8. Traffic Impact Analysis (TIA)

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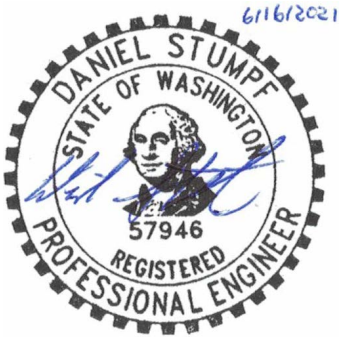

Oak Village Apartments

Transportation Impact Study

Woodland, Washington

Date:
June 16, 2021

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41st Avenue LLC

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Executive Summary

1. The proposed Oak Village Apartments will include the development of an apartment facility, located on several parcels to the northeast of Old Pacific Highway and west of Green Mountain Road in Woodland, Washington. Specifically, the facility will include the construction of eight, three-story apartment buildings (consisting of 186 dwelling units), a clubhouse/office building, a main access onto the proposed Burris Lane alignment, and an emergency access onto Green Mountain Road.
2. The trip generation calculations show that the proposed project is projected to generate 62 morning peak hour trips, 80 evening peak hour trips, and 1,002 average weekday trips.
3. No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.
4. Adequate sight distances are or can be made available at all proposed/potential site access locations to ensure safe operation along Old Pacific Highway and Green Mountain Road, provided the following mitigation are implemented:
    - At the potential Burris Lane location approximately 350 feet southeast of Belmont Loop, the minor-street approach will need to intersect Old Pacific Highway at approximately the same elevation.
    - At the proposed emergency access location along Green Mountain Road, any obstructing on-site foliage along the west side of the roadway will need to be removed to allow at least 390 feet of sight distances to the north and south.

    No other sight distance related mitigation is necessary or recommended.
5. Left-turn lane warrants are projected to be met at the following study intersections:
    - Burris Lane at Old Pacific Highway (regardless of alignment location): Southeast-bound left-turn lane warranted under 2023 buildout conditions.
    - Green Mountain Road at Old Pacific Highway: Southeast-bound left-turn lane warranted under 2021 existing conditions.

    Based on the queuing analysis and correspondence with City of Woodland staff, at a minimum the southbound left-turn turn lanes will need to provide sufficient queue storage to accommodate the projected 95th percentile queues at the Burris Lane intersection with Old Pacific Highway (regardless of location) and Green Mountain Road at Old Pacific Highway.
6. Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at any of the applicable study intersections under any of the analysis scenarios.
7. All study intersections are currently operating acceptably per City of Woodland standards and are projected to continue operating acceptably through the 2023 site buildout year.

Project Description

Introduction

The proposed Oak Village Apartments will include the development of an apartment facility, located on several parcels to the northeast of Old Pacific Highway and west of Green Mountain Road in Woodland, Washington. Specifically, the facility will include the construction of eight, three-story apartment buildings (consisting of 186 dwelling units), a clubhouse/office building, a main access onto the proposed Burris Lane alignment, and an emergency access onto Green Mountain Road.

Based on correspondence with City of Woodland staff, the report conducts safety and capacity/level of service analyses at the following intersections during the evening peak hour:

1. Interstate 5 (I-5) Southbound Ramps at Dike Access Road;
2. I-5 Northbound Ramps at Dike Access Road;
3. Belmont Loop/Burris Lane at Old Pacific Highway (potential site access location);
4. Green Mountain Road at Old Pacific Highway;
5. E Scott Avenue at Old Pacific Highway;
6. E Scott Avenue at Lewis River Road; and
7. Burris Lane at Green Mountain Road (site access intersection).

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

The project site is located northeast of Old Pacific Highway and west of Green Mountain Road in Woodland, Washington. The subject site is located within a developing area of the City, with a mix of small commercial, industrial, religious, and recreational land uses, as well as undeveloped land, surrounding the site in all directions. The site consists of several parcels (lots 508630100, 508620100, 508610100, and potentially portions of 508650100 and 508580100 to the north and south of lot 508610100), which encompass an approximate total of ±9.83 acres. The proposed apartment facility will be predominately developed on parcel 508630100, while the remaining lots may accommodate the future roadway alignment of Burris Lane.

The proposed Burris Lane alignment will provide public/general access to the site at two locations: along Green Mountain Road to the east of the site and Old Pacific Highway to the southwest. The specific location of the Burris Lane intersection with Old Pacific Highway is still under consideration, whereby two access analysis scenarios were studied: one scenario where Burris Lane would align with Belmont Loop (north segment) and another scenario where Burris Lane will intersect Old Pacific Highway approximately 350 feet to the southeast.

Figure 1 presents an aerial image of the nearby vicinity with the project site outlined in yellow.

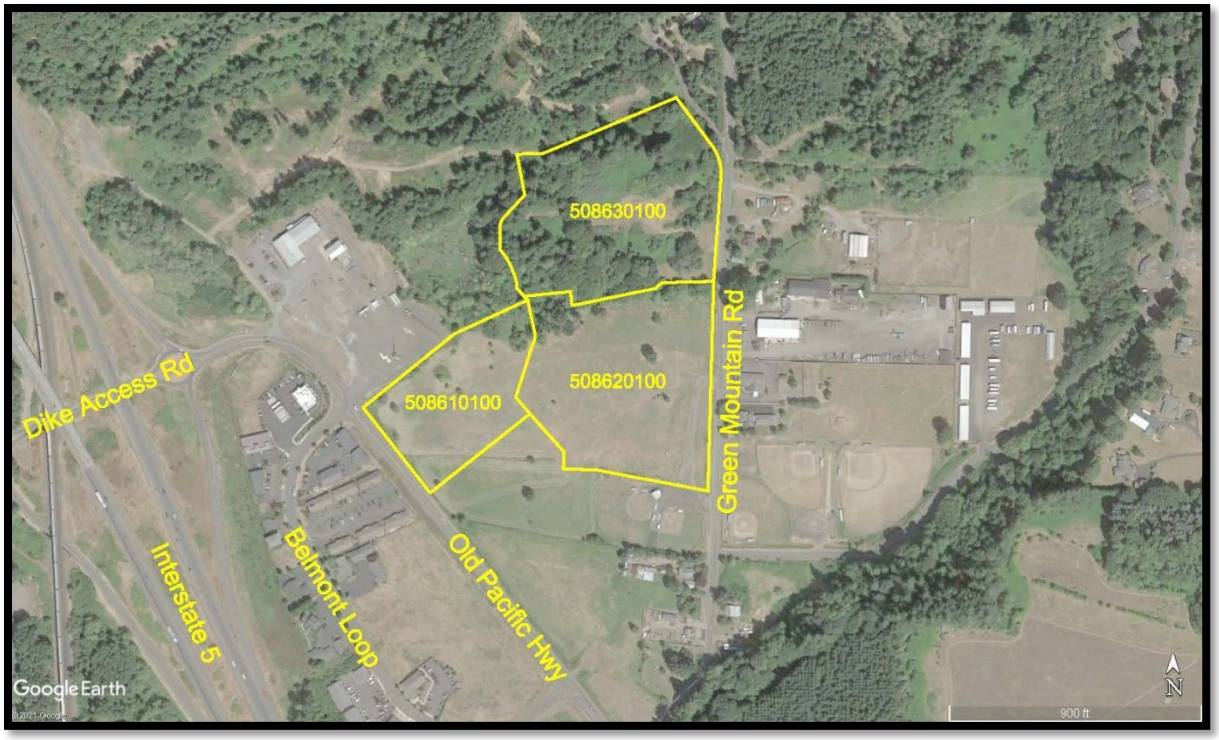


Figure 1: Aerial Photo of Site Vicinity (Image from Google Earth)

Vicinity Streets

The proposed development is expected to impact seven roadways near the site. Table 1 provides a description of each of the vicinity roadways.

Table 1: Vicinity Roadway Descriptions

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	On-Street Parking	Curbs & Sidewalks	Bicycle Lanes
Dike Access Road	WSDOT/City of Woodland	Minor Arterial	35	Not Permitted	Partial Both Sides	None
Belmont Loop	City of Woodland	Local Street	25	Permitted Both Sides	Partial Both Sides	None
Old Pacific Highway	City of Woodland	Minor Arterial	35	Not Permitted	Partial Both Sides	Partial Both Sides

Table Notes: Functional classification based on WSDOT Functional Classification Map.

Statutory speed based on Washington State Code Section RCW 46.61.400.

Table 1: Vicinity Roadway Descriptions (Continued)

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	On-Street Parking	Curbs & Sidewalks	Bicycle Lanes
Green Mountain Road	City of Woodland	Major Collector	35	Not Permitted	None	None
E Scott Avenue	City of Woodland	Major Collector	25	Not Permitted	Partial Both Sides	Partial Both Sides
NE Goerig Street	City of Woodland	Local Street	25	Not Permitted	None	None
Lewis River Road	WSDOT	Minor Arterial	35	Not Permitted	Partial Both Sides	Partial Both Sides

Table Notes: Functional classification based on WSDOT Functional Classification Map.

Statutory speed based on Washington State Code Section RCW 46.61.400.

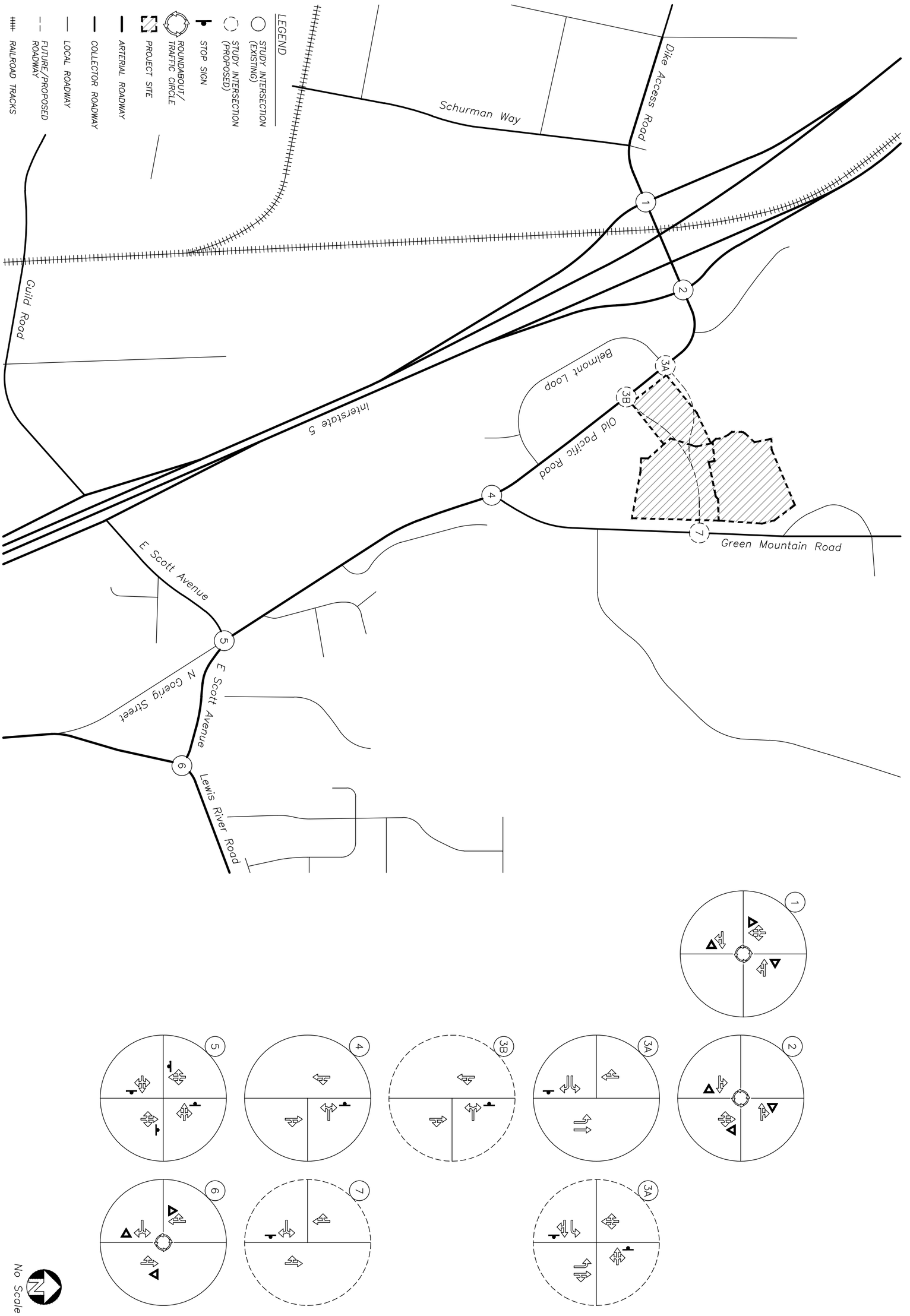
Study Intersections

Based on coordination with City of Woodland staff, six existing intersections were identified for analysis. A summarized description of these study intersections, under their existing lane configurations, is provided in Table 2.

Table 2: Study Intersection Descriptions

Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	I-5 SB Ramps at Dike Access Road	Four-Legged	Roundabout	SB/EB/WB Yield-Controlled
2	I-5 NB Ramps at Dike Access Road	Four-Legged	Roundabout	NB/EB/WB Yield-Controlled
3	Belmont Loop at Old Pacific Hwy (Potential Access Location)	Three-Legged	Stop-Controlled	EB Stop-Controlled Approach
4	Green Mountain Road at Old Pacific Highway	Three-Legged	Stop-Controlled	WB Stop-Controlled Approach
5	E Scott Avenue at Old Pacific Highway	Four-Legged	Stop-Controlled	All-Way Stop-Controlled
6	E Scott Avenue at Lewis River Road	Three-Legged	Roundabout	NB/SB/EB Yield-Controlled

A vicinity map showing the project site, vicinity streets, and study intersection configurations is shown in Figure 2.



VICINITY MAP

Figure 2
Oak Village Apartments
6/16/2021

Site Trips

Trip Generation

The proposed development will include the construction of eight, three-story apartment buildings consisting of 186 dwelling units. To estimate the number of trips that will be generated by the proposed use, trip equations from the *Trip Generation Manual*[1] were used. Specifically, data from land use code 221, *Multifamily Housing (Mid-Rise)*, was used to estimate site trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed project is projected to generate 63 morning peak hour trips, 80 evening peak hour trips, and 1,012 average weekday trips. The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are in the technical appendix to this report.

Table 3: Trip Generation Summary

Land Use	ITE Code	Size/Rate	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Multifamily Housing (Mid-Rise)	221	186 dwelling units	16	47	63	49	31	80	1,012

Trip Distribution

The directional distribution of site trips to/from the project site was estimated based on the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution is projected:

- Approximately 35 percent of site trips will travel to/from the south along I-5 (south of Dike Access Road);
- Approximately 25 percent of site trips will travel to/from the north along I-5 (north of Dike Access Road);
- Approximately 20 percent of site trips will travel to/from the south along Lewis River Road (south of N Goerig Street);
- Approximately 15 percent of site trips will travel to/from the west along Dike Access Road (west of I-5); and
- Approximately 5 percent of site trips will travel to/from the east along Lewis River Road (east/north of E Scott Avenue).

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Based on the site plan and locations of proposed accesses, site trips are expected to utilize site accesses as follows:

- Approximately 80 percent of site trips will utilize the proposed Burris Lane access along Old Pacific Highway; and
- Approximately 20 percent of site trips will utilize the proposed Burris Lane access along Green Mountain Road.

The trip distribution and assignment for the site trips generated during the evening peak hour is shown in Figure 3.

TRIP GENERATION	IN	OUT	TOTAL
PM	49	31	80

SITE TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Plan - Site Trips

PM Peak Hour

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Figure 3

Oak Village Apartments

6/16/2021

Traffic Volumes

Existing Conditions

Due to the ongoing COVID-19 viral pandemic, traffic volumes around Washington have been depressed relative to normal conditions. A review of available traffic count data yielded traffic counts at the I-5 ramp intersections along Dike Access Road from Wednesday, October 9, 2019, between 4:00 PM to 6:00 PM. Given these available counts, the following methodology for data collection and volume adjustment is suggested:

- The historical traffic counts from 2019 at the two I-5 ramp intersections along Dike Access Road were grown to reflect 2021 existing conditions by applying a two percent per year compounded growth rate over a two-year period.
- Since recent/historical traffic counts are not available at the other study intersections, current year 2021 evening peak hour counts were collected at the I-5 northbound ramps intersection at Dike Access Road as well as all other study intersections where evening peak hour count data was not available. These counts were collected on Thursday, March 4, 2021, between 4:00 PM and 6:00 PM.
- The 2019 historical count data (grown to reflect 2021 conditions) and the recently collected 2021 counts at the I-5 northbound ramps intersection were compared, specifically traffic traveling to/from the east of the I-5 ramps intersection. Based on the difference in peak hour volumes, an adjustment factor of 1.3259 was calculated. This adjustment factor is intended to estimate normal traffic conditions without impacts from the COVID-19 virus (i.e. normal commuter patterns, businesses open, etc).
- The calculated adjustment factor was applied to the traffic counts at all study intersections where 2021 count data was collected (excluding the I-5 northbound ramp intersection where historical data is available and used for the remainder of this study).

Data was used from each intersection's respective morning and evening peak hours.

The specific location of the Burris Lane intersection with Old Pacific Highway is still under consideration, whereby two access analysis scenarios were studied: one scenario where Burris Lane would align with Belmont Loop (north segment) and another scenario where Burris Lane will intersect Old Pacific Highway approximately 350 feet to the southeast. For the purposes of analyzing these two access scenarios, traffic volumes were determined for both locations.

Figure 4 shows the existing traffic volumes at the study intersections during the evening peak hour.

Background Conditions

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to approximate the future year 2023 traffic volumes at the study intersections, a compounded growth rate of two percent per year for an assumed buildout condition of two years was applied to the measured 2021 existing traffic volumes.

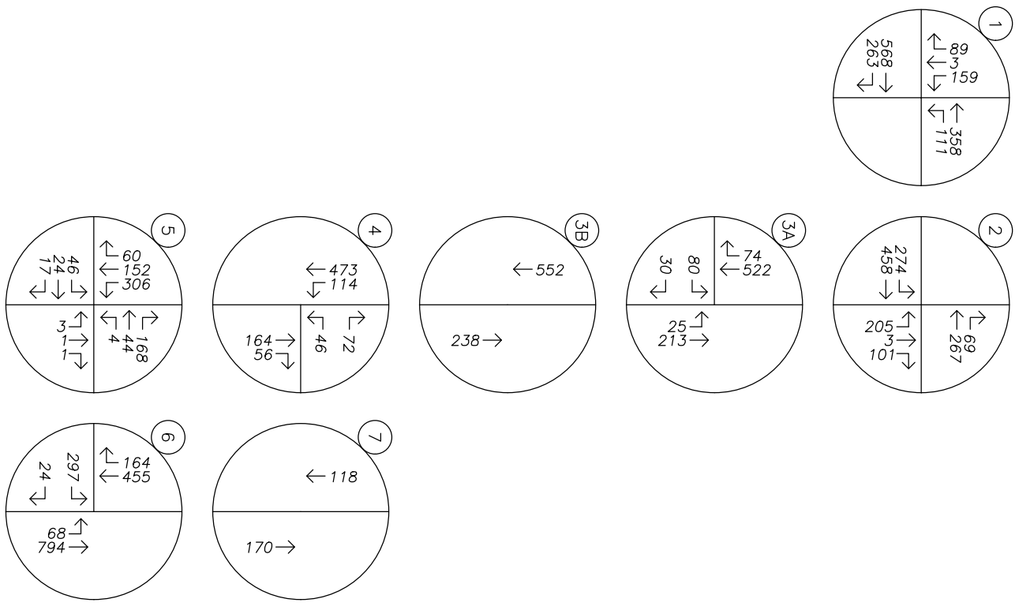
In addition to the traffic growth described above, City of Woodland staff have provided data from the currently planned Woodland Creek Subdivision. The in-process development is currently not fully contributing trips to the transportation system but may potentially be by the assumed 2023 buildout year of the proposed development. Additional trips corresponding to the in-process development were added to the 2021 existing year traffic volumes in addition to the two years of traffic growth at each of the applicable study intersections. To maintain a conservative analysis of operation at the study intersections, the in-process development was assumed to be fully built-out by year 2023.

Figure 5 shows the projected year 2023 background traffic volumes at the study intersections during the evening peak hour. A figure depicting in-process trips are included in the appendix to this report.

Buildout Conditions

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2023 background traffic volumes to obtain the expected 2023 site buildout volumes.

Figure 6 shows year 2023 buildout traffic volumes at the study intersections during the evening peak hour.



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TRAFFIC VOLUMES

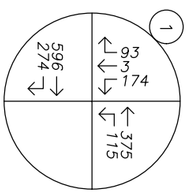
Year 2021 Existing Conditions

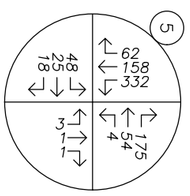
PM Peak Hour

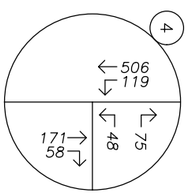
Figure 4

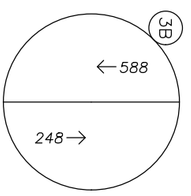
Oak Village Apartments

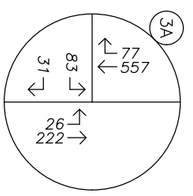
6/16/2021

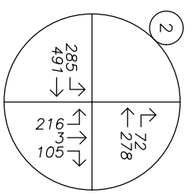


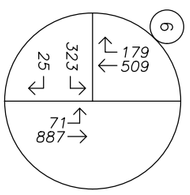


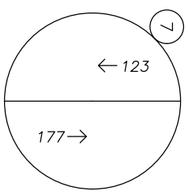












No Scale

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TRAFFIC VOLUMES

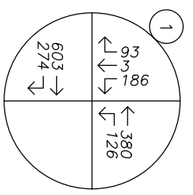
Year 2023 Background Conditions

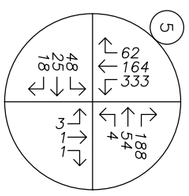
PM Peak Hour

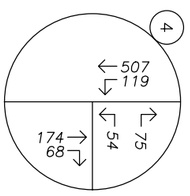
Figure 5

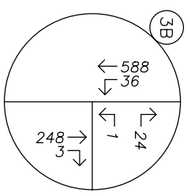
Oak Village Apartments

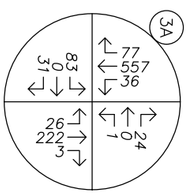
6/16/2021

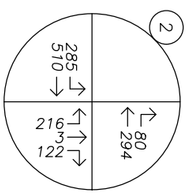


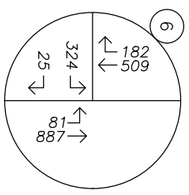


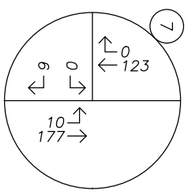












No Scale

TRAFFIC VOLUMES

Year 2023 Buildout Conditions

PM Peak Hour

Figure 6

Oak Village Apartments

6/16/2021

Safety Analysis

Crash History Review

Using data obtained from the Washington Department of Transportation (WSDOT) Crash Data and Reporting Branch, a review of the most recent available five years of crash history (January 2016 to December 2020) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.00 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

With regard to crash severity, WSDOT classifies crashes in the following categories:

- *No Apparent Injury* (NA);
- *Possible Injury* (P);
- *Suspected Minor Injury* (SM);
- *Suspected Serious Injury* (SS); and
- Fatality or Fatal Injury.

Table 4 provides a summary of crash types while Table 5 summarizes crash severities and rates for each of the study intersections. Detailed crash data is provided in the appendix to this report.

Table 4: Crash Type Summary

Number	Intersection	Crash Type						Total
		Rear End	Turn/ Angle	Fixed Object	Side swipe	Ped/ Bike	Other	
1	I-5 SB Ramps at Dike Access Road	1	2	1	2	0	1	7
2	I-5 NB Ramps at Dike Access Road	1	1	3	0	0	0	5
3	Belmont Loop at Old Pacific Highway	0	0	0	0	0	0	0
4	Green Mountain Road at Old Pacific Highway	0	0	0	0	0	1	1
5	E Scott Avenue at Old Pacific Highway	1	0	0	0	0	0	1
6	E Scott Avenue at Lewis River Road	0	0	4	0	0	0	4

Table 5: Crash Severity and Rate Summary

Number	Intersection	Crash Severity						Total Crashes	AADT	Crash Rate
		NA	P	SM	SS	Fatal	Unknown			
1	I-5 SB Ramps at Dike Access Road	6	1	0	0	0	0	7	15,510	0.25
2	I-5 NB Ramps at Dike Access Road	4	0	1	0	0	0	5	13,770	0.20
3	Belmont Loop at Old Pacific Highway	0	0	0	0	0	0	0	9,440	0.00
4	Green Mountain Road at Old Pacific Highway	0	0	1	0	0	0	1	9,250	0.06
5	E Scott Avenue at Old Pacific Highway	1	0	0	0	0	0	1	8,260	0.07
6	E Scott Avenue at Lewis River Road	4	0	0	0	0	0	4	18,020	0.12

Table Notes: ***BOLDED*** *text indicates a crash rate in excess of 1.00 CMEV.*

Based on the review of the available crash data, no significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Sight Distance Evaluation

Intersection sight distance was examined for the proposed Burris Lane public/emergency access locations along Green Mountain Road and the two potential access locations along Old Pacific Highway, opposite of Belmont Loop (north segment) and at another location approximately 350 feet to the southeast. Sight distance was measured and evaluated in accordance with standards established in *A Policy on Geometric Design of Highways and Streets*[2]. According to AASHTO, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The driver's eye-height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

[2] American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

Proposed Access along Old Pacific Highway

Based on a posted speed of 35 mph, the minimum recommended intersection sight distance along Old Pacific Highway is 350 feet to the northwest and southeast (per City of Woodland Standard Drawing T-*28 Intersection Sight Distance Requirements*). At the location opposite of Belmont Loop (north) as well as the location approximately 350 feet to the southeast, sight distances were measured to be in excess of 400 feet to the northwest and southeast.

Note that at the location approximately 350 feet southeast of Belmont Loop (north), due to topography sight distances were measured along the edge of the roadway rather than at the standard 15 feet behind the travel lane. However, no vertical/horizontal obstructions were noted that would limit sight distances to less than 350 feet if measured at the standard 15 feet (provided the minor-street approach elevation/grade approximately matches the major-street elevation).

Proposed Accesses along Green Mountain Road

Based on a posted speed of 35 mph, the minimum recommended intersection sight distance along Green Mountain Road is 350 feet to the north and south. At the proposed Burris Lane alignment location, sight distances were measured to be in excess of 400 feet to the north and south. Provided any obstructing on-site foliage along Green Mountain Road is removed, sight distances of 350 feet to the north and south of the emergency access location can be obtained.

Analysis Summary

Based on the sight distance analysis, adequate sight distances are or can be made available at all proposed/potential site access locations to ensure safe operation along Old Pacific Highway and Green Mountain Road, provided the following mitigation are implemented:

- At the potential Burris Lane location approximately 350 feet southeast of Belmont Loop, the minor-street approach will need to intersect Old Pacific Highway at approximately the same elevation/grade.
- At the proposed emergency access location along Green Mountain Road, any obstructing on-site foliage along the west side of the roadway will need to be removed to allow at least 350 feet of sight distances to the north and south.

No other sight distance related mitigation is necessary or recommended.

Warrant Analysis

Left-turn lane and preliminary traffic signal were examined for the study intersections where such treatments would be applicable.

Left-turn Lane Warrant

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants used were developed from the *National Cooperative Highway Research Project's* (NCHRP) *Report 457*. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Based on the analysis, left-turn lane warrants are projected to be met at the following study intersections:

3. Burris Lane at Old Pacific Highway (regardless of alignment location): Southeast-bound left-turn lane warranted under 2023 buildout conditions.
4. Green Mountain Road at Old Pacific Highway: Southeast-bound left-turn lane warranted under 2021 existing conditions.

No other turn lanes are projected to be warranted at the study intersections under any analysis scenario.

Preliminary Traffic Signal Warrant

Preliminary traffic signal warrants were examined for the unsignalized (non-roundabout) study intersections to determine whether the installation of a new traffic signal will be warranted at the intersections by the 2023 buildout year of the site. Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at any of the applicable study intersections under any of the analysis scenarios.

Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* (HCM)[3]. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay.

Performance Standards

According to the City of Woodland's *Transportation Infrastructure Strategic Plan,* Appendix A.1, intersections along state highways, major/minor arterials, or within the City's Urban Growth Area are required to operate at LOS D.

Delay & Capacity Analysis

The operational and capacity analysis were conducted utilizing Trafficware's Synchro 10 software. Subsequently, methodologies detailed in the *WSDOT Synchro & SimTraffic Protocol – Aug 2018* were utilized when preparing these analysis models.

The LOS and delay results of the capacity analysis are shown in Table 6 for the evening peak hour. Specific to two-way stop-controlled intersections, the highest approach delay and LOS at the intersection was reported. For roundabout and all-way stop-controlled intersection the overall LOS and delay were reported. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

[3] Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.

Table 6: Intersection Capacity Analysis Summary

	PM Peak Hour	
	LOS	Delay (s)
1. I-5 SB Ramps at Dike Access Road		
2021 Existing Conditions	D	29
2023 Background Conditions	D	29
2023 Buildout Conditions	D	33
2. I-5 NB Ramps at Dike Access Road		
2021 Existing Conditions	B	13
2023 Background Conditions	B	13
2023 Buildout Conditions	B	15
3a. Belmont Loop/Burris Lane at Old Pacific Highway (Opposite Belmont Loop)		
2021 Existing Conditions	C	19
2023 Background Conditions	C	24
2023 Buildout Conditions	D	33
3b. Burris Lane at Old Pacific Highway (South of Belmont Loop)		
2023 Buildout Conditions	B	10
4. Green Mountain Road at Old Pacific Highway		
2021 Existing Conditions	C	18
2023 Background Conditions	C	19
2023 Buildout Conditions	C	20
5. E Scott Avenue at Old Pacific Highway		
2021 Existing Conditions	C	20
2023 Background Conditions	C	23
2023 Buildout Conditions	C	25
6. E Scott Avenue at Lewis River Road		
2021 Existing Conditions	C	21
2023 Background Conditions	D	32
2023 Buildout Conditions	D	33
7. Burris Lane at Green Mountain Road		
2023 Buildout Conditions	A	9

Table Notes: ***BOLDED*** *text indicates interseciton operation above jurisdictional standards.*

Based on the results of the operational analysis, all study intersections are currently operating acceptably per City of Woodland standards and are projected to continue operating acceptably through the 2023 site buildout year. No operational mitigation is necessary or recommended at these intersections.

Queuing Analysis

As determined in the *Warrant Analysis* section, dedicated southeast-bound left-turn lanes are warranted at the proposed Burris Lane intersection along Old Pacific Highway as well as at the intersection of Green Mountain Road at Old Pacific Highway. According to City of Woodland staff, at a minimum the queue storage for each turn lane should be long enough to accommodate the projected 95th percentile queues at each respective turn lane.

To determine the minimum turn lane storage length necessary to adequately serve projected left-turn queues at these intersections a queuing analysis was conducted. The queue lengths were projected based on the results of a Synchro/SimTraffic simulation, with the reported values representing the 95th percentile queue lengths. The 95th percentile queue is a statistical measurement which indicates there is a 5 percent chance that the queue may exceed this length during the analysis period; however, given this is a probability, the 95th percentile queue length may theoretically never be met or observed in the field.

The projected 95th percentile queue lengths reported in the simulation are presented in Table 7 for the evening peak hour. It should be noted that the reported queue lengths were rounded up to the nearest five feet. Detailed queuing analysis worksheets are included in the technical appendix to this report.

Table 7: Intersection Queuing Analysis Summary

	Projected 95th Percentile Queue Length (ft)
	Evening Peak Hour
3a. Belmont Loop/Burris Lane at Old Pacific Highway (Opposite Belmont Loop)	
2023 Buildout Conditions	30
3b. Burris Lane at Old Pacific Highway (South of Belmont Loop)	
2023 Buildout Conditions	55
4. Green Mountain Road at Old Pacific Highway	
2023 Buildout Conditions	30

Based on the queuing analysis and correspondence with City of Woodland staff, at a minimum the southbound left-turn turn lanes will need to provide sufficient queue storage to accommodate the projected 95th percentile queues at the Burris Lane intersection with Old Pacific Highway (regardless of location) and Green Mountain Road at Old Pacific Highway.

Conclusions

No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Adequate sight distances are or can be made available at all proposed/potential site access locations to ensure safe operation along Old Pacific Highway and Green Mountain Road, provided the following mitigation are implemented:

- At the potential Burris Lane location approximately 350 feet southeast of Belmont Loop, the minor-street approach will need to intersect Old Pacific Highway at approximately the same elevation.
- At the proposed emergency access location along Green Mountain Road, any obstructing on-site foliage along the west side of the roadway will need to be removed to allow at least 390 feet of sight distances to the north and south.

No other sight distance related mitigation is necessary or recommended.

Left-turn lane warrants are projected to be met at the following study intersections:

- Proposed Burris Lane at Old Pacific Highway (regardless of alignment location): Southeast-bound left-turn lane warranted under 2023 buildout conditions.
- Green Mountain Road at Old Pacific Highway: Southeast-bound left-turn lane warranted under 2021 existing conditions.

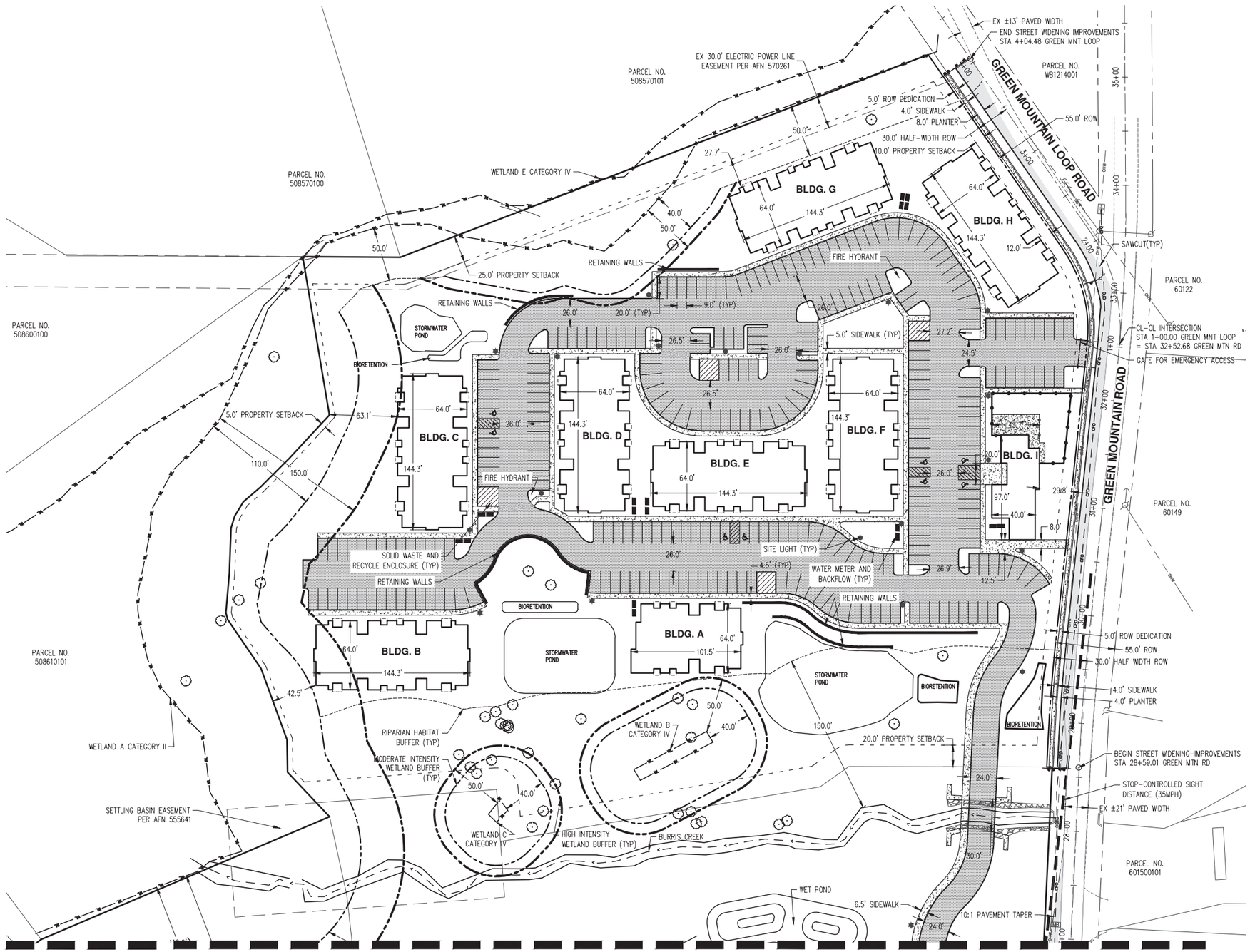
Based on the queuing analysis and correspondence with City of Woodland staff, at a minimum the southbound left-turn turn lanes will need to provide sufficient queue storage to accommodate the projected 95th percentile queues at the Burris Lane intersection with Old Pacific Highway (regardless of location) and Green Mountain Road at Old Pacific Highway.

Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at any of the applicable study intersections under any of the analysis scenarios.

All study intersections are currently operating acceptably per City of Woodland standards and are projected to continue operating acceptably through the 2023 site buildout year.

Appendix A

Site Plan



N

SCALE: 1"=50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

GENERAL NOTES

1. ROADWAY WIDENING AND FRONTAGE IMPROVEMENTS ARE PROPOSED FOR GREEN MOUNTAIN RD AND GREEN MOUNTAIN LOOP ROAD.
2. STORMWATER QUALITY AND QUANTITY REQUIREMENTS WILL BE MET THROUGH THE USE OF BIORETENTION, WET PONDS, AND DETENTION PONDS.
3. THE PROPOSED PROJECT INCLUDES THE CONSTRUCTION OF 8 APARTMENT BUILDINGS AND 1 AMENITIES BUILDING.
4. THE PROPOSED BUILDINGS WILL BE CONNECTED TO PUBLIC WATER AND SANITARY SEWER PROVIDED BY THE CITY OF WOODLAND.
5. PROPOSED LIGHTING AND LANDSCAPING NOT SHOWN FOR CLARITY. SEE P8 SHEET SERIES FOR PRELIMINARY LANDSCAPE AND LIGHTING PLAN.
6. PARKING REQUIREMENTS WERE DETERMINED PER WOODLAND MUNICIPAL CODE SECTION 17.56.050, ASSUMING ALL UNITS WILL BE ONE OR TWO BEDROOM.
7. THERE ARE NO OUTDOOR STORAGE AREA PROPOSED ON SITE.
8. TWO FIRE HYDRANT LOCATIONS ARE PROPOSED AS SHOWN ON THE RESIDENTIAL SITE.
9. SEE TYPICAL ROADWAY SECTIONS ON SHEET P6.4.

BUILDING INFORMATION

BUILDING	AREA (SF)	STORIES	UNITS
A	5,967	3	18
B	8,137	3	24
C	8,137	3	24
D	8,137	3	24
E	8,137	3	24
F	8,137	3	24
G	8,137	3	24
H	8,137	3	24
I	3,443	1	NA

OVERALL SITE STATISTICS

GROSS AREA:	1,510,870	SF	(34.68 AC)	
ROW AREA:	504,433	SF	(11.58 AC)	
NET AREA:	1,006,437	SF	(23.10 AC)	
IMPERVIOUS AREA:	210,050	SF	(4.82 AC)	(20.9%)
LANDSCAPING AREA:	515,547	SF	(11.83 AC)	(51.2%)
CRITICAL AREA:	280,840	SF	(6.45 AC)	(27.9%)

RESIDENTIAL SITE STATISTICS (PARCEL 508630-100)

GROSS AREA:	424,842	SF	(9.75 AC)	
ROW AREA:	3,528	SF	(0.08 AC)	
NET AREA:	421,314	SF	(9.67 AC)	
IMPERVIOUS AREA:	203,827	SF	(4.68 AC)	(48.4%)
LANDSCAPING AREA:	82,776	SF	(1.90 AC)	(19.5%)
CRITICAL AREA:	134,711	SF	(3.09 AC)	(32.1%)
*PARKING AREA:	105,789	SF	(2.43 AC)	(25.1%)
*LOT COVERAGE AREA:	66,369	SF	(1.52 AC)	(15.8%)

*INCLUDED IN IMPERVIOUS AREA

RESIDENTIAL SITE PARKING STATISTICS (PARCEL 508630-100)

REQUIRED: SEE NOTE 6	
REQUIRED MULTIFAMILY PARKING STALLS (1.5/UNIT*186 UNITS):	279
PROPOSED STANDARD PARKING STALLS (9' X 20'):	271
*PROPOSED ADA PARKING STALLS (9' X 20'):	8
TOTAL PROPOSED PARKING STALLS:	279

*INCLUDES 2 ADA VAN PARKING STALLS

SURFACING LEGEND

- NEW PRIVATE AC PAVEMENT
- NEW PUBLIC AC PAVEMENT
- NEW CEMENT CONCRETE SIDEWALK

AKS ENGINEERING & FORESTRY, LLC
9600 NE 126TH AVE, STE 2520
VANCOUVER, WA 98682
360.882.0419
WWW.AKS-ENG.COM

ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

PROPOSED DEVELOPMENT PLAN
OAK VILLAGE APARTMENTS
41ST AVENUE LLC
WOODLAND, WASHINGTON

BRYCE D. HANSON — STATE OF WASHINGTON — 21079 — REGISTERED PROFESSIONAL ENGINEER

DRAWING ONLY

JOB NUMBER:	8344
DATE:	06/17/2021
DESIGNED BY:	TJW/BDH
DRAWN BY:	TJW
CHECKED BY:	BDH

P6.0

AKS DRAWING FILE: 8344 P5 PROPOSED DEVELOPMENT.DWG | LAYOUT: P6.0

Appendix B

Trip Generation Calculations

TRIP GENERATION CALCULATIONS

Land Use: Multifamily Housing (Mid-Rise)
Land Use Code: 221
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 186

AM PEAK HOUR

Trip Equation: Ln(T)=0.98Ln(X)-0.98

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	16	47	63

PM PEAK HOUR

Trip Equation: Ln(T)=0.96Ln(X)-0.63

	Enter	Exit	Total
Directional Distribution	61%	39%	
Trip Ends	49	31	80

WEEKDAY

Trip Equation: T=5.45(X)-1.75

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	506	506	1,012

SATURDAY

Trip Equation: T=3.04(X)+417.11

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	491	491	982

Source: TRIP GENERATION, Tenth Edition

Appendix C

Traffic Counts

In-Process Development Trips

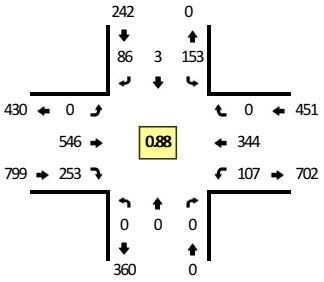
Type of peak hour being reported: Intersection Peak

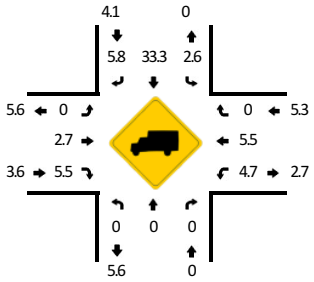
Method for determining peak hour: Total Entering Volume

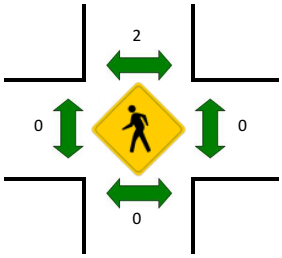
LOCATION: I-5 SB Ramps -- Dike Access Rd
CITY/STATE: Cowlitz, WA

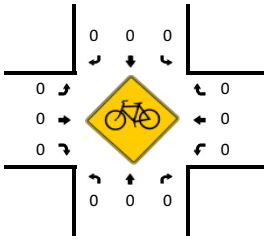
QC JOB #: 15099204
DATE: Wed, Oct 9 2019

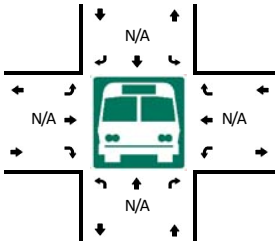
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

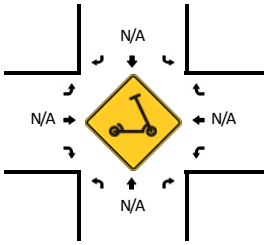












5-Min Count Period Beginning At	I-5 SB Ramps (Northbound)				I-5 SB Ramps (Southbound)				Dike Access Rd (Eastbound)				Dike Access Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	17	0	8	0	0	62	28	0	5	22	0	0	142	
4:05 PM	0	0	0	0	15	0	5	0	0	54	21	0	11	42	0	1	149	
4:10 PM	0	0	0	0	11	2	8	0	0	51	18	0	10	29	0	2	131	
4:15 PM	0	0	0	0	7	0	8	0	0	70	26	0	8	15	0	0	134	
4:20 PM	0	0	0	0	13	0	4	0	0	57	19	0	5	24	0	0	122	
4:25 PM	0	0	0	0	19	0	7	0	0	37	20	0	5	23	0	0	111	
4:30 PM	0	0	0	0	14	0	5	0	0	39	24	0	16	20	0	0	118	
4:35 PM	0	0	0	0	16	0	8	0	0	39	26	0	11	30	0	0	130	
4:40 PM	0	0	0	0	11	1	10	0	0	33	25	0	7	23	0	0	110	
4:45 PM	0	0	0	0	4	0	8	0	0	26	14	0	9	36	0	0	97	
4:50 PM	0	0	0	0	15	0	6	0	0	43	11	0	9	39	0	0	123	
4:55 PM	0	0	0	0	11	0	9	0	0	35	21	0	8	41	0	0	125	1492
5:00 PM	0	0	0	0	8	0	12	0	0	35	22	0	15	28	0	0	120	1470
5:05 PM	0	0	0	0	12	0	5	0	0	45	22	0	13	36	0	0	133	1454
5:10 PM	0	0	0	0	15	0	9	0	0	53	16	0	10	31	0	0	134	1457
5:15 PM	0	0	0	0	9	1	5	0	0	40	22	0	13	32	0	0	122	1445
5:20 PM	0	0	0	0	17	0	10	0	0	29	20	0	14	26	0	0	116	1439
5:25 PM	0	0	0	0	13	0	11	0	0	35	19	0	1	34	0	1	114	1442
5:30 PM	0	0	0	0	13	0	10	0	0	35	23	0	3	19	0	0	103	1427
5:35 PM	0	0	0	0	10	0	9	0	0	43	20	0	7	25	0	0	114	1411
5:40 PM	0	0	0	0	9	0	9	0	0	34	9	0	4	28	0	0	93	1394
5:45 PM	0	0	0	0	8	0	9	0	0	47	14	0	5	25	0	0	108	1405
5:50 PM	0	0	0	0	12	0	7	0	0	25	9	0	6	33	0	0	92	1374
5:55 PM	0	0	0	0	9	1	6	0	0	26	19	0	4	24	0	0	89	1338

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	172	8	84	0	0	668	268	0	104	372	0	12	1688
Heavy Trucks	0	0	0		4	4	4		0	48	12		4	32	0		108
Buses																	
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/10/2021 10:33 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

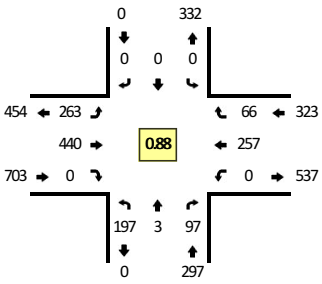
Type of peak hour being reported: Intersection Peak

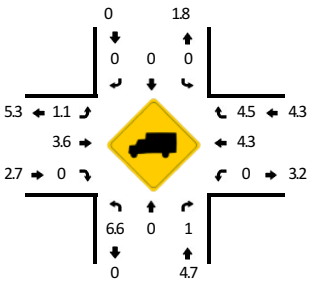
Method for determining peak hour: Total Entering Volume

LOCATION: I-5 NB Ramps -- Dike Access Rd
CITY/STATE: Cowlitz, WA

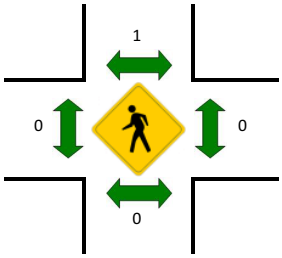
QC JOB #: 15099202
DATE: Wed, Oct 9 2019

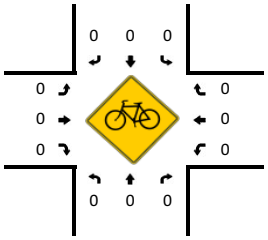
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

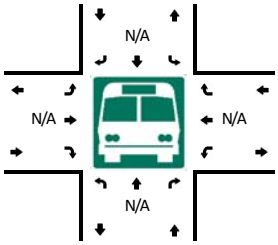


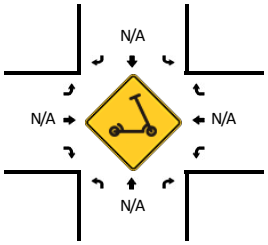


Quality Counts
DATA THAT DRIVES COMMUNITIES









5-Min Count Period Beginning At	I-5 NB Ramps (Northbound)				I-5 NB Ramps (Southbound)				Dike Access Rd (Eastbound)				Dike Access Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	9	0	11	0	0	0	0	0	24	53	0	0	0	17	6	0	120	
4:05 PM	28	0	3	0	0	0	0	0	20	51	0	0	0	27	5	0	134	
4:10 PM	18	0	6	0	0	0	0	0	25	42	0	0	0	24	6	0	121	
4:15 PM	8	0	8	0	0	0	0	0	34	40	0	0	0	12	8	0	110	
4:20 PM	17	0	6	0	0	0	0	0	32	40	0	0	0	12	4	0	111	
4:25 PM	14	0	9	0	0	0	0	0	21	35	0	0	0	15	8	0	102	
4:30 PM	10	0	8	0	0	0	0	0	20	35	0	0	0	28	8	0	109	
4:35 PM	19	0	7	0	0	0	0	0	15	37	0	0	0	24	2	0	104	
4:40 PM	12	0	8	0	0	0	0	0	22	26	0	0	0	16	3	0	87	
4:45 PM	20	0	11	0	0	0	0	0	14	14	0	0	0	29	3	0	91	
4:50 PM	22	3	10	0	0	0	0	0	21	39	0	0	0	25	6	0	126	
4:55 PM	20	0	10	0	0	0	0	0	15	28	0	0	0	28	7	0	108	1323
5:00 PM	18	0	3	0	0	0	0	0	13	30	0	0	0	24	3	0	91	1294
5:05 PM	24	1	7	0	0	0	0	0	20	35	0	0	0	25	12	0	124	1284
5:10 PM	19	0	5	0	0	0	0	0	33	36	0	0	0	21	8	0	122	1285
5:15 PM	21	0	6	0	0	0	0	0	9	39	0	0	0	26	7	0	108	1283
5:20 PM	18	0	6	0	0	0	0	0	10	37	0	0	0	20	10	0	101	1273
5:25 PM	19	0	5	0	0	0	0	0	12	36	0	0	0	17	10	0	99	1270
5:30 PM	10	0	6	0	0	0	0	0	18	32	0	0	0	12	5	0	83	1244
5:35 PM	24	0	8	0	0	0	0	0	22	32	0	0	0	12	4	0	102	1242
5:40 PM	15	0	4	0	0	0	0	0	16	27	0	0	0	14	6	0	82	1237
5:45 PM	13	0	9	0	0	0	0	0	15	39	0	0	0	17	6	0	99	1245
5:50 PM	19	0	9	0	0	0	0	0	10	26	0	0	0	18	6	0	88	1207
5:55 PM	17	0	8	0	0	0	0	0	10	25	0	0	0	12	9	0	81	1180

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	220	0	80	0	0	0	0	0	276	584	0	0	0	272	68	0	1500
Heavy Trucks	20	0	0		0	0	0		4	48	0		0	16	4		92
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/10/2021 10:34 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

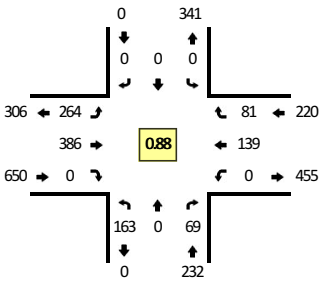
Type of peak hour being reported: Intersection Peak

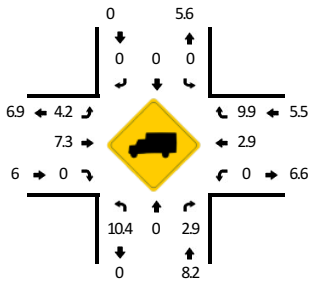
Method for determining peak hour: Total Entering Volume

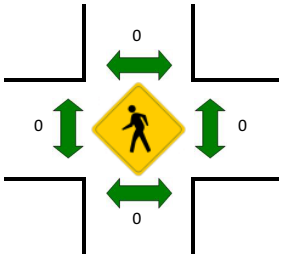
LOCATION: I-5 NB Ramps -- Dike Access Rd
CITY/STATE: Woodland, WA

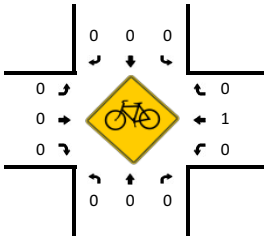
QC JOB #: 15381001
DATE: Thu, Mar 4 2021

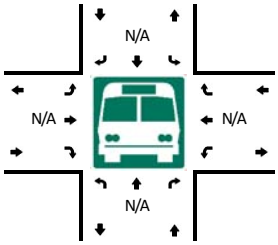
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:10 PM -- 4:25 PM

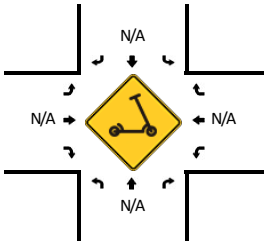












5-Min Count Period Beginning At	I-5 NB Ramps (Northbound)				I-5 NB Ramps (Southbound)				Dike Access Rd (Eastbound)				Dike Access Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	14	0	3	0	0	0	0	0	25	42	0	0	0	9	8	0	101	
4:05 PM	16	0	3	0	0	0	0	0	19	39	0	0	0	15	3	0	95	
4:10 PM	17	0	6	0	0	0	0	0	32	37	0	0	0	15	8	0	115	
4:15 PM	14	0	9	0	0	0	0	0	26	32	0	0	0	10	4	0	95	
4:20 PM	13	0	9	0	0	0	0	0	20	41	0	1	0	14	6	0	104	
4:25 PM	13	0	4	0	0	0	0	0	14	33	0	0	0	7	8	0	79	
4:30 PM	12	0	9	0	0	0	0	0	18	20	0	1	0	13	11	0	84	
4:35 PM	11	0	8	0	0	0	0	0	25	35	0	1	0	16	12	0	108	
4:40 PM	14	0	5	0	0	0	0	0	24	22	0	0	0	9	9	0	83	
4:45 PM	14	0	4	0	0	0	0	0	17	25	0	1	0	13	3	0	77	
4:50 PM	6	0	4	0	0	0	0	0	15	33	0	0	0	13	3	0	74	
4:55 PM	19	0	5	0	0	0	0	0	25	27	0	0	0	5	6	0	87	1102
5:00 PM	18	0	8	0	0	0	0	0	15	28	0	0	0	18	8	0	95	1096
5:05 PM	19	0	7	0	0	0	0	0	22	26	0	0	0	14	5	0	93	1094
5:10 PM	13	0	6	0	0	0	0	0	18	27	0	0	0	19	4	0	87	1066
5:15 PM	16	1	6	0	0	0	0	0	20	33	0	0	0	11	3	0	90	1061
5:20 PM	17	0	10	0	0	0	0	0	22	31	0	0	0	15	5	0	100	1057
5:25 PM	14	0	8	0	0	0	0	0	14	33	0	0	0	19	5	0	93	1071
5:30 PM	12	0	7	0	0	0	0	0	20	26	0	0	0	15	1	0	81	1068
5:35 PM	12	1	4	0	0	0	0	0	7	28	0	0	0	12	6	0	70	1030
5:40 PM	13	1	8	0	0	0	0	0	9	35	0	0	0	11	6	0	83	1030
5:45 PM	16	0	6	0	0	0	0	0	12	27	0	0	0	12	3	0	76	1029
5:50 PM	13	0	4	0	0	0	0	0	10	29	0	0	0	6	7	0	69	1024
5:55 PM	13	0	8	0	0	0	0	0	11	12	0	0	0	12	2	0	58	995

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	176	0	96	0	0	0	0	0	312	440	0	4	0	156	72	0	1256
Heavy Trucks	24	0	0		0	0	0		0	36	0		0	4	8		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Scooters																	

Comments:

Report generated on 3/10/2021 10:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

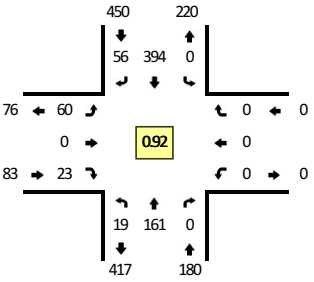
Type of peak hour being reported: Intersection Peak

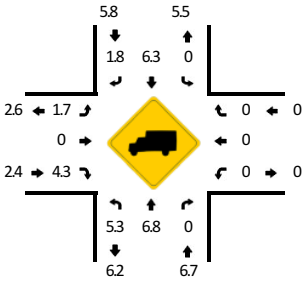
Method for determining peak hour: Total Entering Volume

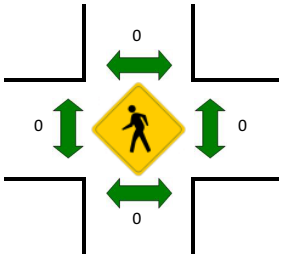
LOCATION: Old Pacific Hwy -- Belmont Loop (north)
CITY/STATE: Woodland, WA

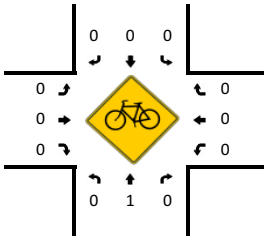
QC JOB #: 15381002
DATE: Thu, Mar 4 2021

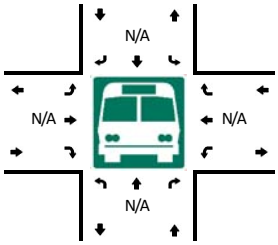
Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:10 PM -- 4:25 PM

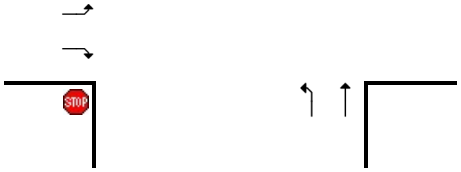


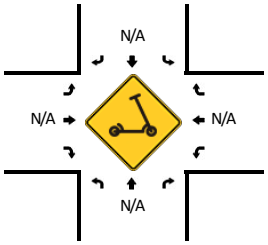












5-Min Count Period Beginning At	Old Pacific Hwy (Northbound)				Old Pacific Hwy (Southbound)				Belmont Loop (north) (Eastbound)				Belmont Loop (north) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	11	0	0	0	39	4	0	7	0	1	0	0	0	0	0	66	
4:05 PM	0	17	0	0	0	37	4	0	7	0	3	0	0	0	0	0	68	
4:10 PM	1	16	0	0	0	38	5	0	2	0	0	0	0	0	0	0	62	
4:15 PM	1	14	0	0	0	39	4	0	0	0	0	0	0	0	0	0	58	
4:20 PM	1	11	0	0	0	41	10	0	6	0	3	1	0	0	0	0	73	
4:25 PM	0	9	0	0	0	29	2	0	8	0	1	0	0	0	0	0	49	
4:30 PM	0	19	0	0	0	28	3	0	6	0	2	0	0	0	0	0	58	
4:35 PM	2	17	0	0	0	39	7	0	4	0	3	0	0	0	0	0	72	
4:40 PM	3	11	0	0	0	23	3	0	5	0	1	0	0	0	0	0	46	
4:45 PM	3	12	0	0	0	34	0	0	4	0	1	0	0	0	0	0	54	
4:50 PM	3	12	0	0	0	28	6	0	2	0	3	0	0	0	0	0	54	
4:55 PM	3	7	0	0	0	29	4	0	5	0	4	0	0	0	0	0	52	712
5:00 PM	2	16	0	0	0	29	8	0	10	0	2	0	0	0	0	0	67	713
5:05 PM	1	16	0	0	0	21	9	0	5	0	3	0	0	0	0	0	55	700
5:10 PM	1	11	0	0	0	31	4	0	7	0	7	0	0	0	0	0	61	699
5:15 PM	3	18	0	0	0	38	6	0	2	0	1	0	0	0	0	0	68	709
5:20 PM	1	12	0	0	0	30	4	0	8	0	2	0	0	0	0	0	57	693
5:25 PM	2	15	0	0	0	33	9	0	4	0	1	0	0	0	0	0	64	708
5:30 PM	2	6	0	0	0	30	6	0	9	0	2	0	0	0	0	0	55	705
5:35 PM	0	15	0	0	0	26	6	0	6	0	5	0	0	0	0	0	58	691
5:40 PM	1	8	0	0	0	37	5	0	5	0	1	0	0	0	0	0	57	702
5:45 PM	0	11	0	0	0	29	3	0	4	0	0	0	0	0	0	0	47	695
5:50 PM	0	10	0	0	0	25	7	0	3	0	2	0	0	0	0	0	47	688
5:55 PM	1	9	0	0	0	17	3	0	5	0	3	0	0	0	0	0	38	674

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	164	0	0	0	472	76	0	32	0	12	4	0	0	0	0	772
Heavy Trucks	0	12	0		0	36	0		4	0	0		0	0	0		52
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/10/2021 10:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

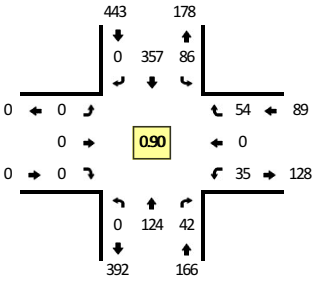
Type of peak hour being reported: Intersection Peak

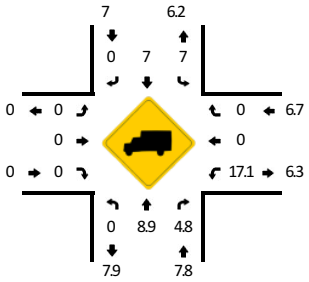
Method for determining peak hour: Total Entering Volume

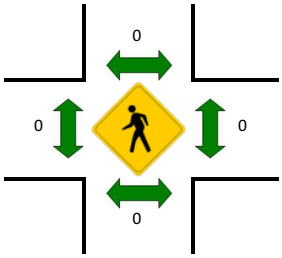
LOCATION: Old Pacific Hwy -- Green Mountain Rd
CITY/STATE: Woodland, WA

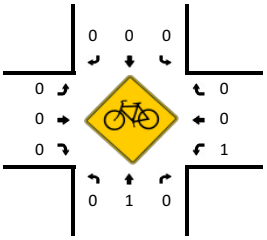
QC JOB #: 15381003
DATE: Thu, Mar 4 2021

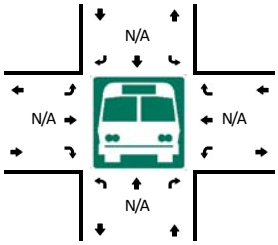
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

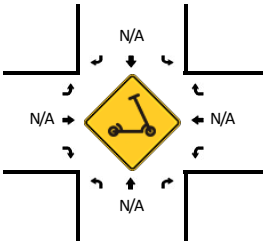












5-Min Count Period Beginning At	Old Pacific Hwy (Northbound)				Old Pacific Hwy (Southbound)				Green Mountain Rd (Eastbound)				Green Mountain Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	10	7	0	8	38	0	0	0	0	0	0	2	0	4	0	69	
4:05 PM	0	9	6	0	5	37	0	0	0	0	0	0	4	0	6	0	67	
4:10 PM	0	14	2	0	4	32	0	0	0	0	0	0	2	0	4	0	58	
4:15 PM	0	12	2	0	9	29	0	0	0	0	0	0	3	0	4	0	59	
4:20 PM	0	9	4	0	11	33	0	0	0	0	0	0	2	0	3	0	62	
4:25 PM	0	9	6	0	7	27	0	0	0	0	0	0	0	0	2	0	51	
4:30 PM	0	12	9	0	6	23	0	0	0	0	0	0	6	0	7	0	63	
4:35 PM	0	11	1	0	10	36	0	0	0	0	0	0	3	0	8	0	69	
4:40 PM	0	8	2	0	6	20	0	0	0	0	0	0	3	0	8	0	47	
4:45 PM	0	10	1	0	9	27	0	0	0	0	0	0	3	0	2	0	52	
4:50 PM	0	13	1	0	7	25	0	0	0	0	0	0	5	0	3	0	54	
4:55 PM	0	7	1	0	4	30	0	0	0	0	0	0	2	0	3	0	47	698
5:00 PM	0	11	2	0	4	26	0	0	0	0	0	0	2	0	7	0	52	681
5:05 PM	0	11	6	0	6	19	0	0	0	0	0	0	2	0	4	0	48	662
5:10 PM	0	8	3	0	9	28	0	0	0	0	0	0	2	0	4	0	54	658
5:15 PM	0	17	1	0	9	32	0	0	0	0	0	0	0	0	4	0	63	662
5:20 PM	0	10	2	0	8	25	0	0	0	0	0	0	1	0	5	0	51	651
5:25 PM	0	12	4	0	6	31	0	0	0	0	0	0	4	0	3	0	60	660
5:30 PM	0	11	5	0	12	22	0	0	0	0	0	0	1	0	0	0	51	648
5:35 PM	0	9	1	0	5	30	0	0	0	0	0	0	4	0	5	0	54	633
5:40 PM	0	5	2	0	12	28	0	0	0	0	0	0	0	0	3	0	50	636
5:45 PM	0	7	4	0	10	24	0	0	0	0	0	0	3	0	3	0	51	635
5:50 PM	0	9	3	0	4	25	0	0	0	0	0	0	0	0	2	0	43	624
5:55 PM	0	8	5	0	6	15	0	0	0	0	0	0	2	0	2	0	38	615

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	132	60	0	68	428	0	0	0	0	0	0	32	0	56	0	776
Heavy Trucks	0	12	8		16	60	0		0	0	0		4	0	0		100
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	4	0		0	0	0		0	0	0		4	0	0		8
Scooters																	

Comments:

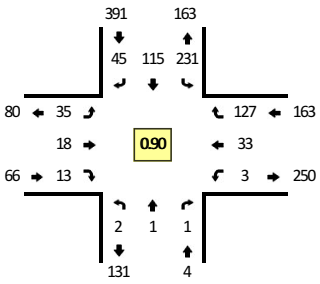
Report generated on 3/10/2021 10:35 AM

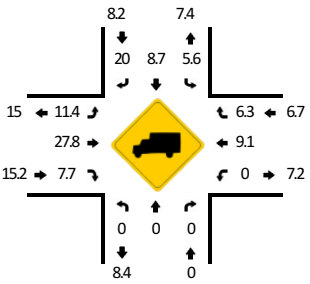
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

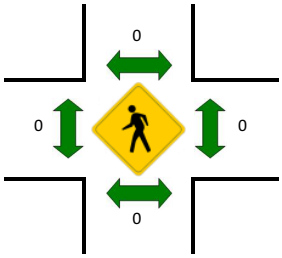
LOCATION: Old Pacific Hwy -- E Scott Ave | **QC JOB #:** 15381004
CITY/STATE: Woodland, WA | **DATE:** Thu, Mar 4 2021

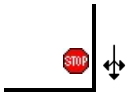
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:05 PM -- 4:20 PM

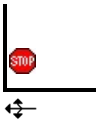


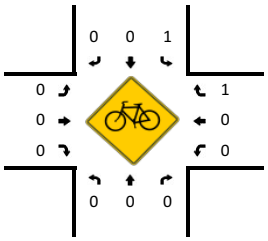


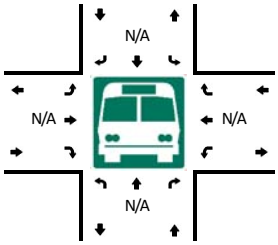
Quality Counts
DATA THAT DRIVES COMMUNITIES

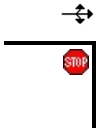


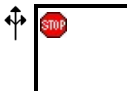


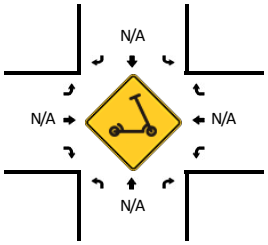












5-Min Count Period Beginning At	Old Pacific Hwy (Northbound)				Old Pacific Hwy (Southbound)				E Scott Ave (Eastbound)				E Scott Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	25	8	4	0	6	1	1	0	0	2	10	0	57	
4:05 PM	0	0	0	0	26	9	6	0	3	1	1	0	0	3	10	0	59	
4:10 PM	0	0	0	0	21	10	6	0	2	1	1	0	0	2	13	0	56	
4:15 PM	1	0	0	0	25	9	2	0	4	3	2	0	1	1	10	0	58	
4:20 PM	0	0	0	0	18	5	4	0	2	2	1	0	0	0	10	0	42	
4:25 PM	0	0	0	0	18	14	1	0	5	4	1	0	0	4	9	0	56	
4:30 PM	0	1	0	0	10	11	4	0	4	0	1	0	0	1	20	0	52	
4:35 PM	0	0	1	0	22	12	4	0	1	0	0	0	0	2	10	0	52	
4:40 PM	1	0	0	0	17	10	1	0	1	2	0	0	1	2	7	0	42	
4:45 PM	0	0	0	0	10	9	7	0	5	2	5	0	0	9	8	0	55	
4:50 PM	0	0	0	0	21	11	3	0	1	1	0	0	0	4	12	0	53	
4:55 PM	0	0	0	0	18	7	3	0	1	1	0	0	1	3	8	0	42	624
5:00 PM	0	0	1	0	19	6	6	0	1	3	1	0	0	5	12	0	54	621
5:05 PM	0	0	0	0	14	7	1	0	3	1	0	0	0	4	11	0	41	603
5:10 PM	0	1	0	0	20	9	2	0	2	2	2	0	0	5	8	0	51	598
5:15 PM	0	0	0	0	17	6	2	0	0	0	0	0	1	5	16	0	47	587
5:20 PM	0	0	0	0	21	7	3	0	5	3	0	0	1	6	10	0	56	601
5:25 PM	0	0	0	0	20	11	3	0	3	0	1	0	0	4	14	0	56	601
5:30 PM	0	0	0	0	11	10	0	0	2	1	0	0	1	3	11	0	39	588
5:35 PM	0	0	0	0	24	10	3	0	0	1	1	0	1	4	9	0	53	589
5:40 PM	0	0	0	0	17	6	3	0	1	1	0	0	0	2	8	0	38	585
5:45 PM	0	0	0	0	18	12	3	0	1	2	0	0	0	3	10	0	49	579
5:50 PM	0	0	0	0	16	7	0	0	2	1	1	0	0	3	12	0	42	568
5:55 PM	0	0	0	0	15	2	1	0	2	0	1	0	0	5	10	0	36	562

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	288	112	56	0	36	20	16	0	4	24	132	0	692
Heavy Trucks	0	0	0		20	24	12		8	4	4		0	4	8		84
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		4	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 3/10/2021 10:35 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

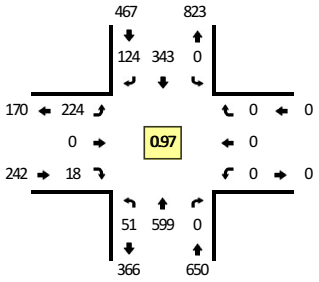
Type of peak hour being reported: Intersection Peak

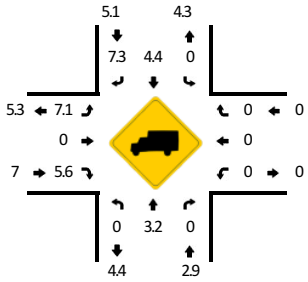
Method for determining peak hour: Total Entering Volume

LOCATION: Lewis River Rd -- E Scott Ave
CITY/STATE: Woodland, WA

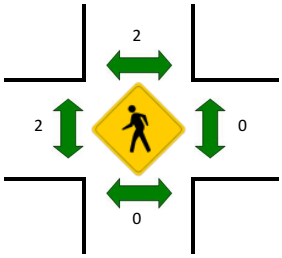
QC JOB #: 15381005
DATE: Thu, Mar 4 2021

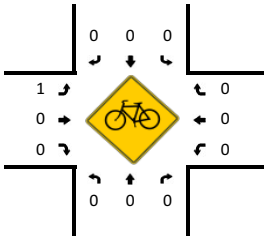
Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:20 PM -- 4:35 PM

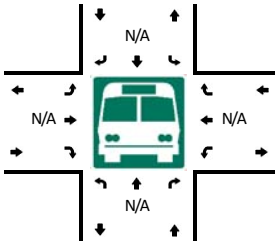


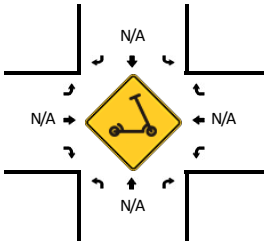


Quality Counts
DATA THAT DRIVES COMMUNITIES









5-Min Count Period Beginning At	Lewis River Rd (Northbound)				Lewis River Rd (Southbound)				E Scott Ave (Eastbound)				E Scott Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	37	0	0	0	30	9	0	27	0	2	0	0	0	0	0	109	
4:05 PM	4	41	0	0	0	28	10	1	20	0	3	0	0	0	0	0	107	
4:10 PM	3	46	0	1	0	28	12	0	25	0	0	0	0	0	0	0	115	
4:15 PM	5	48	0	0	0	20	7	0	23	0	4	0	0	0	0	0	107	
4:20 PM	3	55	0	0	0	29	6	0	25	0	0	0	0	0	0	0	118	
4:25 PM	3	54	0	0	0	30	11	0	20	0	0	0	0	0	0	0	118	
4:30 PM	6	56	0	2	0	24	15	0	13	0	0	0	0	0	0	0	116	
4:35 PM	4	57	0	0	0	27	8	0	14	0	4	0	0	0	0	0	114	
4:40 PM	3	46	0	0	0	31	6	0	18	0	3	0	0	0	0	0	107	
4:45 PM	4	39	0	0	0	37	13	0	12	0	0	0	0	0	0	0	105	
4:50 PM	4	56	0	0	0	29	13	0	20	0	1	0	0	0	0	0	123	
4:55 PM	5	39	0	1	0	34	7	0	18	0	1	0	0	0	0	0	105	1344
5:00 PM	3	47	0	1	0	25	14	0	21	0	5	0	0	0	0	0	116	1351
5:05 PM	3	56	0	0	0	29	12	0	15	0	0	0	0	0	0	0	115	1359
5:10 PM	7	39	0	0	0	22	9	0	19	0	2	0	0	0	0	0	98	1342
5:15 PM	6	37	0	0	0	25	16	0	18	0	1	0	0	0	0	0	103	1338
5:20 PM	6	45	0	0	0	19	9	0	22	0	1	0	0	0	0	0	102	1322
5:25 PM	2	54	0	0	0	24	15	1	15	0	2	0	0	0	0	0	113	1317
5:30 PM	4	44	0	0	0	22	12	1	11	0	1	0	0	0	0	0	95	1296
5:35 PM	6	48	0	0	0	26	8	0	22	0	2	0	0	0	0	0	112	1294
5:40 PM	4	45	0	0	0	13	6	1	23	0	0	0	0	0	0	0	92	1279
5:45 PM	6	47	0	1	0	19	9	0	17	0	0	0	0	0	0	0	99	1273
5:50 PM	4	38	0	0	0	24	10	0	15	0	1	0	0	0	0	0	92	1242
5:55 PM	4	50	0	0	0	22	9	0	19	0	1	0	0	0	0	0	105	1242

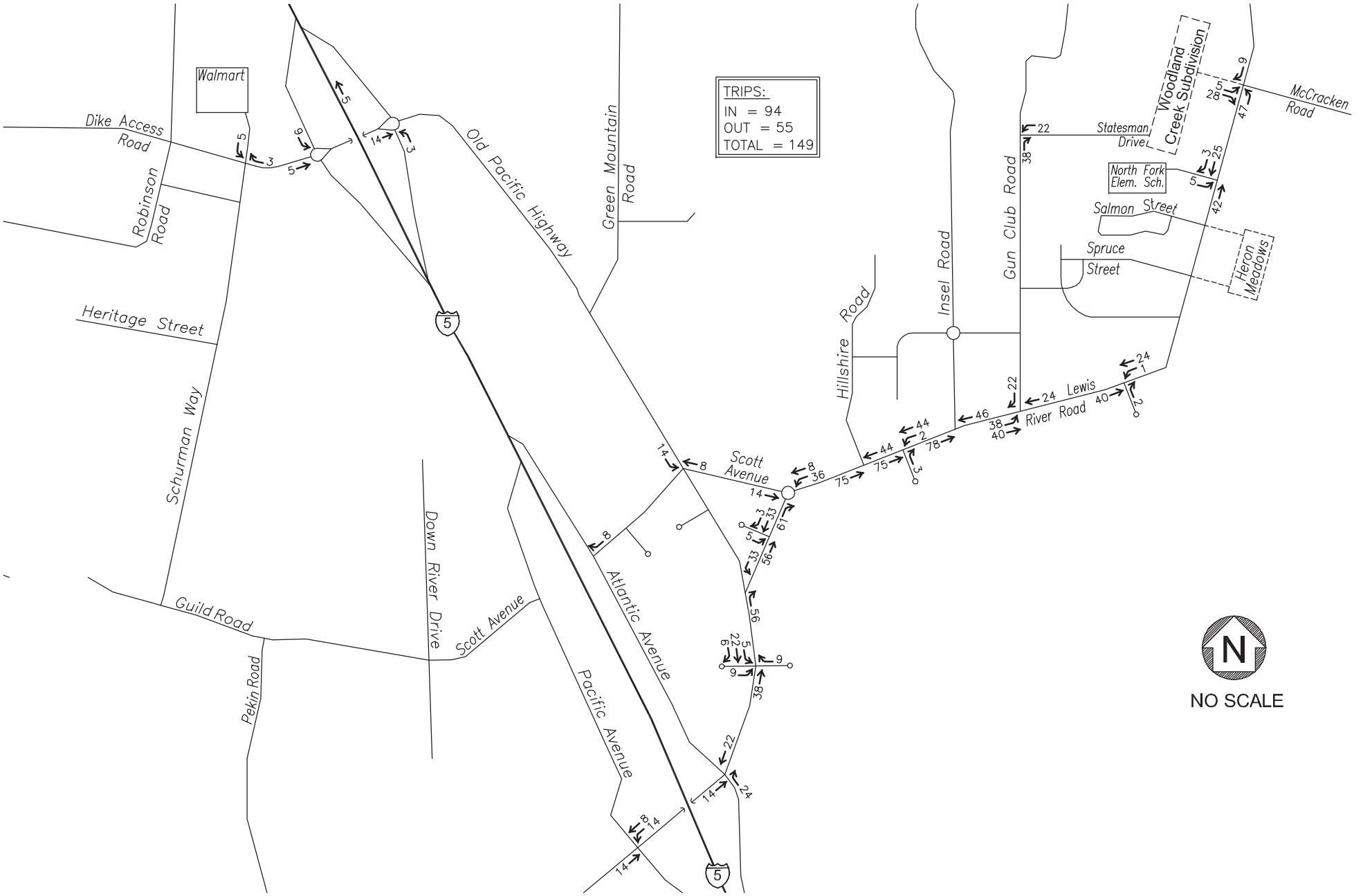
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	660	0	8	0	332	128	0	232	0	0	0	0	0	0	0	1408
Heavy Trucks	0	16	0		0	20	16		12	0	0		0	0	0		64
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/10/2021 10:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

PLOT DATE: 11.10.2020 FILE: 2020-26flow.dwg



CHARBONNEAU ENGINEERING LLC

PROJECT: 2020-26

NOTES: Trip generation calculated with Single-Family Residential (ITE 210) trip rates.

TRIP ASSIGNMENT
PM PEAK HOUR
WOODLAND CREEK SUBDIVISION

FIGURE 5b

Appendix D

Crash History Data

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

STATE ROUTES

SR 005LX02272 (aka Dike Access Rd, mp 0.00 - 0.06) @ SB SR 5 ON/OFF-RAMPS

SR 005R102312 (mp 0.36 - 0.38) @ DIKE ACCESS RD

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES
State Route	Cowlitz	Woodland	005LX02272							0.04		No	E620649	12/13/2016	17:15	No Apparent Injury	0	0	2	0	0
State Route	Cowlitz	Woodland	005LX02272							0.04		No	E636825	01/28/2017	06:46	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	005LX02272							0.04		No	E758328	01/12/2018	05:56	Possible Injury	1	0	2	0	0
State Route	Cowlitz	Woodland	005LX02272							0.04		No	E874994	12/21/2018	12:55	No Apparent Injury	0	0	2	0	0
State Route	Cowlitz	Woodland	005LX02272							0.04		No	E909374	04/08/2019	11:26	No Apparent Injury	0	0	2	0	0
State Route	Cowlitz	Woodland	005LX02272							0.05		No	E920724	05/16/2019	08:01	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	005R102312							0.36		No	EA46657	07/12/2020	17:15	No Apparent Injury	0	0	2	0	0

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

STATE ROUTES

SR 005LX02272 (aka Dike Access Rd, mp 0.00 - 0.06) @ SB SR 5 ON/OFF-RAMPS

SR 005R102312 (mp 0.36 - 0.38) @ DIKE ACCESS RD

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)
Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Entering Roundabout	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Slowing	East	West	West	East	Other Contributing Circ Not Listed	
Passenger Car		Circulating Roundabout	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Street Light Pole or Base	Going Straight Ahead		West	East			Inattention	Exceeding Stated Speed Limit
Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Entering Roundabout	Overcast	Wet	Dark-Street Lights On	Entering at angle	Making Right Turn	Going Straight Ahead	North	West	East	West	Did Not Grant RW to Vehicle	
Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Entering Roundabout	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Merging (Entering Traffic)	Going Straight Ahead	South	East	West	East	Did Not Grant RW to Vehicle	
Truck - Double Trailer Combinations	Pickup,Panel Truck or Vanette under 10,000 lb	Entering Roundabout	Raining	Wet	Daylight	Same direction -- both turning right -- both moving -- sideswipe	Making Right Turn	Making Right Turn	North	West	North	West	None	
Pickup,Panel Truck or Vanette under 10,000 lb		Circulating Roundabout	Raining	Wet	Daylight	Vehicle overturned	Going Straight Ahead		West	East			Exceeding Reas. Safe Speed	
Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Roundabout Related but not at Roundabout	Clear	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Going Straight Ahead	Going Straight Ahead	North	South	North	South	Exceeding Reas. Safe Speed	

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

STATE ROUTES

SR 005LX02272 (aka Dike Access Rd, mp 0.00 - 0.06) @ SB SR 5 ON/OFF-RAMPS

SR 005R102312 (mp 0.36 - 0.38) @ DIKE ACCESS RD

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
	None			Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)	1065920.8	224696.55
Exceeding Reas. Safe Speed				Past Right Shoulder LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)	1065915.3	224703.5
	None			Lane 1 LX Decreasing Milepost	1065916.03	224701.63
	None			Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)	1065914.74	224700.6
	Inattention			Lane 1 LX Decreasing Milepost	1065916.03	224701.63
				Past Right Shoulder LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)	1065966.74	224721.18
	None			Lane 1 Off Ramp Decreasing Milepost Side of Mainline	1065894.99	224802.08

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

STATE ROUTES

SR 005LX02272 (aka Dike Access Rd, mp 0.16 - 0.23) @ NB SR 5 ON/OFF-RAMPS

SR 005P102343 (mp 0.30 - 0.32) @ DIKE ACCESS RD

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES
State Route	Cowlitz	Woodland	005LX02272							0.18		No	E612837	11/24/2016	19:10	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	005LX02272							0.18		No	E656061	03/27/2017	02:50	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	005LX02272							0.18		No	EA05091	01/20/2020	14:15	Suspected Minor Injury	1	0	1	0	0
State Route	Cowlitz	Woodland	005LX02272							0.18		No	EA08787	01/28/2020	16:10	No Apparent Injury	0	0	2	0	0
State Route	Cowlitz	Woodland	005P102243							0.32		No	E808272	06/08/2018	18:12	No Apparent Injury	0	0	2	0	0

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

STATE ROUTES

SR 005LX02272 (aka Dike Access Rd, mp 0.16 - 0.23) @ NB SR 5 ON/OFF-RAMPS

SR 005P102343 (mp 0.30 - 0.32) @ DIKE ACCESS RD

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)
Pickup,Panel Truck or Vanette under 10,000 lb		Exiting Roundabout	Raining	Wet	Dark-Street Lights On	Metal Sign Post	Going Straight Ahead		West	East			Other Contributing Circ Not Listed	
Passenger Car		Circulating Roundabout	Raining	Wet	Dark-Street Lights On	Metal Sign Post	Going Straight Ahead		West	East			Other Contributing Circ Not Listed	
Passenger Car		At Intersection and Related	Overcast	Dry	Daylight	Traffic Island	Going Straight Ahead		South	East			Unknown Distraction	
Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Entering Roundabout	Overcast	Dry	Daylight	Entering at angle	Making Right Turn	Stopped for Traffic	North	East	West	Vehicle Stopped	Follow Too Closely	
Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Entering Roundabout	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Stopped for Traffic	Going Straight Ahead	Vehicle Stopped	Vehicle Stopped	South	North	None	

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

STATE ROUTES

SR 005LX02272 (aka Dike Access Rd, mp 0.16 - 0.23) @ NB SR 5 ON/OFF-RAMPS

SR 005P102343 (mp 0.30 - 0.32) @ DIKE ACCESS RD

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
				Increasing Other Location	1066628.12	224976.15
				Decreasing Other Location	1066621	224979.73
				Past Right Shoulder LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)	1066628.85	224977.6
	None			Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)	1066627.98	224977.39
	Follow Too Closely			Lane 1 Off Ramp Increasing Milepost Side of Mainline	1066628.93	224977.63

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

BELMONT LP @ OLD PACIFIC HWY - No intersection related crashes

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

BELMONT LP @ OLD PACIFIC HWY - No intersection related crashes

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

BELMONT LP @ OLD PACIFIC HWY - No intersection related crashes

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

GREEN MTN RD @ OLD PACIFIC HWY

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES
City Street	Cowlitz	Woodland	OLD PACIFIC HWY	0	GREEN MOUNTAIN RD							No	E717038	09/27/2017	07:50	Suspected Minor Injury	1	0	1	0	0

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

GREEN MTN RD @ OLD PACIFIC HWY

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)
Motorcycle		At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Going Straight Ahead		South	North			None	

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

GREEN MTN RD @ OLD PACIFIC HWY

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
				Lane of Primary Trafficway	1068200.97	223469.26

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

SCOTT AVE @ OLD PACIFIC HWY / GOERIG ST

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES
City Street	Cowlitz	Woodland	E SCOTT AVE	9900	OLD PACIFIC HWY							No	E964779	09/25/2019	14:44	No Apparent Injury	0	0	2	0	0

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

SCOTT AVE @ OLD PACIFIC HWY / GOERIG ST

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)
Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	West	East	Vehicle Stopped	Vehicle Stopped	Other Contributing Circ Not Listed	

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

SCOTT AVE @ OLD PACIFIC HWY / GOERIG ST

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
	None			Lane of Primary Trafficway	1069293.94	221287.39

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

SCOTT AVE @ LEWIS RIVER RD

STATE ROUTES

SR 503 (aka Lewis River Rd, mp 53.51 - 53.55) @ SCOTT AVE

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES
State Route	Cowlitz	Woodland	503							53.53		No	E564878	07/18/2016	20:20	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	503							53.53		No	E643111	02/11/2017	02:56	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	503							53.53		No	E688109	07/04/2017	15:32	No Apparent Injury	0	0	1	0	0
State Route	Cowlitz	Woodland	503							53.55		No	E884702	01/20/2019	14:06	No Apparent Injury	0	0	1	0	0

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

SCOTT AVE @ LEWIS RIVER RD

STATE ROUTES

SR 503 (aka Lewis River Rd, mp 53.51 - 53.55) @ SCOTT AVE

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)
Pickup,Panel Truck or Vanette under 10,000 lb		Circulating Roundabout	Clear or Partly Cloudy	Dry	Daylight	Metal Sign Post	Going Straight Ahead		Northeast	Southwest			Other Contributing Circ Not Listed	
Passenger Car		Circulating Roundabout	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Metal Sign Post	Making Left Turn		East	Southwest			Under Influence of Alcohol	
Passenger Car		Circulating Roundabout	Clear or Partly Cloudy	Dry	Daylight	Metal Sign Post	Going Straight Ahead		East	South			Inattention	
Passenger Car		Circulating Roundabout	Overcast	Wet	Daylight	Traffic Island	Making Left Turn		East	Southwest			Inattention	

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS IN THE CITY OF WOODLAND

CITY STREETS

SCOTT AVE @ LEWIS RIVER RD

STATE ROUTES

SR 503 (aka Lewis River Rd, mp 53.51 - 53.55) @ SCOTT AVE

01/01/2016 - 12/31/2020 *See 2nd tab below for road information & interchange drawing for reference*

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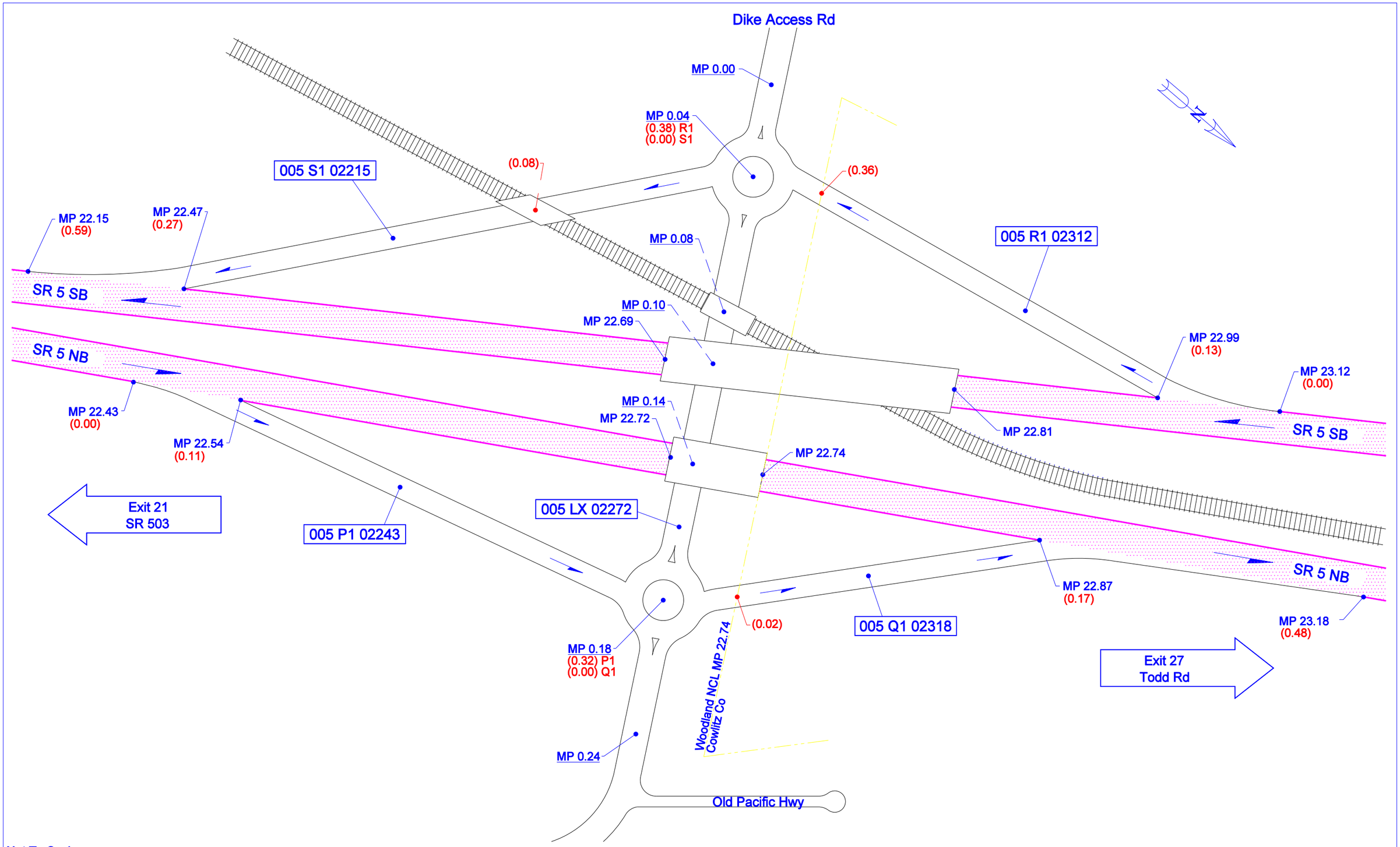
MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
				Past Right Shoulder Increasing Milepost	1070248.62	220946.79
				Past Right Shoulder Increasing Milepost	1070258.3	220965.62
				Past Right Shoulder Increasing Milepost	1070253.42	220951.1
				Increasing Other Location	1070231.81	220878.81



Not To Scale

10/12/2011	KLK	WSDOT SOUTHWEST REGION	WOODLAND, COWLITZ COUNTY	JUNCTION DIKE ACCESS RD	SR 5 - EXIT 22

Appendix E

Left-turn Lane Warrant Analysis

Preliminary Signal Warrant Analysis

Left-Turn Lane Warrant Analysis

Project: Oak Village Apartments
Intersection: 3a. Belmont Loop/Burris Lane at Old Pacific Highway
Date: 6/16/2021
Scenario: 2023 Buildout Conditions - PM Peak Hour (SB)

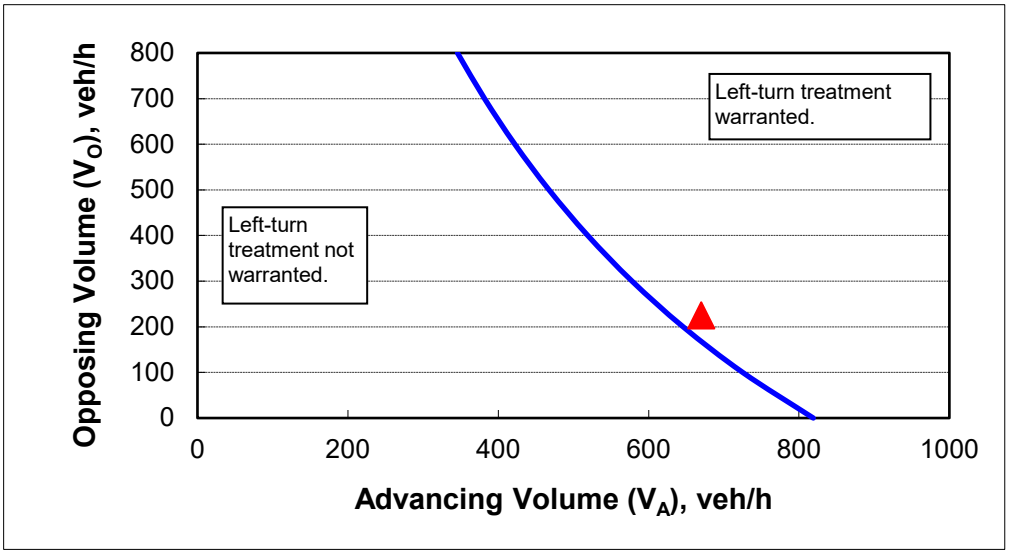
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	5%
Advancing volume (V_A), veh/h:	670
Opposing volume (V_O), veh/h:	225

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	628
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Oak Village Apartments
Intersection: 3a. Burris Lane at Old Pacific Highway
Date: 6/16/2021
Scenario: 2023 Buildout Conditions - PM Peak Hour (SB)

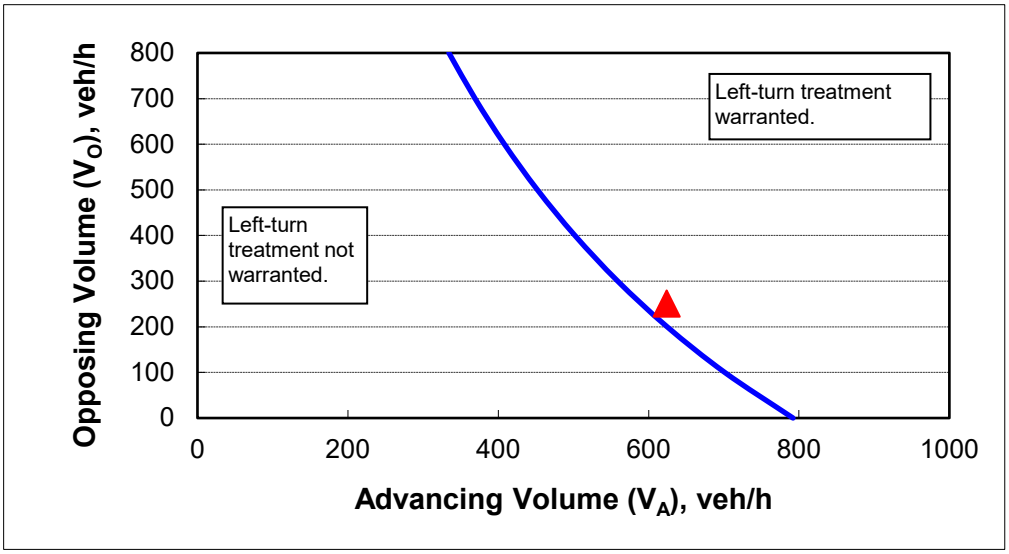
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	6%
Advancing volume (V_A), veh/h:	624
Opposing volume (V_O), veh/h:	251

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	590
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Oak Village Apartments
Intersection: 4. Green Mountain Road at Old Pacific Highway
Date: 6/16/2021
Scenario: 2021 Existing Conditions - PM Peak Hour (SB)

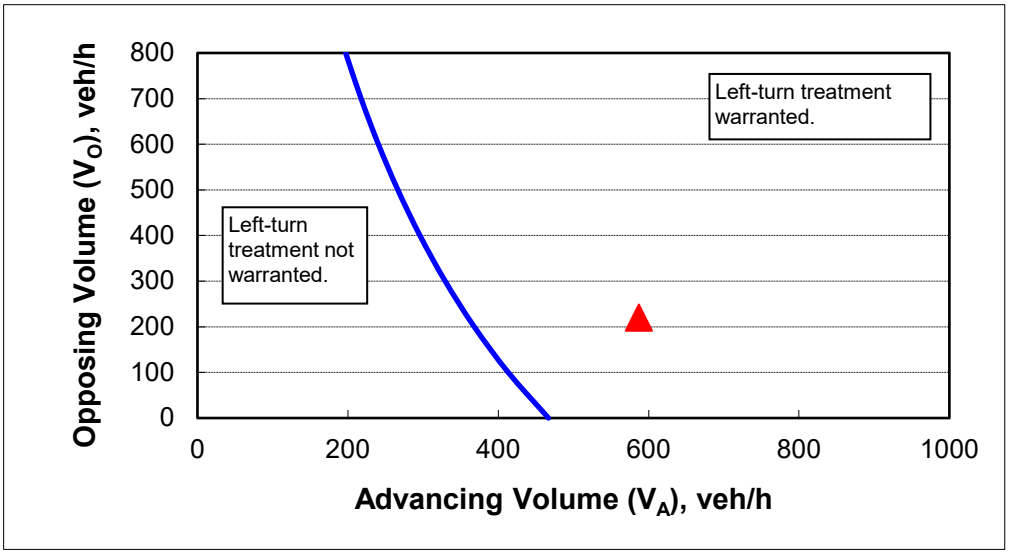
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	19%
Advancing volume (V_A), veh/h:	587
Opposing volume (V_O), veh/h:	220

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	360
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Oak Village Apartments
Intersection: 7. Belmont Road at Green Mountain Road
Date: 6/16/2021
Scenario: 2023 Buildout Conditions - PM Peak Hour (NB)

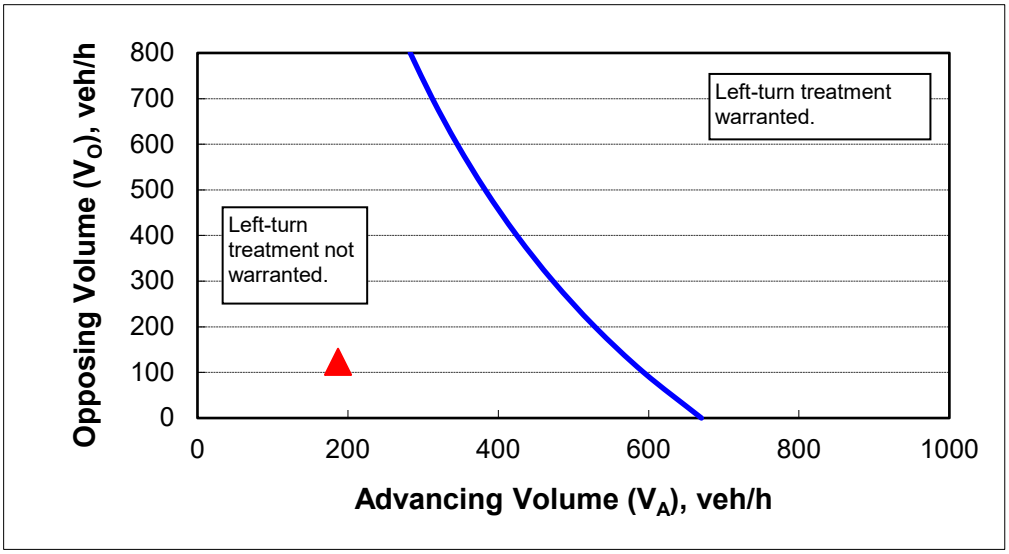
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	5%
Advancing volume (V_A), veh/h:	187
Opposing volume (V_O), veh/h:	123

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	578
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Traffic Signal Warrant Analysis

Project: Oak Village Apartments
Date: 6/16/2021
Scenario: 2023 Buildout Conditions

	Major Street:	Minor Street:
	Old Pacific Highway	Belmont Loop (North)
Number of Lanes:	1	1
PM Peak Hour Volumes:	921	106

Warrant Used:

	100 percent of standard warrants used
X	70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100% Warrants	70% Warrants	100% Warrants	70% Warrants
Major St.	Minor St.				
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	9,210	6,200	
Minor Street*	1,060	1,850	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	9,210	9,300	
Minor Street*	1,060	950	**No**
Combination Warrant			
Major Street	9,210	7,440	
Minor Street*	1,060	1,480	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: Oak Village Apartments
Date: 6/16/2021
Scenario: 2023 Buildout Conditions

	Major Street:	Minor Street:
Number of Lanes:	1	1
PM Peak Hour Volumes:	868	110

Warrant Used:

	100 percent of standard warrants used
X	70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	8,680	6,200	
Minor Street*	1,100	1,850	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	8,680	9,300	
Minor Street*	1,100	950	**No**
Combination Warrant			
Major Street	8,680	7,440	
Minor Street*	1,100	1,480	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: Oak Village Apartments
Date: 6/16/2021
Scenario: 2023 Buildout Conditions

Major Street:	Old Pacific Hwy/E Scott Ave	Minor Street:	E Scott Avenue (West Leg)
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	805	PM Peak Hour Volumes:	87

Warrant Used:

	100 percent of standard warrants used
X	70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	8,050	6,200	
Minor Street*	870	1,850	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	8,050	9,300	
Minor Street*	870	950	**No**
Combination Warrant			
Major Street	8,050	7,440	
Minor Street*	870	1,480	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Appendix F

Level of Service Descriptions

Capacity Reports

Queuing Reports

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Intersection Delay, s/veh	28.9
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	1	1	0	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	944	533	0	285
Demand Flow Rate, veh/h	982	559	0	296
Vehicles Circulating, veh/h	323	0	859	559
Vehicles Exiting, veh/h	532	859	446	0
Ped Vol Crossing Leg, #/h	0	0	0	2
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	47.4	6.6	0.0	9.6
Approach LOS	E	A	-	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LTR
Assumed Moves	TR	LT	LTR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	982	559	296
Cap Entry Lane, veh/h	993	1380	780
Entry HV Adj Factor	0.961	0.953	0.962
Flow Entry, veh/h	944	533	285
Cap Entry, veh/h	954	1315	751
V/C Ratio	0.989	0.405	0.379
Control Delay, s/veh	47.4	6.6	9.6
LOS	E	A	A
95th %tile Queue, veh	18	2	2

Intersection	
Intersection Delay, s/veh	13.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	0
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	831	381	351	0
Demand Flow Rate, veh/h	856	396	369	0
Vehicles Circulating, veh/h	0	568	856	560
Vehicles Exiting, veh/h	560	657	0	404
Ped Vol Crossing Leg, #/h	0	0	0	1
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.1	12.4	20.7	0.0
Approach LOS	B	B	C	-

Lane	Left	Left	Left
Designated Moves	LT	TR	LTR
Assumed Moves	LT	TR	LTR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	856	396	369
Cap Entry Lane, veh/h	1380	773	576
Entry HV Adj Factor	0.971	0.962	0.951
Flow Entry, veh/h	831	381	351
Cap Entry, veh/h	1340	744	548
V/C Ratio	0.620	0.512	0.640
Control Delay, s/veh	10.1	12.4	20.7
LOS	B	B	C
95th %tile Queue, veh	5	3	5

Intersection	
Int Delay, s/veh	2.5

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	522	74	25	213	80	30
Future Vol, veh/h	522	74	25	213	80	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	80	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	2	2
Mvmt Flow	567	80	27	232	87	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	647	0	893	607
Stage 1	-	-	-	-	607	-
Stage 2	-	-	-	-	286	-
Critical Hdwy	-	-	4.17	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.263	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	915	-	312	496
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	763	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	915	-	303	496
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	740	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1	19.2
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	SET	SER
Capacity (veh/h)	303	496	915	-	-	-
HCM Lane V/C Ratio	0.287	0.066	0.03	-	-	-
HCM Control Delay (s)	21.6	12.8	9.1	-	-	-
HCM Lane LOS	C	B	A	-	-	-
HCM 95th %tile Q(veh)	1.2	0.2	0.1	-	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	72	164	56	114	473
Future Vol, veh/h	46	72	164	56	114	473
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	7	7	8	8	7	7
Mvmt Flow	51	80	182	62	127	526

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	993	213	0	0	244	0
Stage 1	213	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	4.17	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	2.263	-
Pot Cap-1 Maneuver	266	815	-	-	1293	-
Stage 1	811	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	229	815	-	-	1293	-
Mov Cap-2 Maneuver	229	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	381	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.9	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	408	1293	-
HCM Lane V/C Ratio	-	-	0.321	0.098	-
HCM Control Delay (s)	-	-	17.9	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.3	-

Intersection	
Intersection Delay, s/veh	20.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	46	24	17	4	44	168	3	1	1	306	152	60
Future Vol, veh/h	46	24	17	4	44	168	3	1	1	306	152	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	15	15	15	7	7	7	0	0	0	8	8	8
Mvmt Flow	51	27	19	4	49	187	3	1	1	340	169	67
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.4	11.3	8.8	26
HCM LOS	B	B	A	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	53%	2%	59%
Vol Thru, %	20%	28%	20%	29%
Vol Right, %	20%	20%	78%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	87	216	518
LT Vol	3	46	4	306
Through Vol	1	24	44	152
RT Vol	1	17	168	60
Lane Flow Rate	6	97	240	576
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.164	0.354	0.811
Departure Headway (Hd)	5.732	6.125	5.307	5.071
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	623	585	677	719
Service Time	3.779	4.174	3.349	3.071
HCM Lane V/C Ratio	0.01	0.166	0.355	0.801
HCM Control Delay	8.8	10.4	11.3	26
HCM Lane LOS	A	B	B	D
HCM 95th-tile Q	0	0.6	1.6	8.5

Intersection	
Intersection Delay, s/veh	21.4
Intersection LOS	C

Approach	EB	NB	SW
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	331	889	638
Demand Flow Rate, veh/h	354	916	669
Vehicles Circulating, veh/h	492	327	72
Vehicles Exiting, veh/h	249	519	1171
Ped Vol Crossing Leg, #/h	2	0	2
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	10.1	34.7	8.7
Approach LOS	B	D	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	354	916	669
Cap Entry Lane, veh/h	835	989	1282
Entry HV Adj Factor	0.935	0.971	0.954
Flow Entry, veh/h	331	889	638
Cap Entry, veh/h	781	959	1222
V/C Ratio	0.424	0.927	0.522
Control Delay, s/veh	10.1	34.7	8.7
LOS	B	D	A
95th %tile Queue, veh	2	14	3

Intersection	
Intersection Delay, s/veh	28.4
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	1	1	0	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	936	527	0	290
Demand Flow Rate, veh/h	974	553	0	301
Vehicles Circulating, veh/h	327	0	861	553
Vehicles Exiting, veh/h	527	861	440	0
Ped Vol Crossing Leg, #/h	0	0	0	2
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	46.5	6.6	0.0	9.6
Approach LOS	E	A	-	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LTR
Assumed Moves	TR	LT	LTR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	974	553	301
Cap Entry Lane, veh/h	989	1380	785
Entry HV Adj Factor	0.961	0.953	0.963
Flow Entry, veh/h	936	527	290
Cap Entry, veh/h	950	1315	756
V/C Ratio	0.985	0.401	0.384
Control Delay, s/veh	46.5	6.6	9.6
LOS	E	A	A
95th %tile Queue, veh	18	2	2

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	0
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	844	380	352	0
Demand Flow Rate, veh/h	869	395	370	0
Vehicles Circulating, veh/h	0	569	869	561
Vehicles Exiting, veh/h	561	670	0	403
Ped Vol Crossing Leg, #/h	0	0	0	1
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.3	12.4	21.5	0.0
Approach LOS	B	B	C	-

Lane	Left	Left	Left
Designated Moves	LT	TR	LTR
Assumed Moves	LT	TR	LTR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	869	395	370
Cap Entry Lane, veh/h	1380	772	569
Entry HV Adj Factor	0.971	0.962	0.951
Flow Entry, veh/h	844	380	352
Cap Entry, veh/h	1340	743	541
V/C Ratio	0.630	0.511	0.651
Control Delay, s/veh	10.3	12.4	21.5
LOS	B	B	C
95th %tile Queue, veh	5	3	5

Intersection	
Int Delay, s/veh	2.6

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	557	77	26	222	83	31
Future Vol, veh/h	557	77	26	222	83	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	80	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	2	2
Mvmt Flow	605	84	28	241	90	34

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	689	0	944	647
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	-	-	4.17	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.263	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	882	-	291	471
Stage 1	-	-	-	-	521	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	882	-	282	471
Mov Cap-2 Maneuver	-	-	-	-	282	-
Stage 1	-	-	-	-	521	-
Stage 2	-	-	-	-	730	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1	20.8
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	SET	SER
Capacity (veh/h)	282	471	882	-	-	-
HCM Lane V/C Ratio	0.32	0.072	0.032	-	-	-
HCM Control Delay (s)	23.7	13.2	9.2	-	-	-
HCM Lane LOS	C	B	A	-	-	-
HCM 95th %tile Q(veh)	1.3	0.2	0.1	-	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	75	171	58	119	506
Future Vol, veh/h	48	75	171	58	119	506
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	8	8	7	7
Mvmt Flow	52	82	186	63	129	550

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1026	218	0	0	249	0
Stage 1	218	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	4.17	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	2.263	-
Pot Cap-1 Maneuver	254	809	-	-	1288	-
Stage 1	807	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	217	809	-	-	1288	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	392	1288	-
HCM Lane V/C Ratio	-	-	0.341	0.1	-
HCM Control Delay (s)	-	-	18.9	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0.3	-

Intersection	
Intersection Delay, s/veh	23.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	25	18	4	54	175	3	1	1	332	158	62
Future Vol, veh/h	48	25	18	4	54	175	3	1	1	332	158	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	15	15	15	7	7	7	0	0	0	8	8	8
Mvmt Flow	52	27	20	4	59	190	3	1	1	361	172	67
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.6	11.8	9	30.3
HCM LOS	B	B	A	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	53%	2%	60%
Vol Thru, %	20%	27%	23%	29%
Vol Right, %	20%	20%	75%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	91	233	552
LT Vol	3	48	4	332
Through Vol	1	25	54	158
RT Vol	1	18	175	62
Lane Flow Rate	5	99	253	600
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.172	0.381	0.852
Departure Headway (Hd)	5.855	6.245	5.417	5.114
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	610	574	664	708
Service Time	3.907	4.292	3.458	3.14
HCM Lane V/C Ratio	0.008	0.172	0.381	0.847
HCM Control Delay	9	10.6	11.8	30.3
HCM Lane LOS	A	B	B	D
HCM 95th-tile Q	0	0.6	1.8	9.8

Intersection	
Intersection Delay, s/veh	31.6
Intersection LOS	D

Approach	EB	NB	SW
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	348	958	688
Demand Flow Rate, veh/h	373	987	722
Vehicles Circulating, veh/h	534	346	73
Vehicles Exiting, veh/h	261	561	1260
Ped Vol Crossing Leg, #/h	2	0	2
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.3	54.9	9.5
Approach LOS	B	F	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	373	987	722
Cap Entry Lane, veh/h	800	970	1281
Entry HV Adj Factor	0.933	0.971	0.953
Flow Entry, veh/h	348	958	688
Cap Entry, veh/h	747	941	1220
V/C Ratio	0.466	1.018	0.564
Control Delay, s/veh	11.3	54.9	9.5
LOS	B	F	A
95th %tile Queue, veh	2	20	4

Intersection	
Intersection Delay, s/veh	33.1
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	1	1	0	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	943	544	0	303
Demand Flow Rate, veh/h	981	571	0	315
Vehicles Circulating, veh/h	353	0	882	571
Vehicles Exiting, veh/h	533	882	452	0
Ped Vol Crossing Leg, #/h	0	0	0	2
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	55.6	6.7	0.0	10.2
Approach LOS	F	A	-	B

Lane	Left	Left	Left
Designated Moves	TR	LT	LTR
Assumed Moves	TR	LT	LTR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	981	571	315
Cap Entry Lane, veh/h	963	1380	771
Entry HV Adj Factor	0.961	0.952	0.962
Flow Entry, veh/h	943	544	303
Cap Entry, veh/h	925	1314	741
V/C Ratio	1.019	0.414	0.409
Control Delay, s/veh	55.6	6.7	10.2
LOS	F	A	B
95th %tile Queue, veh	20	2	2

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	0
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	864	407	371	0
Demand Flow Rate, veh/h	890	423	390	0
Vehicles Circulating, veh/h	0	569	890	580
Vehicles Exiting, veh/h	580	711	0	412
Ped Vol Crossing Leg, #/h	0	0	0	1
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.7	13.3	24.7	0.0
Approach LOS	B	B	C	-

Lane	Left	Left	Left
Designated Moves	LT	TR	LTR
Assumed Moves	LT	TR	LTR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	890	423	390
Cap Entry Lane, veh/h	1380	772	557
Entry HV Adj Factor	0.971	0.963	0.951
Flow Entry, veh/h	864	407	371
Cap Entry, veh/h	1340	743	529
V/C Ratio	0.645	0.548	0.701
Control Delay, s/veh	10.7	13.3	24.7
LOS	B	B	C
95th %tile Queue, veh	5	3	5

Intersection	
Int Delay, s/veh	4.2

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	36	557	77	26	222	3	83	0	31	1	0	24
Future Vol, veh/h	36	557	77	26	222	3	83	0	31	1	0	24
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	-	-	-	80	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	7	7	7	2	2	2	2	2	2
Mvmt Flow	39	605	84	28	241	3	90	0	34	1	0	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	244	0	0	689	0	0	1037	1025	647	1041	1066	243
Stage 1	-	-	-	-	-	-	725	725	-	299	299	-
Stage 2	-	-	-	-	-	-	312	300	-	742	767	-
Critical Hdwy	4.16	-	-	4.17	-	-	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	2.254	-	-	2.263	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1299	-	-	882	-	-	209	235	471	208	222	796
Stage 1	-	-	-	-	-	-	416	430	-	710	666	-
Stage 2	-	-	-	-	-	-	699	666	-	408	411	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1299	-	-	882	-	-	190	216	471	181	204	796
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	216	-	181	204	-
Stage 1	-	-	-	-	-	-	396	409	-	675	645	-
Stage 2	-	-	-	-	-	-	655	645	-	360	391	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	1	32.7	10.3
HCM LOS			D	B

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	190	471	882	-	-	1299	-	-	701
HCM Lane V/C Ratio	0.475	0.072	0.032	-	-	0.03	-	-	0.039
HCM Control Delay (s)	40	13.2	9.2	-	-	7.9	0	-	10.3
HCM Lane LOS	E	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	2.3	0.2	0.1	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	75	174	68	119	507
Future Vol, veh/h	54	75	174	68	119	507
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	8	8	7	7
Mvmt Flow	59	82	189	74	129	551

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1035	226	0	0	263	0
Stage 1	226	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	4.17	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	2.263	-
Pot Cap-1 Maneuver	251	801	-	-	1273	-
Stage 1	800	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	214	801	-	-	1273	-
Mov Cap-2 Maneuver	214	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	367	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.3	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	373	1273	-
HCM Lane V/C Ratio	-	-	0.376	0.102	-
HCM Control Delay (s)	-	-	20.3	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.7	0.3	-

Intersection	
Intersection Delay, s/veh	24.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	48	25	18	4	54	188	3	1	1	333	164	62
Future Vol, veh/h	48	25	18	4	54	188	3	1	1	333	164	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	15	15	15	7	7	7	0	0	0	8	8	8
Mvmt Flow	52	27	20	4	59	204	3	1	1	362	178	67
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.7	12.2	9	32.8
HCM LOS	B	B	A	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	53%	2%	60%
Vol Thru, %	20%	27%	22%	29%
Vol Right, %	20%	20%	76%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	91	246	559
LT Vol	3	48	4	333
Through Vol	1	25	54	164
RT Vol	1	18	188	62
Lane Flow Rate	5	99	267	608
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.173	0.404	0.871
Departure Headway (Hd)	5.93	6.306	5.444	5.158
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	601	568	660	705
Service Time	3.986	4.361	3.489	3.183
HCM Lane V/C Ratio	0.008	0.174	0.405	0.862
HCM Control Delay	9	10.7	12.2	32.8
HCM Lane LOS	A	B	B	D
HCM 95th-tile Q	0	0.6	2	10.5

Intersection	
Intersection Delay, s/veh	33.3
Intersection LOS	D

Approach	EB	NB	SW
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	349	968	691
Demand Flow Rate, veh/h	374	997	725
Vehicles Circulating, veh/h	534	347	83
Vehicles Exiting, veh/h	274	561	1261
Ped Vol Crossing Leg, #/h	2	0	2
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.3	58.1	9.7
Approach LOS	B	F	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	374	997	725
Cap Entry Lane, veh/h	800	969	1268
Entry HV Adj Factor	0.933	0.971	0.953
Flow Entry, veh/h	349	968	691
Cap Entry, veh/h	747	940	1208
V/C Ratio	0.467	1.029	0.572
Control Delay, s/veh	11.3	58.1	9.7
LOS	B	F	A
95th %tile Queue, veh	3	21	4

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	6	10	177	123	0
Future Vol, veh/h	0	6	10	177	123	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	7	7	7	7
Mvmt Flow	0	7	11	192	134	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	348	134	134	0	-	0
Stage 1	134	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.17	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.263	-	-	-
Pot Cap-1 Maneuver	649	915	1420	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	643	915	1420	-	-	-
Mov Cap-2 Maneuver	643	-	-	-	-	-
Stage 1	884	-	-	-	-	-
Stage 2	822	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1420	-	915	-	-
HCM Lane V/C Ratio	0.008	-	0.007	-	-
HCM Control Delay (s)	7.6	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	36	588	248	3	1	24
Future Vol, veh/h	36	588	248	3	1	24
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, %	6	6	7	7	2	2
Mvmt Flow	39	639	270	3	1	26

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	989	272
Stage 1	-	-	-	-	272	-
Stage 2	-	-	-	-	717	-
Critical Hdwy	4.16	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.254	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1267	-	-	-	274	767
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	484	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1267	-	-	-	261	767
Mov Cap-2 Maneuver	-	-	-	-	261	-
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	484	-

Approach	SE	NW	SW
HCM Control Delay, s	0.5	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1267	-	712
HCM Lane V/C Ratio	-	-	0.031	-	0.038
HCM Control Delay (s)	-	-	7.9	0	10.3
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.1

Intersection: 3: Belmont Loop/Burris Lane & Old Pacific Highway

Movement	SE	SE	NW	NE	NE	SW
Directions Served	L	TR	L	L	TR	LTR
Maximum Queue (ft)	42	13	50	89	67	44
Average Queue (ft)	8	0	14	40	22	18
95th Queue (ft)	30	7	42	74	57	45
Link Distance (ft)		601			591	416
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	500		80	100		
Storage Blk Time (%)			0	1		
Queuing Penalty (veh)			0	0		

Intersection: 4: Old Pacific Highway & Green Mountain Road

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	89	8	64
Average Queue (ft)	40	0	22
95th Queue (ft)	70	4	54
Link Distance (ft)	1597	2369	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			500
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 103: Old Pacific Highway & Burris Lane

Movement	SE	SW
Directions Served	L	LR
Maximum Queue (ft)	39	44
Average Queue (ft)	6	17
95th Queue (ft)	27	44
Link Distance (ft)		599
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0