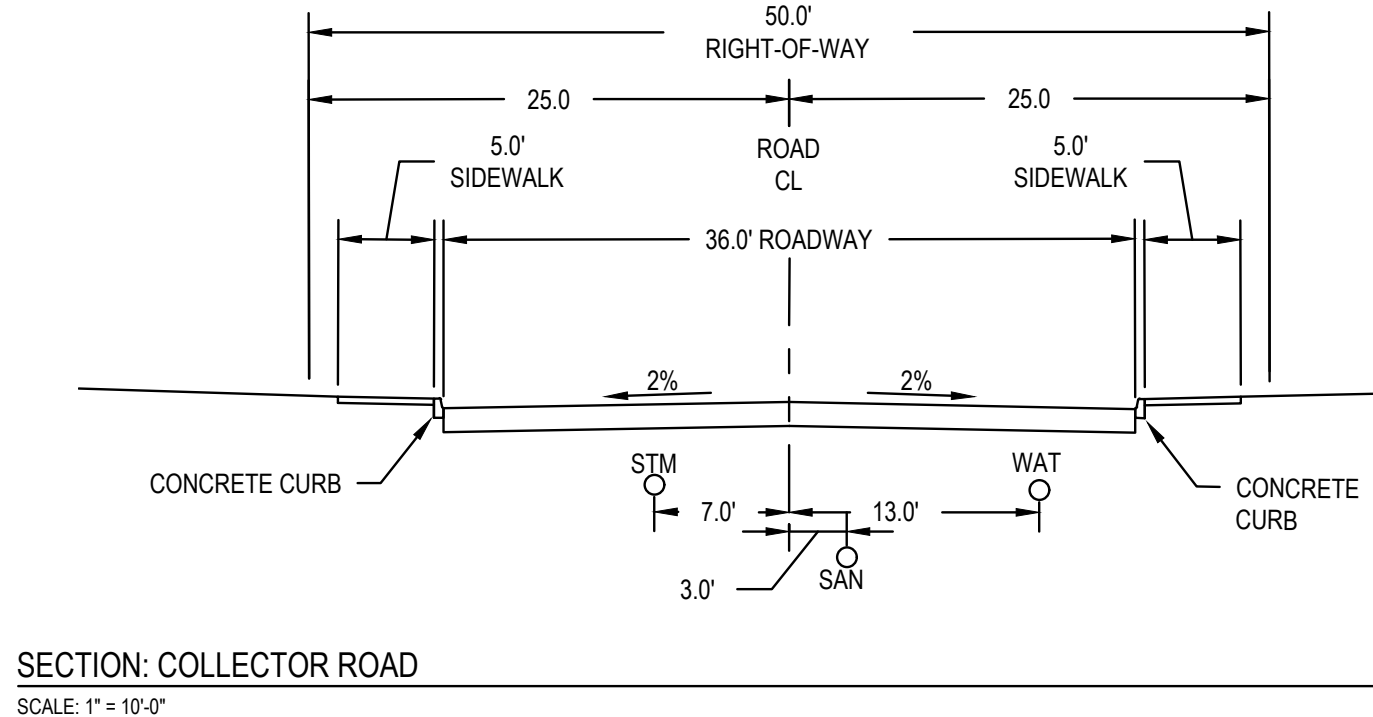


ISD = INTERSECTION SIGHT DISTANCE WITH 3.5' EYE HEIGHT AND 3.5' OBJECT HEIGHT
 SSD = STOPPING SIGHT DISTANCE WITH 3.5' EYE HEIGHT AND 2' OBJECT HEIGHT.

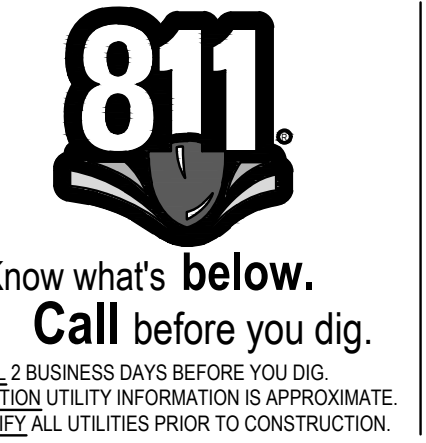
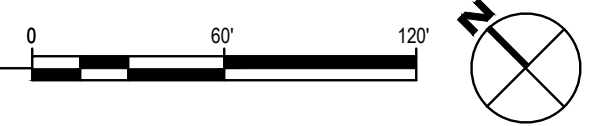
SANITARY
 400' MAX SANITARY SEWER MANHOLES SPACING
 0.4% MIN SLOPE OF MAIN

STORM
 400' MAX CATCH BASIN / MANHOLES SPACING
 0.25% MIN SLOPE OF MAIN

WATER
 400' MAX BETWEEN HYDRANTS
 600' MAX BETWEEN VALVES



1 SITE PLAN
 Scale: 1" = 60'



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PRELIMINARY STREET PLAN

P4

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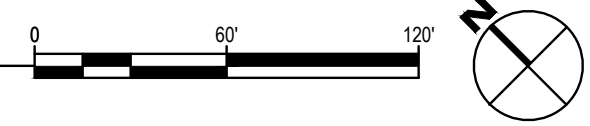
TOLEDO-VADER RD

PLOMONDON RD



**PRELIMINARY EARTHWORK
CALCULATIONS**
 CUT: 22,000 CY
 FILL: 27,000 CY
 NET FILL: 5,000 CY

1 SITE PLAN
 Scale: 1" = 60'



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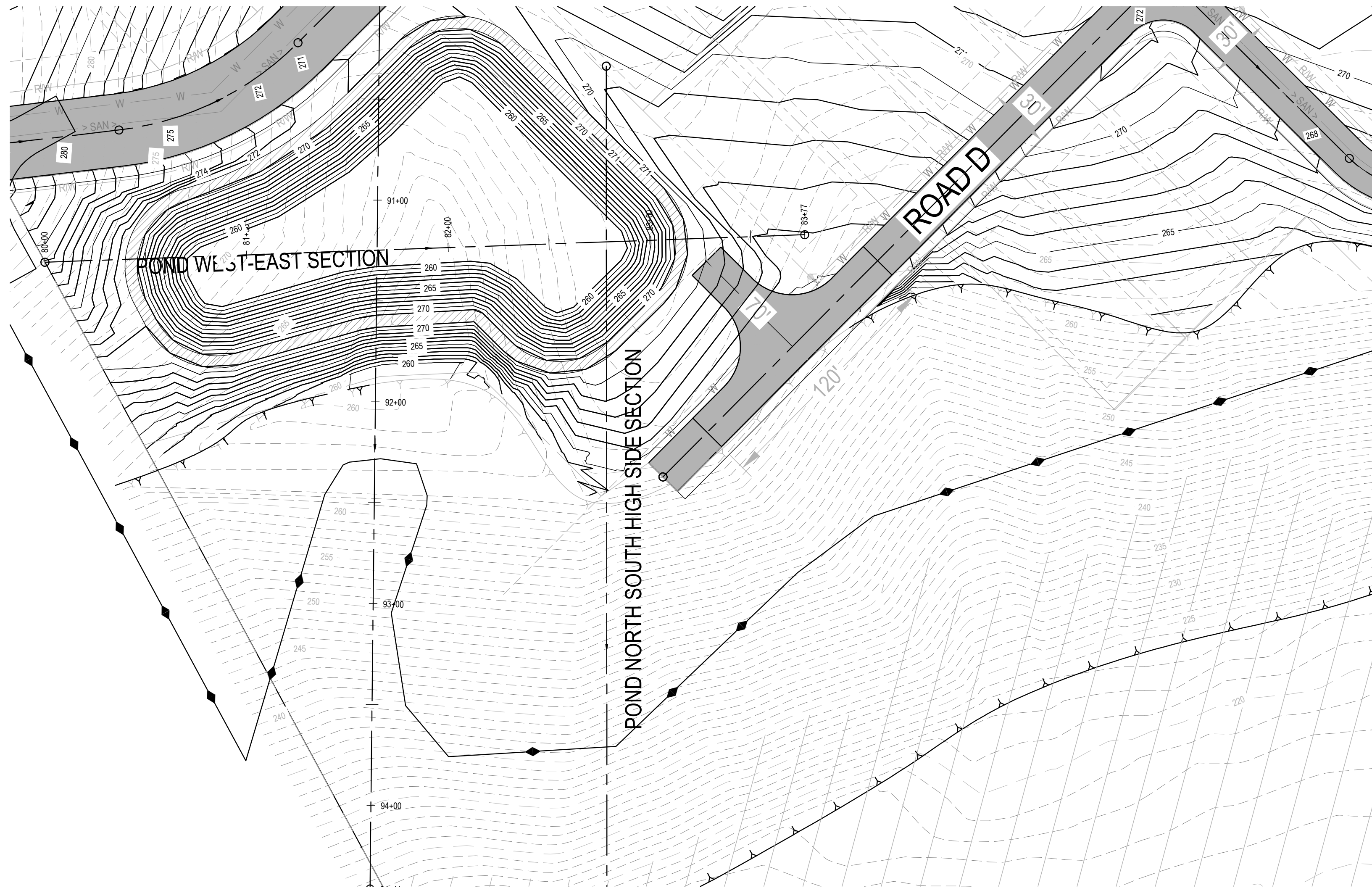
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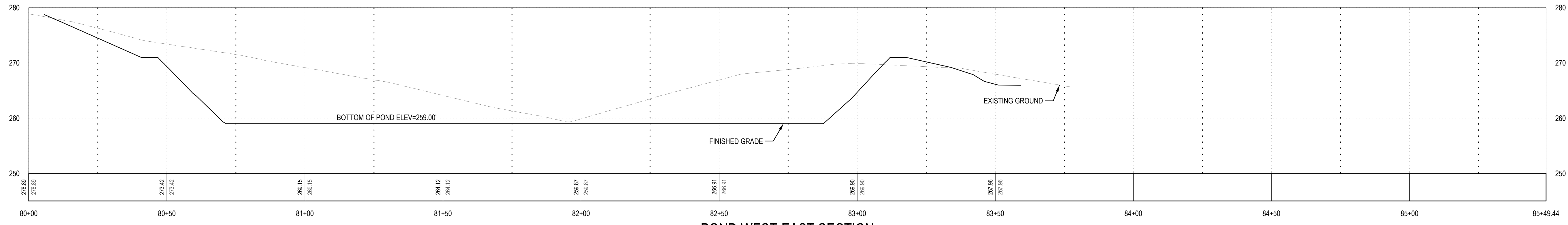
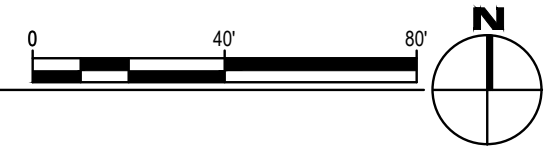
Project Manager: ES
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PRELIMINARY GRADING PLAN
P5

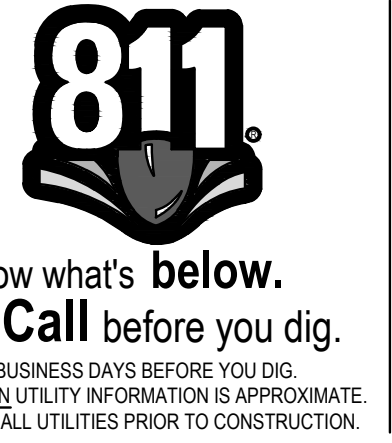
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1 POND PLAN
Scale: 1" = 40'



A SECTION A:A POND WEST-EAST SECTION
Scale: HORIZONTAL 1" = 20' VERTICAL 1"=10'



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PRELIMINARY PLAT RE-SUBMITTAL
 Issue Date: 2022-06-21

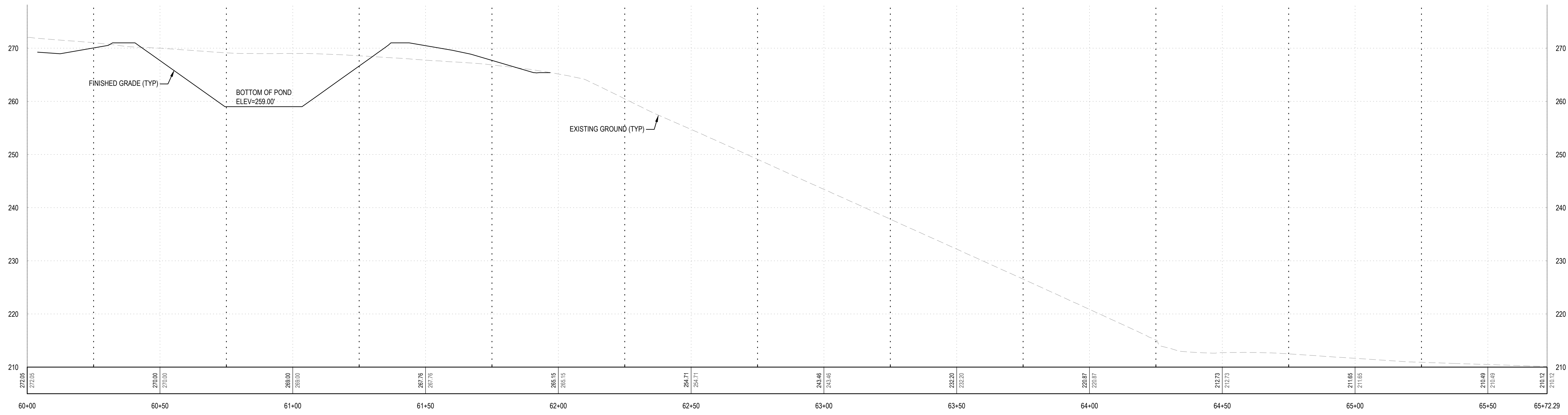
Project Manager ES
 Drawn by CKJ
 Checked by TS

PRELIMINARY STORMWATER POND ENLARGED PLAN

P6

ISSUED FOR PRE-PLAT APPROVAL ONLY

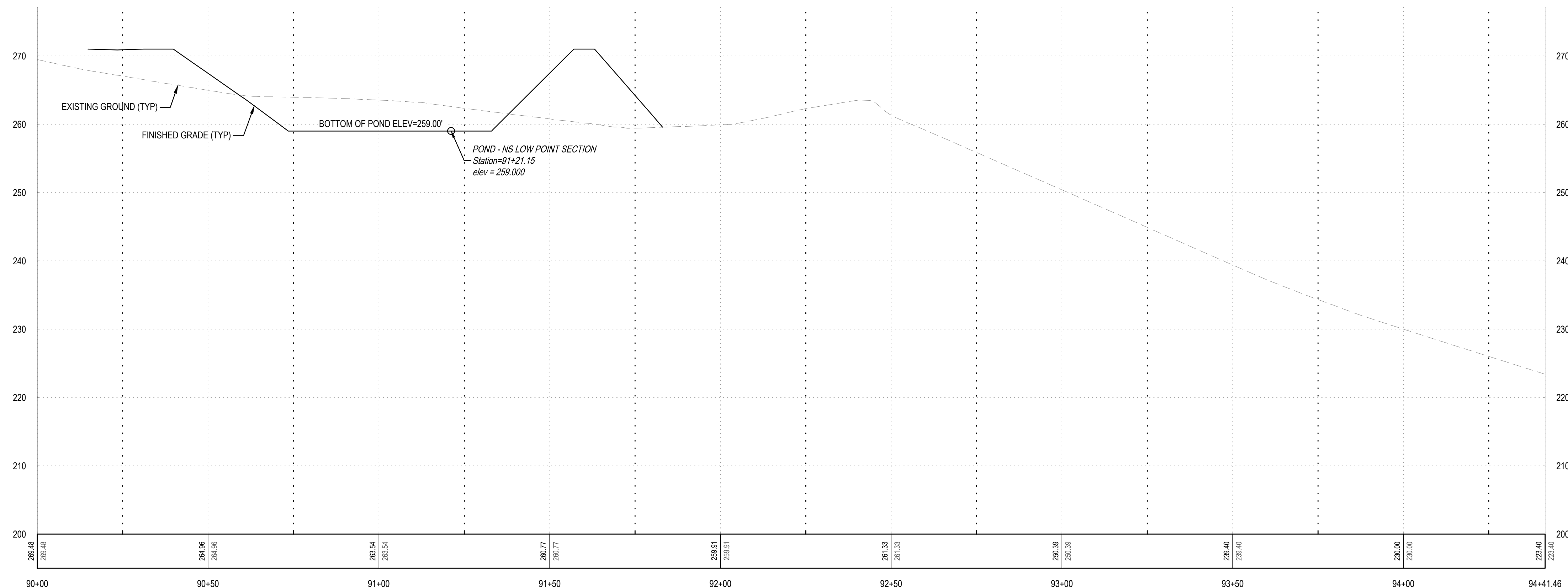
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POND NORTH SOUTH HIGH SIDE SECTION

B SECTION B-B: POND NORTH-SOUTH SECTION AT HIGH POINT

Scale: HORIZONTAL 1" = 20' VERTICAL 1"=10'



POND NORTH SOUTH LOW POINT SECTION

C SECTION C-C: POND NORTH-SOUTH SECTION AT LOW POINT

Scale: HORIZONTAL 1" = 20' VERTICAL 1"=10'

Revisions:

No.	Description	Date

LINE IS 1" ON FULL SCALE DRAWING

811
Know what's below.
Call before you dig.
CALL 2 BUSINESS DAYS BEFORE YOU DIG.
CAUTION: UTILITY INFORMATION IS APPROXIMATE.
VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION.

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Project No: 21217
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Travis Torrey
34472
REGISTERED PROFESSIONAL ENGINEER

COWLITZ MEADOWS
TOLEDO, WA

PRELIMINARY PLAT RE-SUBMITTAL
Issue Date: 2022-06-21

PRELIMINARY POND SECTIONS

Project Manager: ES
Drawn by: CKJ
Checked by: TS

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ISSUED FOR PRE-PLAT APPROVAL ONLY